



TEXAS A&M
UNIVERSITY

A black and white photograph of a bronze statue of a man with a beard and mustache, wearing a suit and tie. The statue is positioned in the foreground, looking slightly to the left. In the background, there is a large, domed building, likely the Texas State Capitol, partially obscured by trees.

TEXAS A&M
UNIVERSITY
2008–2009

UNDERGRADUATE CATALOG ★ EDITION 131

Accreditation

Texas A&M University is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools (1866 Southern Lane, Decatur, Georgia 30033-4097, 404-679-4501) to award degrees at the bachelors', masters', doctoral and professional levels. The curriculum in architecture is accredited by the National Architectural Accrediting Board; the curriculum in urban and regional planning is accredited by the Planning Accreditation Board; the curriculum in landscape architecture is accredited by the Landscape Architectural Accreditation Board and the curriculum in construction science is accredited by the American Council for Construction Education. The clinical psychology program in the Department of Psychology and the counseling psychology and school psychology program in the Department of Educational Psychology are accredited by the American Psychological Association. The veterinary medicine degree program is accredited by the American Veterinary Medical Association Council on Education. The medical education degree program is fully accredited by the Liaison Committee on Medical Education. The curriculum in forestry is accredited by the Society of American Foresters and the curriculum in rangeland ecology and management is accredited by the Society for Range Management. The curriculum in nutritional sciences and the dietetic internship are accredited by the Commission on Accreditation for Dietetics Education. Within the Look College of Engineering, the undergraduate programs in aerospace, agricultural, biological systems, biomedical, chemical, civil, computer, electrical, industrial, mechanical, nuclear, ocean, petroleum and radiological health engineering are accredited by the Engineering Accreditation Commission of ABET, Inc. (formerly the Accreditation Board for Engineering and Technology). The electronics, manufacturing, mechanical, and telecommunications engineering technology programs are accredited by the Technology Accreditation Commission of ABET, Inc. The manufacturing and mechanical engineering technology program, a meld of the manufacturing engineering technology and mechanical engineering technology programs, will be submitted for accreditation review at the next general review of the engineering technology programs in 2006–2007. The computer science program is accredited by the Computing Accreditation Commission of ABET, Inc. The baccalaureate and master's curricula in Mays Business School are accredited by the Association to Advance Collegiate Schools of Business (AACSB). The curriculum in recreation, park and tourism sciences is accredited by the National Recreation and Park Association. Other accrediting agencies which have approved programs offered at the University are the American Chemical Society and the American Society of Agricultural Engineers. The Agricultural Systems Management curriculum is recognized by the American Society for Agricultural Engineering. The Food Science and Technology curriculum is approved by the Institute of Food Technologists. Programs in professional education and degrees conferred by Texas A&M University are approved by the State Board of Educator Certification for certification and salary qualification purposes and are fully accredited by the National Council for Accreditation of Teacher Education.

Purpose of Catalog

The purpose of this catalog is to provide information about the academic programs of Texas A&M University to students, prospective students, faculty and staff of the University. Included is information concerning admissions, academic regulations and requirements, services available to students, academic offerings and a list of the administrative officers and faculty of the University. While every effort has been made to make this catalog as complete and accurate as possible, changes may occur at any time in requirements, deadlines, fees, curricula and courses listed in this catalog.

Students should refer to the Web site courses.tamu.edu for course offerings in any given semester. For administrative reasons, because of insufficient enrollment or because of limited resources, any given course might not be offered in the announced semester.

The provisions of this catalog do not constitute a contract, express or implied, between any applicant, student, faculty or staff member of Texas A&M University or The Texas A&M University System. This catalog is for informational purposes only. The university reserves the right to change or alter any statement herein without prior notice. This catalog should not be interpreted to allow a student that begins his or her education under the catalog to continue the program under the provisions in the catalog.

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Academic Calendar

2008 Summer Term I*

May 23	Last day to register for first term and pay fees, 5 p.m.
May 26	Memorial Day. Faculty and staff holiday.
May 27	First day of first term classes.
May 30	Last day for adding/dropping courses for the first term, 5 p.m. Last day to apply for degrees to be awarded in August for students completing degree requirements in the first term, 5 p.m.
June 16	Last day for all students to drop courses with no penalty for the first term (Q-drop), 5 p.m. Last day to change Kinesiology 198/199 grade type for the first term on the Web site myrecord.tamu.edu , 5 p.m. Last day to officially withdraw from the University for the first term, 5 p.m.
June 27	Last day of first term classes.
June 30	First term final examinations.
July 3	First term final grades due in Office of the Registrar, noon.
August 8	Last day for August undergraduate degree candidates to apply for Tuition Rebate, 5 p.m.

2008 Summer Term II*

June 30	Last day to register for the second term and pay fees, 5 p.m.
July 1	First day of second term classes.
July 3	Last day to apply for degrees to be awarded in August for students completing degree requirement in the second term, 5 p.m.
July 4	Independence Day holiday.
July 7	Last day for adding/dropping courses for the second term, 5 p.m.
July 22	Last day for all students to drop courses with no penalty for the second term (Q-drop), 5 p.m. Last day to change Kinesiology 198/199 grade type for the second term on the Web site myrecord.tamu.edu , 5 p.m. Last day to officially withdraw from the University for the second term, 5 p.m.
August 4	Last day of second term classes.
August 5–6	Second term final examinations for all students.
August 7	Grades for degree candidates from departments due in Office of the Registrar, noon.
August 8	Commencement and Commissioning. Last day for August undergraduate degree candidates to apply for Tuition Rebate, 5 p.m.
August 9	Texas A&M University at Galveston Commencement.
August 11	Final grades for second term due in Office of the Registrar, noon.

2008 10-Week Summer Semester*

May 23	Last day to register for 10-week semester and pay fees, 5 p.m.
May 26	Memorial Day. Faculty and staff holiday.
May 27	First day of 10-week semester classes.
May 30	Last day for adding/dropping courses for the 10-week semester, 5 p.m.
June 30	No 10-week semester classes.
July 3	Last day to apply for degrees to be awarded in August for students completing degree requirements in the 10-week semester, 5 p.m.
July 4	Independence Day holiday.
July 16	Last day for all students to drop courses with no penalty for the 10-week semester (Q-drop), 5 p.m. Last day to officially withdraw from the University for the 10-week semester.
August 4	Last day of 10-week semester classes.
August 5–6	10-week semester final examinations for all students.
August 7	Grades for degree candidates from departments due in Office of the Registrar, noon.
August 8	Commencement and Commissioning. Last day for August undergraduate degree candidates to apply for Tuition Rebate, 5 p.m.
August 9	Texas A&M University at Galveston Commencement.
August 11	Final grades for 10-week semester due in Office of the Registrar, noon.

*These dates are subject to change.

2008 Fall Semester*

August 22	Last day to register for fall semester classes and pay fees, 5 p.m.
August 24	Freshman Convocation.
August 25	First day of fall semester classes.
August 29	Last day for adding/dropping courses for the fall semester, 5 p.m.
September 5	Academic Convocation Last day to apply for all degrees to be awarded in December, 5 p.m.
October 13	Mid-semester grades due in Office of the Registrar, noon
October 31	Last day for all students to drop courses with no penalty (Q-drop), 5 p.m. Last day to change Kinesiology 198/199 grade type on the Web site myrecord.tamu.edu, 5 p.m. Last day to officially withdraw from the University, 5 p.m.
November 13– December 2	Preregistration for 2009 spring semester.
November 18	Bonfire 1999 Remembrance Day.
November 27–28	Thanksgiving holiday.
December 1	Redefined day, students attend their Friday classes. Prep day, classes meet. No regular course exams (except for laboratory and one-hour classes) shall be given on these days.
December 2	Last day of fall semester classes. Redefined day, students attend their Thursday classes. Prep day, classes meet. No regular course exams (except for laboratory and one-hour classes) shall be given on these days.
December 3–4	Reading days, no classes.
December 5, 8–10	Fall semester final examinations for all students.
December 12	Last day for December undergraduate degree candidates to apply for Tuition Rebate, 5 p.m.
December 12–13	Commencement and Commissioning.
December 15	Final grades for all students due in Office of the Registrar, noon.
December 24–January 2	Faculty and staff holiday.

2009 Spring Semester*

January 16	Last day to register for the spring semester and pay fees, 5 p.m.
January 19	Martin Luther King, Jr. Day. Faculty and staff holiday.
January 20	First day of spring semester classes.
January 26	Last day for adding/dropping courses for the spring semester, 5 p.m.
January 30	Last day to apply for all degrees to be awarded in May, 5 p.m.
March 9	Mid-semester grades due in Office of the Registrar, noon
March 16–20	Spring break.
March 18–20	Faculty and staff holiday.
April 6	Last day for all students to drop courses with no penalty (Q-drop), 5 p.m. Last day to change Kinesiology 198/199 grade type on the Web site myrecord.tamu.edu, 5 p.m. Last day to officially withdraw from the University, 5 p.m.
April 10	Reading day, no classes.
April 16–May 1	Preregistration for the 2009 first term, second term, 10-week summer semester and fall semester.
April 21	Muster. Campus ceremony.
May 4	Prep day, classes meet. No regular course exams (except for laboratory and one-hour classes) shall be given on these days.
May 5	Last day of spring semester classes. Redefined day, students attend their Friday classes. Prep day, classes meet. No regular course exams (except for laboratory and one-hour classes) shall be given on these days.
May 6-7	Reading days, no classes.
May 8, 11–13	Spring semester final examinations for all students.
May 15	Last day for May undergraduate degree candidates to apply for Tuition Rebate, 5 p.m.
May 15–16	Commencement, Commissioning and Final Review.
May 18	Final grades for all students due in Office of the Registrar, noon.

*These dates are subject to change.

2009 Summer Term I*

May 25	Memorial Day. Faculty and staff holiday.
May 29	Last day to register for first term and pay fees, 5 p.m.
June 1	First day of first term classes.
June 4	Last day for adding/dropping courses for the first term, 5 p.m.
June 5	Last day to apply for degrees to be awarded in August for students completing degree requirements in the first term, 5 p.m.
June 19	Last day for all students to drop courses with no penalty for the first term (Q-drop), 5 p.m. Last day to change Kinesiology 198/199 grade type for the first term on the Web site myrecord.tamu.edu, 5 p.m. Last day to officially withdraw from the University for the first term, 5 p.m.
July 2	Last day of first term classes.
July 3	First term final examinations.
July 4	Independence Day holiday.
July 8	First term final grades due in the Office of the Registrar, noon.

2009 Summer Term II*

July 3	Last day to register for the second term and pay fees, 5 p.m.
July 4	Independence Day holiday.
July 6	First day of second term classes.
July 9	Last day for adding/dropping courses for the second term, 5 p.m.
July 10	Last day to apply for degrees to be awarded in August for students completing degree requirement in the second term, 5 p.m.
July 24	Last day for all students to drop courses with no penalty for the second term (Q-drop), 5 p.m. Last day to change Kinesiology 198/199 grade type for the second term on the Web site myrecord.tamu.edu, 5 p.m. Last day to officially withdraw from the University for the second term, 5 p.m.
August 7	Last day of second term classes.
August 10–11	Second term final examinations for all students.
August 13	Grades for degree candidates from departments due in Office of the Registrar, noon.
August 14	Commencement and Commissioning. Last day for August undergraduate degree candidates to apply for Tuition Rebate, 5 p.m.
August 15	Texas A&M University at Galveston Commencement.
August 17	Final grades for second term due in Office of the Registrar, noon.

2009 10-Week Summer Semester*

May 25	Memorial Day. Faculty and staff holiday.
May 29	Last day to register for 10-week semester and pay fees, 5 p.m.
June 1	First day of 10-week semester classes.
June 4	Last day for adding/dropping courses for the 10-week semester, 5 p.m.
July 3	No 10-week semester classes.
July 4	Independence Day holiday.
July 10	Last day to apply for degrees to be awarded in August for students completing degree requirements in the 10-week semester, 5 p.m.
July 20	Last day for all students to drop courses with no penalty for the 10-week semester (Q-drop), 5 p.m. Last day to officially withdraw from the University for the 10-week semester, 5 p.m..
August 7	Last day of 10-week semester classes.
August 10–11	10-week semester final examinations for all students.
August 13	Grades for degree candidates from departments due in Office of the Registrar, noon.
August 14	Commencement and Commissioning. Last day for August undergraduate degree candidates to apply for Tuition Rebate, 5 p.m.
August 15	Texas A&M University at Galveston Commencement.
August 17	Final grades for 10-week semester due in Office of the Registrar, noon.

*These dates are subject to change.

College of Veterinary Medicine and Biomedical Sciences

2008 Fall Semester*

August 14–15	Orientation for Class 1VM.
August 18	First day of fall semester classes.
September 5	Last day to apply for degrees to be awarded in December (Bachelor of Science in Veterinary Medicine).
November 10–December 6	Exam period for the North American Veterinary Licensing Examination (NAVLE).
November 27–28	Thanksgiving holiday for classes 1VM, 2VM and 3VM.
November 28	Last day of fall semester classes for 1VM, 2VM and 3VM.
December 1–5	Fall semester final examinations for classes 1VM, 2VM and 3VM.
December 10	Final grades due in the Office of the Registrar, 10 a.m.

2009 Spring Semester*

January 12	First day of spring semester classes.
January 19	Martin Luther King, Jr. Day holiday.
January 23	Last day to apply for all degrees to be awarded in May (DVM).
March 16–20	Spring break.
April 6–18	April licensing period. State Board Exam and North American Veterinary Licensing Examination (NAVLE).
April 20	Orientation for new fourth year students.
May 1	Last day of spring semester classes for 1VM, 2VM and 3VM.
May 4–8	Spring semester final examinations for classes 1VM, 2VM and 3VM.
May 11	First day of fourth-year classes (09V).
May 13	Final grades due in the Office of the Registrar, 10 a.m.
May 14	Doctor of Veterinary Medicine Commencement.

*These dates are subject to change.

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* * *

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Associate Vice Chancellor for Budgets and Accounting.....	B. J. Crain
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* * *

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Associate Vice President for International Programs	Emily Y. Ashworth

* * *

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Interim Dean, Mays Business School	Ricky W. Griffin
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Dean, College of Liberal Arts	Charles A. Johnson
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Dean, College of Veterinary Medicine and Biomedical Sciences	H. Richard Adams
Dean, The George Bush School of Government and Public Service	Richard A. Chilcoat
Interim Dean, Graduate Studies	Robert C. Webb
Dean, Texas A&M University Libraries	C. Colleen Cook
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* * *

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Admission Statement and Policy on Individuals with Disabling Conditions

Texas A&M University has a strong institutional commitment to the principle of diversity in all areas. In that spirit, admission to Texas A&M University and any of its sponsored programs, is open to all qualified individuals. Texas A&M does not discriminate on the basis of an individual's disability and complies with Section 504 of the Rehabilitation Act of 1973, and the Americans with Disabilities Act (ADA) in its admissions, accessibility, treatment, and employment of students in its programs and activities. The designated ADA coordinator for Texas A&M University is the Associate Vice President for University Risk and Compliance, (979) 845-1323, Web site: compliance.tamu.edu/ADAMenu.aspx. Texas A&M provides academic accommodations and auxiliary aids to students with disabling conditions, as defined under the law, who are otherwise qualified to meet the institution's academic requirements. Disability Services, (979) 845-1637, coordinates Texas A&M University's programs and efforts for the benefit of the individuals covered under the statute.

University Statement on Harassment and Discrimination

Texas A&M University is committed to providing an educational and work climate that is conducive to the personal and professional development of each individual. To fulfill its multiple missions as an institution of higher learning, Texas A&M encourages a climate that values and nurtures collegiality, diversity, pluralism and the uniqueness of the individual within our State, nation and world. The University also strives to protect the rights and privileges, and to enhance the self-esteem of all its members. Faculty, staff and students should be aware that any form of harassment and any form of illegal discrimination against any individual is inconsistent with the values and ideals of the University community.

Individuals who believe they have experienced harassment or discrimination are encouraged to contact the appropriate offices within their respective units. Students should contact the Office of the Vice President for Student Affairs at (979) 845-4728, faculty members should contact the Office of the Dean of Faculties and Associate Provost at (979) 845-4274, and staff should contact Employee Services, Employee Relations Office at (979) 862-4027.



TEXAS A&M
UNIVERSITY

A black and white photograph of a bronze statue of a man with a beard, wearing a suit and tie. The statue is in the foreground, and in the background, a large domed building is visible through some foliage.

GENERAL INFORMATION

★ 2008–2009 UNDERGRADUATE CATALOG ★

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History and Development

Mission Statement

Texas A&M University is dedicated to the discovery, development, communication, and application of knowledge in a wide range of academic and professional fields. Its mission of providing the highest quality undergraduate and graduate programs is inseparable from its mission of developing new understandings through research and creativity. It prepares students to assume roles in leadership, responsibility, and service to society. Texas A&M assumes as its historic trust the maintenance of freedom of inquiry and an intellectual environment nurturing the human mind and spirit. It welcomes and seeks to serve persons of all racial, ethnic, and geographic groups, women and men alike, as it addresses the needs of an increasingly diverse population and a global economy. In the twenty-first century, Texas A&M University seeks to assume a place of preeminence among public universities while respecting its history and traditions.

History and Development

Texas A&M University, the state's first public institution of higher education, opened for classes in 1876. It is now one of a select few institutions in the nation to hold land grant, sea grant and space grant designations. It is also one of the few universities to host a presidential library. The George Bush Presidential Library and Museum opened in 1997 on a 90-acre tract of land on the west side of campus. The University owes its origin to the Morrill Act approved by the Congress on July 2, 1862. This act provided for donation of public land to the states. The land was to be sold at auction, and the proceeds were set aside in a perpetual fund. The act directed that interest from this fund be used to support a college whose "leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and mechanic arts. . . in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life."

By resolution of the Legislature of the State of Texas in November 1866, Texas agreed to provide for a college under the terms of the Morrill Act, but no such institution was organized until the establishment of the Agricultural and Mechanical College of Texas by act of the Twelfth Texas Legislature on April 17, 1871. The same act appropriated \$75,000 for the erection of buildings and bound the state to defray all expenses of the college exceeding the annual interest from the endowment. Proceeds from the sale of the 180,000 acres of land scrip received under the Land Grant College Act were invested in \$174,000 of gold frontier defense bonds to Texas, forming a perpetual endowment for the institution. A commission created to locate the institution accepted the offer of 2,416 acres of land from the citizens of Brazos County in 1871, and instruction began in 1876.

As the State of Texas grew, so did its land grant institution. Texas A&M now has a physical plant valued at more than \$1 billion. The campus in College Station includes 5,200 acres and is one of the largest campuses of any major institution of higher education in the nation. The University also operates branch campuses at Galveston and Doha, Qatar, with the latter operating at no expense to the State of Texas. Additionally, the University operates a study center at Santa Chiara, Italy, and a facility in Mexico City.

In keeping with the diversified and expanded character of the institution, the 58th Legislature of Texas, on August 23, 1963, changed the name of the Agricultural and Mechanical College of Texas to Texas A&M University.

On September 17, 1971, the designation “sea grant college” was assigned to Texas A&M University in recognition of its achievements in oceanographic and marine resources development. Texas A&M was one of the first four institutions nationwide to achieve this distinction. Patterned after the century-old land grant idea, sea grant colleges are federal-state partnerships for furthering marine work through practical research, education and advisory services. The designation clearly establishes the University’s leadership relative to marine affairs of the state.

Texas A&M added a third special designation to its credentials on August 31, 1989, when it was named a “space grant college.” This new designation, bestowed by the National Aeronautics and Space Administration, came to the University based on its continuing commitment to space research and its participation in the Texas Space Grant Consortium, a group of 35 institutions that includes universities, industrial organizations, non-profit organizations, and government agencies within Texas under the leadership of Texas A&M University, The University of Texas at Austin and the University of Houston.

In addition to its traditional strengths in agriculture and engineering, Texas A&M has established itself as a leader in such newer technological areas as the space, nuclear, computer, biotechnological, oceanographic, and marine resources fields. It also has placed added emphasis on the arts and sciences and business and continues to enhance its prominent role in these fields.

A mandatory military component was a part of the Land Grant designation until the 1950s, and the Corps of Cadets has played an important part in the history and development of Texas A&M. Even though membership in the Corps of Cadets became voluntary in 1965, Texas A&M historically has produced more officers than any other institution in the nation with the exception of the service academies. The University is one of only three institutions with a full-time corps of cadets including ROTC programs leading to commissions in all branches of service — Army, Air Force, Navy, Marine Corps and Coast Guard.

Texas A&M offers a variety of programs in both undergraduate and graduate studies through its academic colleges and schools — Agriculture and Life Sciences, Architecture, The George Bush School of Government and Public Service, Mays Business School, Education and Human Development, Dwight Look College of Engineering, Geosciences, Liberal Arts, Science, and Veterinary Medicine and Biomedical Sciences. Texas A&M University at Galveston is the marine and maritime branch campus of Texas A&M University. In addition, Texas A&M’s extensive research efforts in all fields, in conjunction with agricultural and engineering experiment stations, resulted in annual expenditures of approximately \$500 million and has been consistently ranked in the top tier of research institutions by the National Science Foundation.

Classified by the Carnegie Foundation as a Research University (very high research activity), Texas A&M embraces its mission of the advancement of knowledge and human achievement in all its dimensions. The research mission is a key to advancing economic development in both public and private sectors. Integration of research with teaching prepares students to compete in a knowledge-based society and to continue developing their own creativity, learning, and skills beyond graduation.

In 2001, Texas A&M University was admitted to the Association of American Universities (AAU), the prestigious organization founded in 1900 that restricts its ranks to the nation’s premier public and private institutions of higher learning. In 2004, the Kappa of Texas Chapter of Phi Beta Kappa was installed at Texas A&M University. Founded in 1776 at the College of William and Mary in Williamsburg, Virginia, Phi Beta Kappa is the nation’s oldest and largest academic honor society. The mission of the society is to recognize and foster excellence in the liberal arts and sciences. While most students are nominated in their senior year, membership is also offered to a few juniors and graduate students.

University Core Curriculum

The University Core Curriculum at Texas A&M University assures that all undergraduate programs provide for breadth of understanding. The Core Curriculum emphasizes competence in the process of learning, the capacity to engage in rigorous and analytical inquiry, and the ability to communicate clearly and effectively. It supports the development of extensive knowledge about and appreciation for our cultural heritage, our social and moral responsibilities, and our interactions with the economies and cultures of the international community. The University Core Curriculum acts to enrich and broaden the University's tradition of providing thorough preparation in each student's academic major.

University Core Curriculum requirements are described in the sections that follow. **These requirements must be met by every student pursuing a baccalaureate degree program at Texas A&M University, regardless of his or her major.** Individual degree programs may require that specific courses from the general University list be used to satisfy University Core Curriculum requirements. Please check with individual program advisors for details (see notes 1, 2, 3 and 6).

Specific Requirements

In addition to the University Core Curriculum and degree specific requirements, Texas A&M has criteria that must be met by all students in order to receive a degree, see page 24.

1. The ability to communicate through the use of the spoken or written word requires the development of speech and writing skills.

Communication (6 hours) A course used to satisfy this requirement shall have as its primary focus the improvement of student expression in communication. This focus on student expression should be demonstrated both in course instruction and assessment. Acceptable forms of student expression may range from creative to technical. Acceptable courses may include those embedded in subject areas other than writing. This requirement must be satisfied by ENGL 104 (3 hours) and one of the following:

AGCJ 404	ENGL 210
COMM 203	ENGL 235
COMM 205	ENGL 241
COMM 243	ENGL 301
ENGL 203	

2. Without knowledge of mathematics, the language of science; and logic, the art of critical inquiry; it is not possible to understand or participate in the development of knowledge.

Mathematics (6 hours, at least 3 of which must be in mathematics)

To be selected from any mathematics course except:

- MATH 102
- MATH 103
- MATH 150
- MATH 365
- MATH 366

Also may select 3 hours from:

- PHIL 240
- PHIL 341
- PHIL 342

3. Knowledge and appreciation of science as a significant human activity, rather than merely a listing of results or collection of data, is acquired only by engaging in the activities of science.

Natural Sciences (8 hours) Two or more natural sciences courses which deal with fundamental principles and in which critical evaluation and analysis of data and processes are required. A minimum of one course shall include a corresponding laboratory. Non-technical courses are specifically excluded.

Four hours to be selected from:

- BIOL 101
- BIOL 107
- BIOL 111
- BIOL 113/123
- CHEM 101/111
- CHEM 103/113
- CHEM 107
- GEOLOG 101
- PHYS 201
- PHYS 218

Remaining hours to be selected from courses listed and/or:

- | | | |
|--------------|--------------|---------------|
| AGRO 105 | CHEM 104/114 | GEOLOG 307 |
| AGRO 301 | CHEM 106/116 | GEOLOG 410 |
| AGRO 405 | CHEM 222/242 | HORT 201/202 |
| ANTH 225 | ENGR 101 | OCNG 251/252 |
| ASTR 101/102 | ENTO 322 | PHYS 202 |
| ATMO 201/202 | FRSC 304 | PHYS 208 |
| BESC 201 | GENE 301 | PHYS 219 |
| BIOL 112 | GENE 310 | RENRE 205/215 |
| BIOL 225 | GEOG 203/213 | |
| CHEM 102/112 | GEOLOG 106 | |

4. Knowledge of our culture and its ideals makes possible both social integration and self-realization (see note 4).

A. Humanities (3 hours) Courses used to satisfy this requirement shall address one of the following subject areas: history, philosophy, literature, the arts, culture or language (exclusive of courses devoted predominantly to acquiring language skills in a student's native language). Acceptable courses are:

AFST 201	ARTS 349	ENGL 334	ENGL 396	MUSC 311
AFST 302	ARTS 350	ENGL 335	ENGL 401	MUSC 312
AMST 300	ARTS 445	ENGL 336	ENGL 412	MUSC 315
AMST 320	CLAS 351	ENGL 337	ENGL 414	MUSC 319
ANTH 202	COMM 301	ENGL 338	ENGL 415	MUSC 321
ANTH 205	COMM 327	ENGL 339	ENGL 431	MUSC 324
ANTH 301	COMM 425	ENGL 340	ENGL 474	PHIL (any course
ANTH 302	ENGL 203	ENGL 345	ENGL 481	except 240,
ANTH 303	ENGL 204	ENGL 346	ENGR 482	341, 342)
ANTH 306	ENGL 205	ENGL 347	EPSY 320	RELS 211
ANTH 308	ENGL 212	ENGL 348	EPSY 321	RELS 213
ANTH 313	ENGL 221	ENGL 350	GEOG 202	RELS 303
ANTH 315	ENGL 222	ENGL 351	GEOG 301	RELS 304
ANTH 316	ENGL 227	ENGL 352	GEOG 305	RELS 317
ANTH 317	ENGL 228	ENGL 353	GEOG 323	RELS 351
ANTH 318	ENGL 231	ENGL 354	HIST (any	RELS 360
ANTH 324	ENGL 232	ENGL 355	course)	RELS 392
ANTH 350	ENGL 235	ENGL 356	HORT 203	THAR 101
ANTH 351	ENGL 251	ENGL 360	HUMA 211	THAR 155
ANTH 353	ENGL 308	ENGL 361	HUMA 213	THAR 201
ANTH 354	ENGL 310	ENGL 362	HUMA 303	THAR 280
ARCH 149	ENGL 312	ENGL 365	HUMA 304	THAR 281
ARCH 250	ENGL 313	ENGL 374	LAND 240	WMST 200
ARCH 329	ENGL 314	ENGL 375	LAND 340	WMST 333
ARCH 345	ENGL 315	ENGL 376	LBAR 203	WMST 374
ARCH 350	ENGL 316	ENGL 377	LBAR 331	WMST 401
ARCH 430	ENGL 317	ENGL 378	LBAR 332	WMST 461
ARCH 434	ENGL 321	ENGL 379	LBAR 333	WMST 473
ARTS 149	ENGL 322	ENGL 385	LING 307	WMST 474
ARTS 150	ENGL 323	ENGL 390	LING 310	WMST 477
ARTS 329	ENGL 329	ENGL 392	MODL*	
ARTS 330	ENGL 330	ENGL 393	MUSC 200	
ARTS 335	ENGL 333	ENGL 394	MUSC 201	

* or any course in the Department of Hispanic Studies or the Department of European and Classical Languages and Cultures (see note 5).

B. Visual and Performing Arts (3 hours) Acceptable courses are:

ANTH 324	ARTS 445	ENGL 385	KINE 165	MUSC 312
ARCH 249	CARC 335	ENGL 412	KINE 166	MUSC 315
ARCH 250	CLAS 352	EURO 405	KINE 167	MUSC 319
ARCH 350	DCED 161	EURO 425	KINE 168	MUSC 321
ARCH 430	DCED 162	EURO 435	KINE 169	MUSC 324
ARCH 434	DCED 168	EURO 446	KINE 170	PERF 301
ARCH 437	DCED 172	EURO 455	KINE 171	PHIL 330
ARTS 103	DCED 173	FILM 201	KINE 172	PHIL 375
ARTS 111	ENDS 101	FILM 301	KINE 173	SPAN 410
ARTS 112	ENDS 115	FILM 394	KINE 174	SPAN 413
ARTS 149	ENDS 311	FREN 425	KINE 175	THAR 101
ARTS 150	ENGL 212	GERM 334	KINE 311	THAR 110
ARTS 305	ENGL 219	GERM 432	LAND 240	THAR 155
ARTS 212	ENGL 251	HORT 203	MODL 352	THAR 201
ARTS 329	ENGL 312	KINE 160	MUSC 200	THAR 210
ARTS 330	ENGL 317	KINE 161	MUSC 201	THAR 280
ARTS 335	ENGL 340	KINE 162	MUSC 280	THAR 281
ARTS 349	ENGL 351	KINE 163	MUSC 302	THAR 407
ARTS 350	ENGL 356	KINE 164	MUSC 311	



5. As the human social environment becomes more complex, it is increasingly important for individuals to understand the nature and function of their social, political and economic institutions (see note 4).

A. Social and Behavioral Sciences (3 hours) Courses used to satisfy this requirement shall address one of the following subject areas: anthropology, economics, political science, geography, psychology, sociology or communication. Acceptable courses are:

ALED 340	ANTH 403	EPSY 321	KINE 304	RELS 403
ALED 400	ANTH 404	GEOG 201	KINE 319	SOCI (any
ALED 440	ANTH 410	GEOG 304	KINE 336	course except
AGEC 105	BIOL 225	GEOG 306	KINE 337	220, 420)
AGEC 350	COMM 315	GEOG 311	LBAR 204	VTPB 221
AGEC 429	COMM 320	GEOG 330	LING 209	WMST 207
AGEC 430	COMM 325	GEOG 401	LING 311	WMST 300
AGEC 452	COMM 335	GEOG 440	LING 402	WMST 310
AGEC 453	ECON (any	HLTH 236	MGMT 475	WMST 316
ANTH 201	course)	HORT 335	POLS (any	WMST 317
ANTH 210	ENGL 209	INST 310	course)	WMST 404
ANTH 225	ENGL 311	INST 322	PSYC (any	WMST 424
ANTH 300	ENGR 400	JOUR 102	course except	WMST 462
ANTH 314	EPSY 320	JOUR 301	203, 204)	WMST 463

B. U.S. History and Political Science (12 hours, 6 hours of history and 6 hours of political science) To be a responsible citizen of the world it is necessary, first, to be a responsible citizen of one's own country and community.

POLS 206 and 207 and HIST 105 and 106 or other courses in American and Texas history, except those courses pertaining solely to Texas history may not comprise more than 3 hours.

6. As individual and national destinies become progressively more interconnected, the ability to survive and succeed is increasingly linked to the development of a more pluralistic, diverse and globally-aware populace. Two courses from the following list are to be taken by the student. If a course listed below also satisfies another University Core Curriculum requirement, it can be used to satisfy both requirements if the student wishes to do so. For example, a course that satisfies the Social and Behavioral Sciences requirement may be used to satisfy the International and Cultural Diversity requirement if that course also appears on the list.

International and Cultural Diversity (6 hours) Acceptable courses are:

ACCT 445	ENGL 205	HIST 336	KINE 336	SOCI 207
AFST 201	ENGL 222	HIST 339	KINE 337	SOCI 316
AFST 302	ENGL 232	HIST 342	LAND 240	SOCI 317
ALED 422	ENGL 251	HIST 343	LBAR 331	SOCI 321
AGEC 452	ENGL 333	HIST 345	LBAR 332	SOCI 323
AGEC 453	ENGL 336	HIST 346	LBAR 333	SOCI 324
ANTH 205	ENGL 337	HIST 348	LING 307	SOCI 325
ANTH 210	ENGL 338	HIST 352	LING 402	SOCI 329
ANTH 300	ENGL 339	HIST 355	MGMT 403	SOCI 330
ANTH 301	ENGL 340	HIST 356	MGMT 430	SOCI 340
ANTH 306	ENGL 352	HIST 402	MGMT 450	SOCI 350
ANTH 314	ENGL 362	HIST 405	MGMT 452	SOCI 403
ANTH 315	ENGL 374	HIST 407	MGMT 489	SOCI 419
ANTH 319	ENGL 378	HIST 412	MKTG 330	SOCI 423
ANTH 324	ENGL 379	HIST 439	MKTG 401	SOCI 424
ANTH 403	ENGL 393	HIST 440	MKTG 403	SPAN 312
ANTH 404	ENGL 474	HIST 441	MKTG 489	SPAN 320
ANTH 426	EURO 223	HIST 449	MODL 222	SPAN 410
ARCH 250	EURO 323	HIST 451	MODL 352	SPAN 411
ARCH 345	FINC 445	HIST 455	MODL 362	SPAN 412
ARTS 150	FREN 301	HIST 460	MODL 363	SPAN 421
ARTS 350*	FREN 322	HIST 461	MUSC 312	SPAN 450
BIMS 489	FREN 336	HIST 464	MUSC 315	TEFB 271
BUSN 289	FREN 418	HIST 473	MUSC 319	TEFB 273
CARC 301	FREN 425	HIST 477	MUSC 324	THAR 201
CARC 311	GEOG 202	HLTH 236	PHIL 283	THAR 281
CARC 321	GEOG 301	HLTH 334	PHIL 416	VTPB 221
CARC 331	GEOG 305	HORT 335	PHIL 419	WMST 200
CARC 335	GEOG 306	HUMA 303	PLAN 415	WMST 300
COMM 327	GEOG 311	HUMA 304	POLS 317	WMST 310
COMM 335	GEOG 320	IBUS 401	POLS 322	WMST 316
COMM 407	GEOG 321	IBUS 403	POLS 323	WMST 317
COMM 425	GEOG 323	IBUS 445	POLS 324	WMST 333
COSC 484*	GEOG 402	IBUS 446	POLS 326	WMST 374
COSC 494*	GERM 305	IBUS 450	POLS 328	WMST 391
DCED 301	GERM 322	IBUS 452	POLS 329	WMST 401
ECON 312	HIST 210	IBUS 455	POLS 331	WMST 404
ECON 319	HIST 214	IBUS 456	POLS 338	WMST 407
ECON 320	HIST 258	IBUS 457	POLS 365	WMST 424
ECON 324	HIST 301	IBUS 460	RELS 303	WMST 462
ECON 330	HIST 305	INST 310	RELS 304	WMST 463
EHRD 408	HIST 307	INST 322	RELS 403	WMST 473
ENDS 101	HIST 319	POLS 424	RLEM 314	WMST 474
ENDS 484*	HIST 324	POLS 432	RPTS 340	WMST 477
ENDS 494*	IBUS 458	POLS 462	WMST 430	
ENGL 204	IBUS 459	PSYC 300	WMST 461	

* See Note 7.



7. As the ancient scholars knew and as modern research has confirmed, the development of the body as well as the mind is an integral part of the educational process.

Kinesiology requirements are to be fulfilled by completing KINE 198 Health and Fitness and any other one KINE 199 course. KINE 199 used to fulfill University Core Curriculum requirements must be taken S/U. KINE 199 courses not included in the University Core Curriculum can be taken for a grade in accordance with the student's college policy. Transfer students with fewer than 2 hours of kinesiology credit must meet the KINE 198 requirement either by transfer of credit or by taking the course at Texas A&M.

Notes:

1. Individual degree programs may impose more restrictive requirements in any of these areas. Students should consult the degree listing in this catalog and their academic advisors to ensure that they are satisfying all requirements of their majors.
2. With the exception of courses satisfying the International and Cultural Diversity requirement (see section 6), no course shall be counted twice by the same student toward satisfaction of the University Core Curriculum requirements. For example, if a student elects to use ARCH 349 to satisfy the Visual and Performing Arts requirement, the student may not use the course to satisfy the Humanities requirement.
3. Courses numbered 285 or 485 do not satisfy University Core Curriculum requirements. Individual Special Topics (289 and 489) courses may be approved for use in the Core Curriculum.
4. No student may satisfy all 12 hours of University Core Curriculum requirements in the categories of humanities, visual and performing arts, and social and behavioral Sciences by courses having the same prefix.
5. If courses in MODL are used to fulfill the Humanities requirement, they must be in a different language than taken in high school or, if in the same language, at the 200-level or higher. For example, if the student took Spanish in high school, then the student may not use SPAN 101 or 102 in satisfying the Humanities requirement.
6. Students transferring course credit to satisfy the University Core Curriculum requirements should refer to the Texas Common Course Numbering System (see Appendix B) and the Transfer Course Credit Policies in this catalog.
7. Courses taken abroad, which are conducted in another country by a Texas A&M University faculty member, completed as reciprocal education exchange programs (REEP), or completed in another country through direct enrollment in another institution, can be used to satisfy the Core Curriculum requirement for International and Cultural Diversity. This includes credits earned through 285, 291, 485, 484, and 491 courses conducted abroad for which grades are determined by a Texas A&M University faculty member.
8. Courses approved as satisfying one or more areas of the University Core Curriculum become effective the semester or summer session immediately following approval by the Faculty Senate.

Degree Information

Which Catalog to Follow

In meeting the requirements for a baccalaureate degree, a student is normally expected to complete the course and hour requirements as outlined in the catalog in effect at the time of his or her declaration of a major or change in major, or those of any later catalog of the student's choice. Normally, a student will not be granted a degree based upon completion of the requirements set forth in a catalog more than seven years old. Before changing catalogs, the student must consult his or her academic advisor. A student changes catalogs by filing a written notification with his or her dean. It is incumbent



on the student to verify that the change has been made. Texas A&M University Student Rules is prepared each year for the benefit of the student body. Texas A&M University Student Rules (including periodic revisions) is the governing document in case of conflict between this catalog and Texas A&M University Student Rules. It is the responsibility of the individual student to read this information carefully and to use it as a reference. Please refer to the Web site student-rules.tamu.edu for this information.

Whereas each college must retain the flexibility to improve its curriculum, course offerings may be changed during the student's education. If a course required under a previous catalog is no longer offered, a student eligible to graduate according to that catalog should consult his or her academic advisor or dean to identify another course that may be used to fulfill the requirement. Course substitutions in the degree program are permitted only with the approval of the dean through the department head or program director. Furthermore, the University reserves the right to make any changes in requirements it may consider necessary and desirable by due notice in the catalog.

Students are required to take the courses listed in a curriculum; however, the display of a curriculum does not in any way indicate the length of time required to finish degree requirements. Rather, this display is intended as a guide to indicate the preferred order for completion of degree requirements. Exceptions to certain requirements may be petitioned through the department head to the dean of the college.

Degrees Offered

The following degrees are offered for the satisfactory completion of resident study in the appropriate curriculum:

Bachelor of Science (B.S.)
 Bachelor of Arts (B.A.)
 Bachelor of Business Administration (B.B.A.)
 Bachelor of Environmental Design (B.E.D.)
 Bachelor of Landscape Architecture (B.L.A.)
 Master of Science (M.S.)
 Master of Arts (M.A.)
 Master of Agribusiness (M.A.B.)
 Master of Agriculture (M.Agr.)
 Master of Architecture (M.Arch.)
 Master of Biotechnology (M.BIOT.)
 Master of Business Administration (M.B.A.)
 Master of Computer Science (M.C.S.)
 Master of Education (M.Ed.)
 Master of Engineering (M.Eng.)
 Master of Fisheries Science (M.F.SC.)
 Master of Geoscience (M.Gsc.)
 Master of Industrial Distribution (M.I.D.)
 Masters Program in International Affairs (M.P.I.A.)
 Master of Landscape Architecture (M.L.A.)
 Master of Natural Resources Development (M.N.R.D.)
 Master of Public Service and Administration (M.P.S.A.)
 Master of Real Estate (M.R.E.)
 Master of Recreation and Resources Development (M.R.R.D.)
 Master of Urban Planning (M.U.P.)
 Master of Water Management and Hydrological Science (M.W.M.)
 Master of Wildlife Science (M.W.SC.)
 Doctor of Philosophy (Ph.D.)
 Doctor of Education (Ed.D.)
 Doctor of Engineering (D.Eng.)

Requirements for a Baccalaureate Degree

The diploma of the University, with the appropriate degree, will be granted to the student who has made formal application for the degree by the published official deadline, has all grades on record in the Office of the Registrar, including grades pertaining to graduation with honors, by no later than 5 p.m., Friday, the first week of classes of the succeeding semester or summer term following commencement and has satisfied the requirements outlined in the following:

1. A curriculum leading to a baccalaureate degree shall contain a minimum of 120 credit hours including the required physical activity courses.
2. The undergraduate student must complete with at least a 2.0 grade point ratio all undergraduate course work attempted at Texas A&M University (see 6).
3. The undergraduate student must complete with a 2.0 grade point ratio all courses included in the major field of study (see 7).
4. The student is required to successfully complete one semester of KINE 198 and one semester of KINE 199 (taken satisfactory/unsatisfactory except Health and Kinesiology majors), unless a substitution for this requirement is petitioned through the student's dean.
5. The undergraduate student must satisfy all areas of the University Core Curriculum as outlined in the student's catalog.
6. The total number of grade points earned at this institution in courses must be at least twice the number of hours the student carried in courses at this institution. Grades of F and U shall be included.
 - a. The number of credit hours associated with grades of S in courses taken on a satisfactory/unsatisfactory basis are not included in this computation.
 - b. The number of credit hours associated with grades of U in courses taken on a satisfactory/unsatisfactory basis are included in this computation.
 - c. With the approval of a student's dean, grades in courses not applying to the degree may be waived for the purpose of graduation only.
 - d. The waiver of grades in courses as indicated in item c. will not affect the student's official grade point ratio or entitlement to graduation with honors.
 - e. The provisions of item c. will not affect a student's probationary status prior to graduation.
7. The total number of grade points earned at this institution in courses in the student's major department must be at least twice the number of hours that he or she carried at this institution in his or her major department.
8. Grades made in courses elected in excess of a student's degree requirements shall be counted, but if failed, such courses need not be repeated.
9. First year grade exclusion cannot be invoked after a baccalaureate degree has been conferred upon the student. First Year Grade Exclusion requests for degree candidates must be received in the Office of the Registrar not later than 5 p.m. the day midterm grades are due when the student is graduating in a fall or spring semester or not later than 5 p.m. Friday of the third week of class for the second summer session when the student is graduating in August.

10. The student must be formally recommended for graduation by the Faculty Senate after consideration of his or her complete record.
11. The student must have settled all financial obligations to the University.
12. Graduate and undergraduate students who plan to attend a commencement ceremony must do so the semester they apply for graduation and complete the degree requirements.
13. To be a candidate for a degree at the end of the semester or summer term, a student must be registered for or have completed all degree requirements by the 50th class day in the fall and spring semesters, the 15th class day for summer I and II and the 35th class day for the 10-week summer term of the academic calendar of Texas A&M University either in residence or at another college or university. Proof of registration must be provided to the Office of the Registrar, Degree Audit, by the deadline. A student must be enrolled in his or her degree-granting college(s) and major(s) at the beginning of the student's last semester or summer term at Texas A&M to be a candidate for a degree from that college.
14. Foreign Language: A year of foreign language is required in many degree programs from Texas A&M. This degree requirement can be satisfied by the satisfactory completion in high school of two units of the same foreign language or one year of college work.
 - a. International students are not permitted to enroll in courses to satisfy this degree requirement if those courses are taught in their native language.
 - b. Bachelor of Arts degrees from the College of Liberal Arts require an additional 6 semester hours at the 200-level.
 - c. Students who wish to demonstrate foreign language proficiency without taking acceptable high school or college courses may do so through the existing credit by examination process. In cases where students wish to demonstrate proficiency in a language not taught at Texas A&M, the following procedures shall apply. The student shall request an examination from the Head of the Department of Hispanic Studies or the Head of the Department of European and Classical Languages and Cultures. This department will coordinate the administration of special examinations to demonstrate foreign language proficiency. This will include finding an appropriate examination to test the student's proficiency, informing the student how to arrange to take that examination and certifying the results to the student's advisor. All arrangements shall be made and fees paid by the student.
 - d. American Sign Language (ASL) may be used to fulfill the foreign language degree requirement unless otherwise specified by the student's college or department. Students may either transfer ASL credits or arrange to be tested at another institution. (Texas A&M does not offer courses in ASL.)
15. All students must take at least two courses in their major that are designated as fulfilling a writing requirement (W). The requirement may not be met by any course listed as a University Core Curriculum communication requirement, nor may it be met through credit-by-examination. It may be met by a course transferred from another institution of higher learning, with the approval of the dean of the student's college and the Dean of Undergraduate Studies and Associate Provost for Academic Services. Upon request, students will provide their dean with a course description, syllabus or writing sample from the course being transferred.

Residence Requirement

A minimum of 36 semester hours of 300- and/or 400-level course work must be successfully completed in residence at Texas A&M to obtain a baccalaureate degree. A minimum of 12 of these 36 semester hours must be in the major.

To fulfill degree requirements for graduation that semester, transfer courses taken during a student's final semester must be completed and cited on an official transcript in the Office of the Registrar by the stated deadline.

Candidates for the baccalaureate degree in Mays Business School will be expected to complete approximately the last two years in residence at this institution. Acceptance of transfer credit for business courses will generally be limited to those courses taught in the freshman and sophomore years at this institution (see transfer credits).

Candidates for the baccalaureate degree in the Dwight Look College of Engineering will be expected to complete approximately the last two years in residence at this institution. Acceptance of transfer credit for engineering courses will generally be limited to those courses taught in the freshman and sophomore years at this institution.

A student participating in Texas A&M University off-campus study programs approved by the student's college may apply upper division credits earned in the programs toward the residence requirement up to a maximum of 18 semester hours, including hours transferred from another institution as part of one of these programs. These Texas A&M University off-campus study programs may involve domestic or international institutions and may be taught by Texas A&M University faculty or faculty from other institutions. Students choosing to participate in such programs and wishing to apply credits earned from the programs toward the residence requirement must receive college approval prior to the student's participation in the off-campus study program. Students participating in international programs must contact the Study Abroad Programs Office for details on how to obtain approval for courses taken outside the United States. Students participating in domestic off-campus programs must contact the Dean's office of their college for approval procedures.

Tuition Charged for Excess Credit Hours

The State of Texas will not provide funds to state institutions of higher education for excess semester credit hours earned by a resident student. Because funding will not be provided by the State, and as permitted by State law, Texas A&M University will charge tuition at the non-resident rate to all students who exceed the semester credit hour limit for their program. Excess semester credit hours are those which accrue after the student exceeds by 30 hours the number of semester credit hours required for the completion of the degree program in which the student is enrolled. Thus, the student may accumulate up to 30 hours beyond those required for the chosen degree program and not exceed the limitation. The limitation on excess credit hours applies only to those undergraduate students who first enter higher education in the fall 1999 and thereafter. The semester credit hours counted toward the limitation include all hours attempted by the student except:

- Semester credit hours earned by the student before receiving a baccalaureate degree that has been previously awarded.
- Semester credit hours earned by the student by examination or other procedure by which credit is earned without registering for a course for which tuition is charged.



- Credit for remedial education courses, technical courses, workforce education courses funded according to contact hours, or other courses that would not generate academic credit that could be applied toward a degree program at Texas A&M University.
- Semester credit hours earned by the student at a private or an out-of-state institution.

Requirement in Political Science (Government) and History

In order to meet the legal requirements for a baccalaureate degree, all students must have at least 6 credit hours in political science (government) and at least 6 credit hours in American history. POLS 206 (American National Government) and POLS 207 (State and Local Government with emphasis on Texas) fulfill the political science requirement. Both the political science and American history requirements may be met, in whole or in part, by equivalent course work satisfactorily completed at another accredited college or university.

State law permits the substitution of 3 hours of history and 3 hours of political science for a student in the program of an approved senior ROTC unit. With the approval of the dean of the appropriate college, students successfully completing the required 12 hours of upper-level ROTC courses will be deemed to have completed the equivalent of POLS 206 or 207 plus HIST 105 or 106 (or another appropriate course) for a total of 6 hours.

Students in the College of Liberal Arts may not substitute upper-level ROTC courses for this requirement. Students pursuing teacher certification are not allowed to substitute ROTC credits for this requirement.

Supplementary Fee for Courses Attempted More than Twice

A course that is repeated by a student more than twice at a public institution of higher education in Texas may not be reported for state funding. As a result, the institution must either pass the non-funded portion to all students, or charge a supplementary fee to the student who is repeating the course. Texas A&M has chosen to assess a supplementary fee to those students repeating a course more than twice.

A student attempting certain courses more than twice at Texas A&M University will be subject to a supplementary fee of \$125 per semester credit hour (\$375 for a 3 hour course) for the repeated course, in addition to tuition and required fees associated with the course. The general criteria for determining which courses are subject to the supplementary fee are:

- A course is subject to the fee if a student has completed it twice at Texas A&M University with a grade of A, B, C, D, F, F* (academic dishonesty), S (satisfactory), U (unsatisfactory), I (incomplete), Q (authorized drop after the add/drop period) or X (no grade submitted).
- Courses identified by the University as repeatable for credit are not subject to the fee. A schedule of repeated courses can be found at www.tamu.edu/admissions/records/3peat.html.
- Courses dropped with no record (NR), no grade (NG) and withdrawals (W) are not counted as repeated courses.

Students will be notified at the time they register for a course that it has been taken twice at Texas A&M University and is subject to the supplementary fee.

Graduation Requirements in Foreign Language

To understand the major cultures of the world as expressed in art, philosophy, politics or economy, it is necessary to know and appreciate languages other than one's native language. Therefore, some proficiency in a foreign language is also required to graduate from Texas A&M University. This requirement can be met by:

- completing two units (two full years) of high school course work in the same foreign language;
- completing two semesters (one full year) of course work at the college level in the same foreign language; or
- demonstrating proficiency in a foreign language by examination.

Notes:

- a. International students are not permitted to enroll in courses which satisfy the foreign language requirement if those courses are taught in their native language.
- b. Students who wish to demonstrate foreign language proficiency without taking acceptable high school or college courses may do so through the existing credit by examination process for the first two college courses in the foreign language. In cases where students wish to demonstrate proficiency in a language not taught at Texas A&M, the following procedures shall apply. The student shall request an examination from the Head of the Department of Hispanic Studies or the Head of the Department of European and Classical Languages and Cultures. The department will coordinate the administration of special examinations to demonstrate foreign language proficiency. This will include finding an appropriate examination to test the student's proficiency, informing the student how to arrange to take that examination and certifying the results to the student's advisor. All arrangements shall be made and fees paid by the student.
- c. American Sign Language (ASL) may be used to fulfill the foreign language requirement unless otherwise specified by the student's college or department. Students may either transfer ASL credits or arrange to be tested at another institution. (Texas A&M does not offer courses in ASL.)

Application for a Degree

Formal application for degrees must be submitted online by the deadline stated in the academic calendar and online degree application. Under unusual circumstances, an application for a degree may be accepted after the stated deadline; however, no application will be accepted after grade sheets for graduating students have been produced for the faculty. The student must apply online at degreeapp.tamu.edu.

The buying, selling, creating, duplicating, altering, giving or obtaining the Texas A&M diploma or other academic record is prohibited by state law. A person who violates this statute or who aids another person in violation is guilty of a misdemeanor and is subject to a fine and/or confinement if convicted.

The University has the right to rescind a previously granted degree if the University becomes aware of information indicating that the degree never should have been granted.

Baccalaureate Degree Option for Students Granted Early Admission to Medical/Professional Programs

A minimum of 120 hours is required for a Texas A&M University undergraduate degree. Some degree programs require additional hours (see specific degree requirements for each major in this catalog). Students from undergraduate programs who are selected early into participating programs in medicine, dentistry, optometry or veterinary medicine must have satisfied all University Core Curriculum requirements as specified in this catalog. A student intending to use this baccalaureate degree option must coordinate early in his or her program with the appropriate undergraduate advisor in order to ensure that degree requirements are met. The degree candidate must complete at least half of the total hours required for the baccalaureate degree while in residence at Texas A&M University. This requirement includes a minimum of 24 hours of upper division courses in residence, of which a minimum of 12 must be in the major. A student will become eligible for the Texas A&M degree upon completion of the total credit hours required by his or her undergraduate degree plan. Each undergraduate major specifies those professional courses that may be used to satisfy its degree plan.

A student then selected into an approved professional program will be required to successfully complete a minimum of one full year of acceptable work at an accredited school of medicine, dentistry, optometry or veterinary medicine in the United States. The student will be responsible for submitting official transcripts to the Office of Admissions and Records to verify completion of agreement requirements. The participating undergraduate department or program will complete the required degree audit, approve the necessary substitutions and clear the student to graduate.

Baccalaureate degrees will be awarded in May, August and December after the completion of the first year of the approved professional program or the necessary hours for the desired baccalaureate degree. Students must apply for graduation at degreeapp.tamu.edu. Check the academic calendar on page 4 for deadlines and for commencement dates. Questions may be emailed to degree-audit@tamu.edu or call (979) 845-1089. For additional information about graduation, visit the Web site graduation.tamu.edu.

Students who have received a baccalaureate degree are not eligible to participate. Individuals who would have been eligible to participate in this program had it been in effect when they were students at Texas A&M University may request the conferral of a baccalaureate degree. Although this is a University-wide policy, not all colleges choose to participate. The use of this baccalaureate option will remain a college initiative in that each individual college and/or program must clear each candidate for graduation.

3 + 3 Program for Early Admission to South Texas College of Law

The 3+3 Program is a collaborative venture between Texas A&M University and South Texas College of Law. This program makes it possible for a student to obtain a bachelor's degree and a law degree in only six years by enrolling in law school after their junior year. The bachelor's degree is awarded after successful completion of the first year of law school. Students in this program may enroll at South Texas College of Law after completing a minimum of 98 undergraduate hours in residence at Texas A&M. Undergraduate work at Texas A&M must include all University Core Curriculum requirements and all requirements for a major in the College of Liberal Arts, or in Geology or Geography. No other undergraduate majors currently participate in the program. Additionally, while at Texas A&M, students must maintain a cumulative GPR of at least 3.25 with no more than one semester less below a 3.25. After successful completion of at least one full year of course work at South Texas College of Law, students may petition the College of Liberal Arts or the College of Geosciences for the degree to which, on the basis of their undergraduate record, they would be entitled. The Dean of the College will review each student's academic record at South Texas College of Law and, on that basis, recommend the granting of a bachelor's degree.

Students must follow all normal procedures for applying to the law school early in the junior year and are responsible for having their undergraduate courses approved by their academic advisor and for staying in contact with the prelaw advisor. Students in the program who are not accepted for early admission still have the option of completing their undergraduate degrees at Texas A&M University. For more information about the 3 + 3 Program, please contact the PreLaw Coordinator in the Office of Professional School Advising, (979) 847-8938 or prelaw@tamu.edu.

Two Degrees

A candidate pursuing a second baccalaureate degree must have completed all the essential work of the second curriculum not covered in the first. In all such cases, the total semester hours required must be at least 30 hours additional to the greater number required for either degree. The student must have a minimum of 36 hours of 300- and 400-level courses, 12 hours of which must be in the major field of study, in residence at Texas A&M. The student must also meet the citizenship requirements for history and political science.

Undergraduate Minor Programs

A minor is a concentration of courses that focus on a single area or an interdisciplinary perspective as developed by the department or program that offers the minor. The department or program offering the minor is responsible for setting enrollment limits and deciding which courses are used to meet the minor. Course work consists of 15–18 hours with a minimum of 6 in residence at the 300–400 level.

If a minor is offered by a department or academic unit, then the minor is considered to be available to all students as resources permit. The academic advisor in the major-granting department will add the minor for the student on SIMS. In some cases, approval by the advisor of the minor-granting department is required before the minor is added by the advisor in the student's major. Substitutions in a minor can be initiated by either the major- or minor-granting department, but must be approved by both departments. Students must declare a minor no later than the date on which they apply for graduation. A maximum of two minors can be completed by students. A minor is displayed on the transcript after graduation but not displayed on the diploma.

Graduation with Honors

To be eligible for graduation with honors, a student seeking a baccalaureate degree must enroll in and complete a minimum of 60 undergraduate semester hours preceding graduation at this institution. Course credit received by examination and for graduate level courses is not included in this total. The grade point ratio of all college hours attempted, excluding transfer hours, must equal that required at Texas A&M for the appropriate category of honors.

Graduation with honors in the professional curricula of the College of Veterinary Medicine and Biomedical Sciences will be based on the grade point ratio of credits earned while in the professional curricula at Texas A&M.

Categories for honors shall be designated as follows:

- Summa Cum Laude: A student may be graduated Summa Cum Laude with a grade point ratio of 3.90 or above.
- Magna Cum Laude: A student may be graduated Magna Cum Laude with a grade point ratio range of 3.70 through 3.899.
- Cum Laude: A student may be graduated Cum Laude with a grade point ratio range of 3.50 through 3.699.

Undergraduate and Graduate Degree Programs

Approved by the Texas Higher Education Coordinating Board

Interdisciplinary Degree Programs	Baccalaureate	Masters	Doctorate
Agribusiness	BS	MAB	
Biotechnology		MBIOT	
Engineering Systems Management ¹		MS	
Environmental Studies	BS		
Food Science and Technology		MS	PhD
Genetics ²		MS	PhD
Molecular and Environmental Plant Sciences		MS	PhD
Nutrition		MS	PhD
Spatial Sciences	BS		
Toxicology		MS	PhD
University Studies	BA, BS		
Water Management and Hydrological Science		MS, MWM	PhD
College of Agriculture and Life Sciences			
Interdepartmental Degree Programs			
Agricultural Chemistry		MAgr	
Agricultural Development		MAgr	
Animal Breeding		MS	PhD
Natural Resources Development		MNRD	
Plant Breeding		MS	PhD
Plant Protection		MAgr	
Plant Sciences		MAgr	
Renewable Natural Resources	BS		
Department of Agricultural Economics			
Agribusiness and Managerial Economics			PhD
Agricultural Economics	BS	MS, MAgr	PhD
Finance and Real Estate	X		
Food Marketing Systems	X		
Policy and Economic Analysis	X		
Rural Entrepreneurship	X		
Department of Agricultural Leadership, Education, and Communications			
Agricultural Communications and Journalism	BS		
Agricultural Education ³		MS, MEd	PhD, EdD ⁴
Agricultural Leadership and Development ³	BS		
Agricultural Science ³	BS		

¹ Jointly administered by the Dwight Look College of Engineering and the Mays Business School.

² Administered by the Colleges of Agriculture and Life Sciences, Medicine, Science and Veterinary Medicine and Biomedical Sciences.

³ Joint Program with College of Education and Human Development. Degrees conferred in College of Agriculture and Life Sciences.

⁴ Also offered as joint program with Texas Tech University when offered by Distance Education.

X Indicates option in major shown above.

College of Agriculture and Life Sciences	Baccalaureate	Masters	Doctorate
Department of Animal Science			
Animal Science	BS	MS, MAgr	PhD
Production/Industry	X		
Science	X		
Dairy Science	BS	MS, MAgr	
Dairy Manufacturing	X		
Dairy Production	X		
Physiology of Reproduction		MS	PhD
Department of Biochemistry and Biophysics			
Biochemistry	BS	MS	PhD
Biophysics		MS	
Genetics	BS		
Department of Biological and Agricultural Engineering			
Agricultural Systems Management	BS	MAgr	
Biological and Agricultural Engineering	BS	MS, MEng	PhD
Department of Ecosystem Science and Management			
Ecological Restoration	BS		
Forestry	BS	MS	PhD
Forest Resource Management	X		
Urban Forestry	X		
Rangeland Ecology and Management	BS	MS, MAgr	PhD
Ranch Management	X		
Rangeland Resources	X		
Spatial Sciences	BS		
Department of Entomology			
Economic Entomology		MAgr	
Entomology	BS	MS	PhD
Forensic and Investigative Sciences	BS		
Department of Horticultural Sciences			
Floriculture	BS	MS, MAgr	
Horticulture	BA, BS	MS, MAgr	PhD
Horticulture (Cooperative Program with Texas A&M University-Kingsville)			PhD
Department of Nutrition and Food Science			
Food Science and Technology	BS	MAgr	
Food Science	X		
Industry	X		
Nutritional Sciences	BS		
Department of Plant Pathology and Microbiology			
Bioenvironmental Sciences	BS		
Plant Pathology		MS	PhD
Department of Poultry Science			
Poultry Science	BS	MS, MAgr	PhD

College of Agriculture and Life Sciences	Baccalaureate	Masters	Doctorate
Department of Recreation, Park and Tourism Sciences			
Community Development	BS		
Recreation, Park and Tourism Sciences	BS	MS	PhD
Park and Natural Resources Management	X		
Recreation and Park Administration	X		
Tourism Resources Management	X		
Recreation and Resources Development		MRRD	
Rural Sociology		MAgr	
Department of Soil and Crop Sciences			
Agronomy	BS	MS, MAgr	PhD
Agro-Industry	X		
Soil and Crop Management	X		
Turfgrass Management	X		
Plant and Environmental Soil Science	BS		
Soil Science		MS	PhD
Department of Wildlife and Fisheries Sciences			
Fisheries Science		MFSC	
Wildlife and Fisheries Sciences	BS	MS	PhD
Aquatic Ecology and Conservation	X		
Wildlife Ecology and Conservation	X		
Vertebrate Zoology	X		
Wildlife Science		MWSC	
Wildlife Science (Joint Program with Texas A&M University-Kingsville)			PhD
College of Architecture			
Department of Architecture			
Architecture		MS, MArch	PhD
Environmental Design	BED		
Architectural Studies	X		
Visual Studies	X		
Department of Visualization			
Visualization Sciences		MS	
Department of Construction Science			
Construction Science	BS		
Construction Management		MS	
Department of Landscape Architecture and Urban Planning			
Landscape Architecture	BLA	MLA	
Land Development		MS	
Urban and Regional Planning		MUP	
Urban and Regional Sciences	BS		PhD
Mays Business School			
Interdepartmental Degree Programs			
Business Administration		MBA	PhD
Business Honors	BBA		
College of Business			
		MBA	PhD

Mays Business School	Baccalaureate	Masters	Doctorate
Department of Accounting			
Accounting	BBA	MS	
Business Administration—Accounting			X
Taxation		X	
Department of Finance			
Finance	BBA	MS	
Business Administration—Finance			X
Real Estate		MRE	
Department of Information and Operations Management			
Information and Operations Management	BBA		
Management Information Systems		MS	
Business Administration—Information and Operations Management			X
Department of Management			
Management	BBA	MS	
Business Administration—Management			X
Department of Marketing			
Marketing	BBA	MS	
Business Administration—Marketing			X
College of Education and Human Development			
Interdepartmental Degree Program			
Interdisciplinary Studies	BS		
Human Resource Development	BS		
Technology Management	BS		
Department of Agricultural Education			
Agricultural Education ⁵		MS, MEd	PhD, EdD
Department of Educational Administration and Human Resource Development			
Educational Administration		MS, MEd	PhD, EdD
Educational Human Resource Development		MS	PhD
Department of Educational Psychology			
Educational Psychology		MS, MEd	PhD
Career Development Education		X X	X
Educational Technology		MEd	
Counseling Psychology			PhD
School Psychology			PhD
Department of Health and Kinesiology			
Health	BS		
Community Health	X		
Health Education		MS, MEd	PhD, EdD
Kinesiology	BS	MS	PhD
Physical Education		MEd	EdD
Sport Management	BS		
Department of Teaching, Learning and Culture			
Curriculum and Instruction		MS, MEd	PhD, EdD
Interdisciplinary Studies	BS		

⁵ Joint program with the College of Agriculture and Life Sciences. Degree conferred by College of Agriculture and Life Sciences.

X Indicates option in major shown above.

Dwight Look College of Engineering	Baccalaureate	Masters	Doctorate
Interdepartmental Degree Programs			
Computer Engineering	BS	MS, MEng	PhD
Engineering		MEng	DEng
Interdisciplinary Engineering		MS	PhD
Materials Science and Engineering		MS, MEng	PhD
Safety Engineering		MS	
Department of Aerospace Engineering			
Aerospace Engineering	BS	MS, MEng	PhD
Department of Biomedical Engineering			
Biomedical Engineering	BS	MS, MEng	PhD
Artie McFerrin Department of Chemical Engineering			
Chemical Engineering	BS	MS, MEng	PhD
Zachry Department of Civil Engineering			
Civil Engineering	BS	MS, MEng	PhD
Ocean Engineering	BS	MS, MEng	PhD
Department of Computer Science			
Computer Science	BS	MS, MCS	PhD
Department of Electrical and Computer Engineering			
Electrical Engineering	BS	MS, MEng	PhD
Department of Engineering Technology and Industrial Distribution			
Engineering Technology	BS		
Electronics Engineering Technology	X		
Manufacturing and Mechanical Engineering Technology	X		
Telecommunications Engineering Technology	X		
Industrial Distribution	BS	MID	
Department of Industrial and Systems Engineering			
Industrial Engineering	BS	MS, MEng	PhD
Department of Mechanical Engineering			
Mechanical Engineering	BS	MS, MEng	PhD
Department of Nuclear Engineering			
Health Physics		MS	
Nuclear Engineering	BS	MS, MEng	PhD
Radiological Health Engineering	BS		
Harold Vance Department of Petroleum Engineering			
Petroleum Engineering	BS	MS, MEng	PhD
College of Geosciences			
Interdepartmental Degree Programs			
Environmental Geoscience	BS		
Environmental Studies	BS		
Geoscience		MGsc	
Spatial Sciences	BS		
Department of Atmospheric Sciences			
Atmospheric Sciences		MS	PhD
Meteorology	BS		

College of Geosciences	Baccalaureate	Masters	Doctorate
Department of Geography			
Geography	BS	MS	PhD
Geographic Information Science	X		
Department of Geology and Geophysics			
Earth Sciences	BS		
Geology	BA, BS	MS	PhD
Engineering Geology	X		
Geophysics	BS	MS	PhD
Department of Oceanography			
Oceanography		MS	PhD
<hr/>			
College of Liberal Arts			
Interdepartmental Degree Programs			
American Studies	BA		
Comparative Literature and Culture		MA	
International Studies	BA		
Department of Anthropology			
Anthropology	BA	MA	PhD
Department of Communication			
Communication	BA	MA	PhD
Telecommunication Media Studies	BA, BS		
Department of Economics			
Economics	BA, BS	MS	PhD
Department of English			
English	BA	MA	PhD
Department of European and Classical Languages and Cultures			
Classics	BA		
French	BA		
German	BA		
Russian	BA		
Department of Hispanic Studies			
Hispanic Studies			PhD*
Modern Languages		MA	
Spanish		X	
Spanish	BA		
Department of History			
History	BA	MA	PhD
Department of Performance Studies			
Music	BA		
Theatre Arts	BA		
Department of Philosophy and Humanities			
Philosophy	BA	MA	PhD
Department of Political Science			
Political Science	BA, BS	MA	PhD

* Step 1 Doctoral Program with Texas A&M International University, Texas A&M University-Corpus Christi, and Texas A&M University-Kingsville.

X Indicates option in major shown above.

College of Liberal Arts	Baccalaureate	Masters	Doctorate
Department of Psychology			
Psychology	BA, BS	MS	PhD
Community/Clinical			X
Industrial/Organizational			X
Department of Sociology			
Sociology	BA, BS	MS	PhD
College of Science			
Department of Biology			
Biology	BA, BS	MS	PhD
Botany		MS	PhD
Microbiology	BS	MS	PhD
Molecular and Cell Biology	BS		
Zoology	BS	MS	PhD
Pre-Dentistry ⁶			
Pre-Medicine ⁶			
Department of Chemistry			
Chemistry	BA, BS	MS	PhD
Department of Mathematics			
Applied Mathematical Sciences ⁷	BS		
Mathematics	BA, BS	MS	PhD
Department of Physics			
Physics	BA, BS	MS	PhD
Applied Physics			PhD
Department of Statistics			
Statistics ⁸		MS	PhD
College of Veterinary Medicine and Biomedical Sciences			
Laboratory Animal Medicine		MS	
Science and Technology in Journalism		MS	
Veterinary Medicine			DVM Professional
Veterinary Science	BS		
Biomedical Sciences	BS	MS	
Department of Veterinary Integrative Biosciences			
Epidemiology		MS	
Veterinary Public Health		MS	
Biomedical Sciences		MS	PhD
Department of Veterinary Large Animal Clinical Sciences			
Biomedical Sciences		MS	PhD
Department of Veterinary Pathobiology			
Veterinary Microbiology			PhD
Veterinary Pathobiology			PhD
Biomedical Sciences		MS	PhD

⁶ BS in Zoology awarded upon completion of a three-year pre-dental or pre-medical program and one year in an accredited dental or medical school.

⁷ Joint program between the Departments of Statistics and Mathematics.

⁸ Also offered through Distance Education.



**College of Veterinary Medicine and
Biomedical Sciences**

	Baccalaureate	Masters	Doctorate
Department of Veterinary Physiology and Pharmacology			
Biomedical Sciences		MS	PhD
Department of Veterinary Small Animal Clinical Sciences			
Biomedical Sciences		MS	PhD

**George Bush School of Government and
Public Service**

International Affairs		MIA	
Public Service and Administration		MPSA	

Texas A&M University at Galveston

Department of General Academics			
Maritime Studies	BA		
University Studies	BA, BS		
Department of Marine Biology			
Marine Biology	BS		
Marine Fisheries	BS		
Department of Marine Engineering Technology			
Marine Engineering Technology	BS		
Department of Marine Sciences			
Marine Resources Management		MARM	
Marine Sciences	BS		
Ocean and Coastal Resources	BS		
Department of Maritime Administration			
Maritime Administration	BS		
Department of Maritime Systems Engineering			
Maritime Systems Engineering	BS		
Department of Maritime Transportation			
Marine Transportation	BS		

Undergraduate Minors

Please see the college's undergraduate advisor for specific information.

Agriculture and Life Sciences

Agricultural Communications and Journalism
Agricultural Economics
Agronomy
Animal Science
Biochemistry
Bioenvironmental Sciences
Entomology
Environmental Soil Science
Forestry
Genetics
Horticulture
Park and Natural Resources
Poultry Science
Rangeland Ecology and Management
Tourism Resource Management
Wildlife and Fisheries Sciences

Architecture

Art and Architectural History
Global Art, Design and Construction
Urban and Regional Planning

Business

Business

Education

Applied Learning in Science, Technology Engineering, and Mathematics (STEM)
Coaching
Creative Studies
Dance
Sport Management

Engineering

Aerospace Engineering
Computer Science
Electrical Engineering
Industrial Engineering
Nuclear Engineering
Petroleum Engineering
Radiological Health Engineering

Geosciences

Earth Sciences
Geography
Geoinformatics
Geology
Geophysics
Meteorology
Oceanography

Liberal Arts

Africana Studies
Anthropology
Asian Studies
Classical Studies
Communication
Economics
English
Film Studies
French
German
Hispanic Studies
History
Italian Studies
Journalism
Linguistics
Music
Philosophy
Professional Writing
Psychology
Religious Studies
Russian
Sociology
Spanish
Theatre Arts
Women's Studies

Science

Biology
Chemistry
Mathematics
Neuroscience
Physics
Statistics

Veterinary Medicine and Biomedical Sciences

Biomedical Sciences

Admission

Application Information

The applications for undergraduate admission in the year 2009 are the Apply Texas Application for Admission to Texas Public Universities for freshman, transfer and international admission.

You may access the appropriate application from the Apply Texas Application Web site (www.applytexas.org) or the Texas A&M University Web site (admissions.tamu.edu). Additional information regarding admission may be obtained from:

Main Campus – College Station

Prospective Student Center

109 John J. Koldus Building

Texas A&M University

1265 TAMU

College Station, TX 77843-1265

(979) 458-0427

admissions@tamu.edu

Corpus Christi Regional

Prospective Student Center

5262 South Staples, Suite 115

Corpus Christi, TX 78411

(361) 289-7905

Dallas/Fort Worth Regional*

Prospective Student Center

5787 South Hampton Rd., Suite 430

Dallas, TX 75232

(214) 623-9039

Houston Regional

Prospective Student Center

1225 North Loop West, Suite 200

Houston, TX 77008

(713) 454-1990

Houston Regional Prospective

Student Center—Power Center

12401 South Post Oak Rd.

Houston, TX 77045

(713) 551-8719

*Location will change. Please call (979) 458-0427 for more information.

Laredo Regional

Prospective Student Center

107 Calle Del Norte, Suite 102

Laredo, TX 78041

(956) 795-0412

Rio Grande Valley Regional

Prospective Student Center

5237 North 23rd St.

McAllen, TX 78504

(956) 683-8647

San Antonio Regional

Prospective Student Center

40 NE Loop 410, Suite 605

San Antonio, TX 78216

(210) 212-7016

Office of Admissions and Records

Admissions Counseling

217 John J. Koldus Building

Texas A&M University

1265 TAMU

College Station, TX 77843-1265

(979) 845-3741

admissions@tamu.edu

The admission guidelines presented here are for admission to the spring, summer or fall 2009 semester. While they are the best guide available, admission criteria are subject to change. The 2009 freshman and transfer information guides contain the admission policies and procedures in effect for 2009 admission.

Types of Admission and Application Calendars

Definition	Application Calendar		
At the Time of Application	Term	Opening Date	Closing Date
<p>Freshman An applicant who:</p> <ul style="list-style-type: none"> • is a citizen or permanent resident of the United States* • is a degree-seeking applicant and is without college credit** or is still in high school, with or without college credit <p>* <i>Someone who has applied for permanent residency, or who qualifies for Texas residency based on SB 1528.</i> ** <i>An applicant who has enrolled in a post-secondary institution since high school graduation, with or without credit received, must apply as a transfer applicant.</i></p>	Spring 2009 Summer/Fall 2009	Sept. 1, 2008 Sept. 1, 2008	Oct. 15, 2008 Jan. 15, 2009
<p>Transfer An applicant who:</p> <ul style="list-style-type: none"> • is a citizen or permanent resident of the United States • is a degree-seeking applicant • has graduated from high school or equivalent • has enrolled in a post-secondary institution after graduation from high school • does not have a bachelor's degree • does not qualify for readmission 	Spring 2009 Summer/Fall 2009	Sept. 1, 2008 Jan. 1, 2009	Oct. 15, 2008 March 15, 2009
<p>International Freshman An applicant who:</p> <ul style="list-style-type: none"> • is not a citizen or permanent resident of the United States or an applicant for permanent residency • has never enrolled at Texas A&M as an undergraduate degree-seeking student • is someone who has not graduated from a Texas high school after three years of residence in Texas (if this applies to you, please apply as a U.S. freshman or U.S. transfer applicant). 	Spring 2009 Summer I 2009 Fall 2009 Spring 2010	April 1, 2008 Sept. 1, 2008 Sept. 1, 2008 April 1, 2009	Aug. 1, 2008 Nov. 1, 2008 Jan. 15, 2009 Aug. 1, 2009
<p>International Transfer An applicant who:</p> <ul style="list-style-type: none"> • is not a citizen or permanent resident of the United States or an applicant for permanent residency • has never enrolled at Texas A&M as an undergraduate degree-seeking student 	Spring 2009 Summer I 2009 Fall 2009	April 1, 2008 Sept. 1, 2008 Sept. 1, 2008	Aug. 1, 2008 Nov. 1, 2008 Feb. 1, 2009

Definition	Application Calendar		
At the Time of Application	Term	Opening Date	Closing Date
<p>Readmission An applicant who:</p> <ul style="list-style-type: none"> • is a former degree-seeking Texas A&M undergraduate student (including an international student) • does not have a bachelor's degree • did not officially register for the previous semester (excluding summer sessions) at Texas A&M <p>Readmission does not include applicants whose only previous enrollment at Texas A&M has been as a non-degree student.</p>	Spring 2009 Summer 2009 Fall 2009	Sept. 1, 2008 Jan. 1, 2009 Jan. 1, 2009	Nov. 15, 2008 May 1, 2009 Aug. 1, 2009
<p>Postbaccalaureate Undergraduate An applicant who:</p> <ul style="list-style-type: none"> • has a bachelor's degree • wishes to pursue a second undergraduate degree 	Spring 2009 Summer/Fall 2009	Sept. 1, 2008 Jan. 1, 2009	Oct. 15, 2008 March 15, 2009
<p>Non-degree An applicant who:</p> <ul style="list-style-type: none"> • wishes to take specific undergraduate course work • does not wish to pursue a degree at Texas A&M 	Spring 2009 Summer/Fall 2009 Summer only	Sept. 1, 2008 Jan. 1, 2009 Jan. 1, 2009	Oct. 15, 2008 March 15, 2009 May 1, 2009



Items Necessary to Complete an Application File

Please see the Readmission, Postbaccalaureate or Non-degree sections beginning on page 65 for other items required to complete the transfer application for those types of admission. U.S. citizens completing a non-U.S. high school program should refer to International Admissions on page 62 for questions concerning transcripts, examination results and foreign credentials.

An application is reviewed to make a decision about admission after all items listed below have been received. The items must be received by the appropriate closing date to assure consideration (please see page 42).

Application Form, preferably submitted electronically

- Completed and signed by applicant (if submitting paper application).
- Faxed applications will not be accepted.

Application Fee (check, money order, Visa, MasterCard, Discover or American Express)

- Domestic—Nonrefundable \$60
- International—Nonrefundable \$75
- If payment of the application fee creates an extreme financial hardship, please enclose verification of need for a fee waiver: Freshmen—a letter from school counselor verifying need criteria or SAT/ACT fee waiver form; Transfer/Readmission—a letter from post-secondary school financial aid counselor verifying need or a letter verifying state/federal financial assistance (i.e., Pell grant). No waiver of the international application fee is available.
- Checks or money orders are accepted, provided they display an agency bank in the United States and have magnetic ink character recognition (MICR) routing numbers at the bottom of the check. Make checks and money orders payable to Texas A&M University. The applicant's name and date of birth should be included on the face of the check or money order. Do not send cash.

Essays

- Freshman applicants are required to complete topics A and B. Essay C is strongly recommended for applicants who will be considered in the review process.
- Transfer applicants are required to complete topic A.

SAT or ACT Scores

- Required of all freshman applicants, including all international freshman applicants.
- Applicants must take the SAT with the writing component or the ACT with the writing component.
- Scores should be sent directly from the testing agency.
- The SAT code is 6003; the ACT code is 4198.
- Test scores with the writing component must be from a test date within five years of the date of planned enrollment.
- The highest test score from one test date will be used. Texas A&M does not allow combined test scores from different test dates.

Official High School Transcripts

- Freshman applicants who have not graduated from high school at the time of application must submit an official transcript indicating course work, credits earned, grades and class rank at least through their junior year. If admitted, the applicant will be required to submit a final transcript with graduation data.
- If the applicant's high school does not rank its students, a school profile from the high school must be provided as part of the application file.
- Freshman and transfer applicants who have graduated from high school at the time of application are to submit an official high school transcript that includes class rank and date of graduation, or a certificate verifying completion of a GED program.
- Readmit and postbaccalaureate applicants are not required to submit a high school transcript as part of the application file.
- To be considered official, a transcript must bear an original signature of a school official or an original school seal.
- Transcripts in a language other than English must be accompanied by an official English translation. Applicants who have attended high school both in the U.S. and out of the U.S. should submit official transcripts from each school attended.
- For students enrolled in the U.S., copies of official transcripts from other countries will be accepted provided the copies are on file and verified by the U.S. institution.
- Faxed copies are not official.

Official College Transcripts

- An official transcript is required from every post-secondary institution attended even if the applicant did not earn credit, receive a course grade or the course is not transferable. Course work from one college posted on the transcript of another college will not satisfy this requirement.
- Official transcripts on paper are to be sent by the sending institution in a sealed envelope. The transcript will not be considered official if the student has had access to the actual transcript.
- Transcripts in a language other than English must be accompanied by an official English translation.
- Fax copies are not official.
- For students enrolled in the U.S., copies of official transcripts from other countries will be accepted provided the copies are on file and verified by the U.S. institution.

Permanent Resident Card

An applicant who has permanent resident status in the United States must include a copy of both sides of the permanent resident card with the application to complete the application file. If their parent is also a permanent resident, a copy of the parent's card will be necessary to determine residency. If permanent resident card is not available, provide a copy/copies of the I-485 or the I-797 Notice of Receipt.

Notification of Application Status

Check the Applicant Information System (AIS) Web site at applicant.tamu.edu to verify your application has been received and to determine if any credentials are missing. Please allow two weeks to process credentials.

The Office of Admissions will make every effort to inform applicants of incomplete files through the AIS. If incomplete applications are received within one month of the closing date, there may not be sufficient time for the Office of Admissions to notify applicants. All items necessary to complete an application must be received by the Office of Admissions by the closing date to assure consideration for admission.

Freshman Admissions

When all credentials necessary to complete a freshman applicant's file are received during the admission application period, one of the following criteria will be used to determine who will be offered admission:

1. Top 10% Applicants from Texas High Schools

Applicants who are Texas residents or who are enrolled in recognized public or private high schools in Texas with a rank in the top 10% of their high school graduating class will be automatically admitted to Texas A&M University, but not necessarily to the major of choice.

These applicants must submit all required credentials by the closing date in order to qualify for automatic admission.

Choice of major preference will be given to the top 10% applicants who complete their admission applications with all required documents on or prior to the early admission closing date of December 1, 2008. Applicants who complete their files after this early admission date will be granted a major based on availability.

2. Academic Admits

Domestic applicants who rank in the top 25% of their high school graduating class, achieve a combined SAT math and SAT critical reading score of at least 1300, with a test score of at least 600 in each of these components of the SAT, or a composite ACT score of at least 30 with a test score of at least 27 in ACT math and ACT English, and meet minimum course work will be automatically admitted to Texas A&M University, but not necessarily to the major of choice. These applicants must submit all required credentials by the closing date to qualify for automatic admission.

Choice of major preference will be given to the applicants who complete their admission application with all required documents on or prior to the early admission closing date of December 1, 2008. Applicants who complete their file after this early admission date will be granted a major based on availability.

Notes:

- Freshman applicants who have selected a major in the Dwight Look College of Engineering are required to meet a minimum math score of 550 on the SAT or a minimum math score of 24 on the ACT.
- Students who began grade 9 in the 2007-08 school year and students thereafter are recommended to complete the new requirements for the Texas State Distinguished Achievement Program if they wish to be competitive during the review process for

admission to Texas A&M University. As a flagship institution, Texas A&M University requirements for admission are stringent, and only in rare cases will exceptions be made by the Director of Admissions. Texas A&M University admission requirements are in compliance with Texas Education Code section 51.803 and are subject to change.

3. Other Applicants

Applicants not meeting the above requirements will have their complete application file reviewed to make an admission decision. Factors considered are:

A. Minimum Required Course Work

- Four years of English
- Three and a half years of mathematics to include Algebra, Geometry, Algebra II and at least one-half year of advanced math
- Three years of science with at least two courses from Biology I, Chemistry I or Physics I

Only in exceptional cases will students be admitted without these minimum requirements. Most applicants who are offered admission will have taken courses well beyond the minimum and will have taken advantage of the most challenging courses their high schools offer.

We also recommend:

- Two years of the same foreign language.
Graduation from Texas A&M University requires that a student complete two years of the same foreign language in high school or one year of the same foreign language at the college or university level. Completion of these courses in high school is highly recommended.

B. Information Presented in the Application

- Extracurricular activities including time commitment and duration of involvement
- Leadership and/or exceptional talent as shown in extracurricular activities and/or work
- Community/volunteer work including time commitment and duration of involvement
- Awards and achievements earned while in high school
- Employment and/or internships including dates of work and hours per week
- Family educational background and household income

C. Essay Topics A and B

Freshman applicants must submit Essay Topics A and B from the Apply Texas Application. Essay C is strongly recommended for Review Admit applicants.

Information for all Freshman Applicants

- All applicants should use the application questions and the essays to present their academic background and personal strengths as well as personal circumstances.
- Letters of recommendation are not required. If an applicant chooses to submit letters of recommendation, be sure they validate or certify leadership, exceptional talent, or special circumstances. The most helpful letters are from individuals who know the applicant well and who can write about what distinguishes the individual from other applicants. Please submit no more than two letters of recommendation. Photocopies are acceptable.
- A competitive applicant who cannot be admitted to a major with restricted enrollment (Colleges of Architecture, Business, Engineering and Liberal Arts) will be offered admission to their second major choice or to General Studies. The General Studies major prepares freshmen and sophomores to transfer into other University majors. Successful change of major depends on student performance.
- A limited number of applicants who do not have the college preparatory course work or strong academic credentials may be offered provisional admission that requires the successful completion of a summer school program at Texas A&M University.



Notice of Admission Decision

Admission decisions are made throughout the application period and announced as soon as possible. A final decision may not be announced until early December for spring admission or early April for summer or fall admission. For summer or fall, some applicants who are not admitted may be offered the opportunity to accept placement on a wait list or consideration for the Blinn TEAM Program (see blinnteam.tamu.edu).

Suspected Fraudulent Admission Applications

Applicants for admission to Texas A&M University should be aware that the information submitted will be relied upon by University officials to determine their status for admission and residency for tuition purposes. By signing and submitting an admission application, the applicant certifies that the information in, and submitted with, the application is complete and correct and may be verified by Texas A&M University. The submission of false or incomplete information is grounds for rejection of the application, withdrawal of any offer of acceptance, cancellation of enrollment, or any other appropriate disciplinary action.

For prospective students (admitted but not enrolled), the initial determination of whether an individual has submitted a fraudulent application will be made by the Director of Admissions, with a final right of appeal to the Assistant Provost for Enrollment for undergraduate students and to the Dean of Graduate Studies for graduate students.

For enrolled students, the initial determination of whether a student submitted a fraudulent application will be made by the Registrar, with a final right of appeal to the University Disciplinary Appeals Panel or to the Graduate Appeals Panel.

Any University official who suspects that a prospective student or enrolled student has submitted a fraudulent admission application must notify the Director of Admissions or the Office of the Registrar.

Transfer Admissions

Transfer applicants are admitted to a specific major and are required to follow the curriculum of that major.

To prepare for transfer, identify your desired major and its Degree Track on page 54. Course work for the five Degree Tracks are presented on page 56. An applicant should complete as many courses as possible in Table 1 of the Degree Track for their desired major. Other courses that will fulfill degree requirements for that Degree Track are listed in Table 2. Students who begin a set of courses which have a two-semester sequence are encouraged to complete both courses in the sequence before transferring to Texas A&M.

Admission Criteria

- Transfer applicants must have at least a 2.5 grade point ratio (GPR) on at least 24 graded semester hours of transferable course work at the time of application to be considered.
- Students with less than 24 graded transferable hours will be denied admission.
- Transfer admission decisions are made by college and major and are competitive; thus, admission standards are not known until the review for admission occurs. Preference is given to the applicant with the highest grade point ratio (GPR) and the most courses completed in the Degree Track for the major designated on the application. See the College Specific Information for the college of the major for which you applied.

- Applicants who drop or withdraw from courses frequently and who do not achieve satisfactory grades routinely will be at a disadvantage in the review for admission.
- Spring grades may be used in the fall admission decision if received by June 1 and if space is still available in the intended major. A complete application must be on file by March 15, 2009. This is applicable to all U.S. citizens and international applicants studying in the U.S.
- The entire application, including essay topic A, is considered to identify admissible candidates.
- Some colleges consider second choice majors. While such admissions may be more competitive since they are made after applicants indicating that major as first choice, the admission decision follows the guidelines for that college presented in College Specific Information below. Note that several colleges do not consider second choice majors.

College Specific Information

College of Agriculture and Life Sciences. Applicants must have a 2.5 GPR on at least 24 hours of graded transferable course work at the time of application to be considered for admission. It is recommended that the courses be selected from Tables 1 and 2 of the Degree Track appropriate to their intended major (B, C, D, or E). Performance in courses applicable to the major, such as chemistry for Biochemistry or Animal Science and math for Agribusiness, is important. Completion of the essay indicating why the major was selected and how a degree in this major will help meet career goals is required in this college. Admission requirements vary greatly across the college so that the prospective student is strongly encouraged to contact the advisor for the major prior to submitting the application. For more information, refer to the College of Agriculture and Life Sciences Web site aglifesciences.tamu.edu.

College of Architecture. Applicants must have completed 24 hours of transferable course work at the time of application, and it is recommended that these courses be selected from the degree program electives described elsewhere in this catalog. The essay is an important component in the review process and should explain why the applicant is interested in either the Construction Science, Environmental Design (architecture and visual studies), Landscape Architecture, or Urban and Regional Sciences program. Applicants with less than a 3.0 GPR are rarely admitted. Applicants who select programs in the College of Architecture as their second choice will not be considered. For more information, visit archone.tamu.edu.

Mays Business School. No spring admissions are offered. Summer and fall applicants are expected to have completed and excelled in substantially all of the 27 semester hours of Table 1 of Degree Track E. Due to the competitiveness of the applicant pool, successful applicants will have a combination of As and Bs in this course work and a high overall GPR. For more information, visit mays.tamu.edu.

College of Education and Human Development. The College of Education and Human Development is actively seeking qualified transfer students who are interested in teacher certification. There is a nationwide demand for teachers. In particular, we are seeking students interested in high-need teaching fields: math, science, special education, bilingual, English as a Second Language, and foreign language. The College also offers a variety of non-certification programs.

To be considered for admission, an applicant should, **at the time of application**, have a minimum 2.5 GPR on at least 24 hours of graded transferable course work from Tables 1 and 2 of the Degree Track B. It is required that at least one math course and two science courses be taken from Table 1 and/or 2 prior to application. Admission to teacher preparation programs at Texas A&M for EC-4 and 4-8 requires a minimum 2.75 GPR. The college would prefer to see at least 12 hours of the following courses completed at the time of application.

Course Title	TAMU Number	TCCNS Number
English Composition I	ENGL 104	ENGL 1301
Public Speaking	COMM 203	SPCH 1315 or 1321
Science	BIOL 111 or CHEM 101	BIOL 1406 or CHEM 1411
Mathematics	MATH 141	MATH 1324
Mathematics	MATH 142	MATH 1325

Students interested in certification at grades 8–12 should complete a baccalaureate degree in a discipline area and contact the College regarding certification. **The College of Education and Human Development will not consider any second choice majors.** Applicants should refer to the college website educate.tamu.edu for more information.



Dwight Look College of Engineering.

Applicants should complete at least 24 hours of graded transferable course work at the time of application from Table 1 of the Degree Track appropriate to their intended major, all with a grade of C or better. Transfer admission GPR requirements vary by major, with the majority exceeding the minimum requirements for transfer admission consideration to Texas A&M. Those applicants indicating Engineering as their first choice major who are not admitted to their requested major may be offered alternate engineering major(s). For more information, visit engineering.tamu.edu.



College of Geosciences. Applicants will be considered on their GPR and on graded transferable course work **at the time of application** appropriate to their intended major. Students with a 3.0 GPR or higher are strongly preferred. GPR on most math and science courses is strongly weighed. The essay portion of the application is carefully reviewed in admission decisions. Prospective applicants are encouraged to contact the college through the Web site. Second choice majors are not considered. For more information, visit geosciences.tamu.edu.

College of Liberal Arts. Applicants will be considered on their overall GPR on at least 24 hours of graded transferable course work **at the time of application** from Tables 1 and 2 of the Degree Track appropriate to their intended major. Refer to this catalog for all electives in each curriculum. A limited number of applicants who are denied their first choice of college and who list the College of Liberal Arts as their second choice will be considered for admission on a competitive basis. For more information about majors, programs and curricular requirements, please refer to this catalog and the College of Liberal Arts Web site clla.tamu.edu.

College of Science. Applicants should complete Table I of Degree Track C or D, as appropriate to the choice of major, with a cumulative GPR of at least 3.00. Strength of schedule is a factor in determining admission. Applicants will not be admitted without completing the first two semesters of courses in their declared major with a 3.0 or higher GPR. Chemistry and Physics majors must also complete 8 hours of calculus I and II with a 3.0 or higher GPR. Biology students must complete 8 hours of Chemistry I and II with a 3.0 or higher GPR. The College of Science will consider second choice majors. For more information, visit science.tamu.edu.

College of Veterinary Medicine and Biomedical Sciences. Applicants should have a 3.00 GPR on at least 45 hours of graded transferable course work at the time of application and meet all Common Body of Knowledge requirements for biomedical science in order to be considered for admission into biomedical science. Students who begin a set of courses which have a two-semester sequence are encouraged to complete both courses in the sequence before transferring to Texas A&M. No second choice majors are considered. No summer admissions accepted. For more information, visit cvm.tamu.edu/bims.

General Studies. General Studies should only be listed as a second-choice major. Applicants should have at least a 3.00 GPR and at least 28 hours since graduation from high school, but less than 50 hours passed by their desired date of entry. They may be uncertain about their choice of major or their ability to be competitive in a particular major. Their transcripts will be reviewed to see if the student has been demonstrating the ability to complete all courses successfully, and to see if admission to General Studies appears to be in the best interest of the student in light of change-of-major requirements within the University. General Studies advisors can direct students to select courses for majors that offer similar opportunities and career tracks, but that have different grade requirements. For more information, visit gest.tamu.edu.

Notification of Admission Decisions

Transfer admission decisions are made through a competitive review process. These applicants are notified of the admission decision by early May for summer/fall admission (late November for spring). For those applicants submitting spring grades for fall consideration, decisions should be announced in early July.

Information for Transfer Applicants

1. Applicants to the Colleges of Architecture, Business, Engineering and Veterinary Medicine and Biomedical Sciences—Biomedical Science should refer to the Upper-Level Entry requirements on page 67.
2. At least a 2.0 GPR on course work in progress during the semester (excluding summer terms) immediately prior to enrollment at Texas A&M is a condition of admission.
3. Grades for all transferable courses are used in the computation of the GPR. This includes:
 - Failing grades, repeated courses, WF, Incomplete, etc.
 - Grades reported as Incomplete are computed as Fs.
 - Plus and minus grade designations are not used; C+ is computed as a C, B- as a B, etc.
4. Credit by examination courses which are transcribed from other colleges or universities may be transferred if sequential course work with credit is also indicated. If there is evidence that the credit by examination courses are part of the student's program of study at that institution, credit will be awarded for those courses that meet the transfer guidelines.
5. Course work taken as credit-by-exam must be listed as a specific course on an official college transcript to be considered in the admissions process and for transfer of credit.
6. Credit on course work completed at the time of application to Texas A&M is transferable only when an official transcript from the originating institution is presented as part of the application.

Residence Requirement for Baccalaureate Degree

A minimum of 36 semester hours of 300- and/or 400-level course work, with a minimum of 12 course hours in the major, must be successfully completed in residence at Texas A&M University to qualify for a baccalaureate degree.

Abbreviations for Texas A&M Colleges and Majors and Degree Tracks

	<u>Abbrev.</u>	<u>Track</u>		<u>Abbrev.</u>	<u>Track</u>
College of Agriculture and Life Sciences	AG		College of Education and Human Development	ED	
Agribusiness	AGBL	E ⁸	Health (Health Education)	EDHL	B
Agricultural Communication and Journalism	AGCJ	B	Health (Upper Level)	HLTH	
Agricultural Economics	AGEC	E ⁸	Interdisciplinary Studies (Early Childhood-4; Middle School)	EDIS ³	B
Agricultural Leadership and Development	ALED	B	Interdisciplinary Studies	ISNC	B
Agricultural Science	AGSC	B	Human Resources Development	HRDL	B
Agricultural Systems Management*	AGSM	B	Technology Management	TCML	B
Agronomy	AGRO	B	Interdisciplinary Studies (Special Education, Bilingual)	INST	B
Animal Science	ANSC	B	Kinesiology (Physical Activity)*	EDKI	B
Biochemistry	BICH	D ⁶	Secondary Education ³		
Bioenvironmental Sciences	BESC	C	Sport Management	EDSM	B
Biological and Agricultural Engineering	BAEN	D	University Studies	USEH	B
Community Development	CDEV	B			
Dairy Science	DASC	B	Dwight Look		
Ecological Restoration	ECOR	B	College of Engineering	EN ¹	
Entomology	ENTO	C	Aerospace Engineering	AERL	D
Environmental Studies	ENST	B	Biomedical Engineering	BMEL	D
Floriculture	FLOR	B	Biological Systems Engineering	BSEN	D
Food Science and Technology	FSTC	C	Chemical Engineering	CHEL	D
Forensic and Investigative Sciences	FIVL	C	Civil Engineering	CVEL	D
Forestry	FORS	B	Computer Engineering (Computer Science Track)	CECL	D
Genetics	GENE	D ⁶	Computer Science*	CPSL	B ⁹
Horticulture	HORT	B	Computer Engineering (Electrical Engineering track)	CEEL	D
Nutritional Sciences	NUSC	C	Electrical Engineering	ELEL	D
Plant and Environmental Soil Science	PSSC	D	Engineering Technology	ENTL	D
Poultry Science	POSC	B	Industrial Distribution*	IDIL	B ¹⁰
Rangeland Ecology and Management	RLEM	B ⁷	Industrial Engineering	INEL	D
Recreation, Park and Tourism Sciences	RPTS	B	Mechanical Engineering	MEEL	D
Renewable Natural Resources	RENR	B	Nuclear Engineering	NUEL	D
Spatial Sciences	SPSA	B	Ocean Engineering	OCEL	D
University Studies	USAL	B	Petroleum Engineering	PETL	D ¹¹
Wildlife and Fisheries Sciences	WFSC	B	Radiological Health Engineering	RHEL	D
			University Studies	USEN	D
College of Architecture	AR ¹		General Studies	GS ⁴	
Community Development	CDEV	B	General Studies (not open to transfer applicants except as a second choice major)	GEST	
Construction Science*	COSL	B ⁸			
Environmental Design*	ENDL ²	B ⁷			
Landscape Architecture*	LANL	B			
Urban and Regional Sciences	URSC	B			
University Studies	USAR	B			
Mays Business School**	BA ¹				
Agribusiness	BUAG	E ⁸			
Business	BUAD	E			
University Studies	USBU	E			

	Abbrev. Track			Abbrev. Track	
College of Geosciences	GE		College of Liberal Arts Cont.		
Earth Sciences*	ESCI	B	Psychology	PSYC	A or B ¹³
Environmental Geosciences	ENGS	D	Russian	RUSS	A
Environmental Studies	ENST	B ⁸	Sociology	SOCI	A or B ¹³
Geography	GEOG	B ⁸	Spanish	SPAN	A
			Telecommunication Media		
Geology	GEOG	B or D ¹²	Studies	TCMS	A or B ¹³
Geophysics	GEOG	D	Theatre Arts	THAR	A
Meteorology	METR	D	University Studies	USLA	B
Spatial Sciences	SPSG	B			
University Studies	USGE	B	College of Science	SC	
			Applied Mathematical Sciences	APMS	D
College of Liberal Arts	LA ¹		Biology	BIOL	C
American Studies	AMST	A	Chemistry	CHEM	D
Anthropology	ANTH	A	Mathematics	MATH	D
Classics	CLSS	A	Microbiology	MBIO	C
Communication	COMM	A	Molecular and Cell Biology	BMCB	C
Economics	ECON	A or B ¹³	Physics	PHYS	D
English	ENGL	A	University Studies	USSC	C
French	FREN	A	Zoology	ZOOL	C
German	GERM	A			
History	HIST	A	College of Veterinary Medicine		
International Studies	INTS	A	and Biomedical Sciences	VM ⁵	
Music	MUSC	A	Biomedical Science	BIMS	B or C
Philosophy	PHIL	A	University Studies	USVM	B
Political Science	POLS	A or B ¹³			

* See this catalog pertaining to your major for the specific science.

** No spring transfer admission.

Notes:

- All new students to the Colleges of Architecture, Business and Engineering enter the lower level.
- The curriculum leading to a professional degree in architecture begins in the four-year undergraduate environmental design degree program. This degree provides entry to the Master of Architecture program.
- All students seeking elementary teacher certification will complete a baccalaureate degree in Interdisciplinary Studies. There is no major in Secondary Teacher Education. All students seeking secondary certification (except those preparing to teach physical education or health) will major in an academic discipline other than education (i.e., mathematics, English, computer science, biology, etc.) and take appropriate course work for teacher certification in the College of Education and Human Development.
- Freshman applicants who have not decided on a major should indicate General Studies.
- Preveterinary medicine is not offered at Texas A&M. If you plan to apply to the Doctor of Veterinary Medicine (DVM) program, you should select a major that would be a good vocational choice if you do not later enter the DVM program. Any major may be selected; however, some curricula more closely parallel courses that must be completed before applying to the DVM program than others.
- Requires PHYS 201 (1301 and 1101) rather than PHYS 218.
- Either ENGL 210 or COMM 203 required, not both.
- COMM 203 not required.
- Requires MATH 151, 152 not MATH 141, 142.
- Requires CHEM 102; MATH 141, 151.
- COMM 203 can substitute for ENGL 210.
- Follow Degree Track B for a B.A. degree and Degree Track D for a B.S. degree. COMM 203 not required.
- Select the one Degree Track, A or B, that fits your degree objective (see Degree Tracks).

Table 1.

Degree Tracks A through E by Subject Area by Semester Hours of Course Work

Degree Tracks	A	B	C	D	E		
Subject Area	Most BA Degrees	BS-1	BS-2	BS-3	Business BA; BS-4	Texas A&M Course Number	State of Texas Common Course Number ¹
English Composition	3	3	3	3	3	ENGL 104	ENGL 1301
Technical Writing		3 ⁴	3	3		ENGL 210	ENGL 2311
Speech		3			3	COMM 203 ⁸	SPCH 1315 or 1321
Language ²	8 ²						
Science	4 ³	4 ³	16			BIOL 111, 112 CHEM 101, 111, 102, 112	BIOL 1406, 1407 CHEM 1411, 1412
Mathematics	3	3 ⁵	6 ⁶		6	MATH 141, 142 ⁵	MATH 1324, 1325
Mathematics Chemistry Physics				24 ⁷		MATH 151, 152 CHEM 101, 111, 102, 112 PHYS 218, 219	MATH 2413, 2414 CHEM 1411, 1412 PHYS 2425, 2426
Accounting Economics Management					15	ACCT 229 ACCT 230 ECON 202, 203 MGMT 211 ⁹	ACCT 2301 or 2401 ACCT 2302 or 2402 ECON 2302, 2301 BUSI 2302



Table 2.
Other Degree Track Courses to Complete Before Transfer by Subject Area
by Semester Hours of Course Work

Degree Tracks	A	B	C	D	E		
Subject Area	Most BA Degrees	BS-1	BS-2	BS-3	Business BBA; BS-4	Texas A&M Course Number	State of Texas Common Course Number ¹
U.S. History and Political Science	12	12	12	12	12	HIST 105, 106 POLS 206, 207	HIST 1301, 1302 GOVT 2305, 2306
Mathematics	3	3				See the section pertaining to your major for courses required in these subject areas. Texas Common Course Numbers are listed in Appendix B of this catalog or on the Web site admissions.tamu.edu .	
Natural Sciences	4	4			8		
Social and Behavioral Sciences	3	3	3	3	3 ¹⁰		
Humanities	3	3 ^{6, 11}	3	3 ¹¹	3		
Visual and Performing Arts	3	3	3	3	3		

Notes:

1. Texas Common Course Numbers: To assist students transferring from one school to another, many institutions of higher education in Texas have adopted the Texas Common Course Numbering System (TCCNS). For course equivalencies write to Undergraduate Admissions, Texas A&M University, P. O. Box 30014, College Station, TX 77842-3014 or www.tccns.org.
2. Bachelor of Arts degrees requirements in foreign language may be earned through examination or class work but must appear on the applicant's official college transcript.
3. See the section of this catalog pertaining to your major for the specific science requirement.
4. Interdisciplinary Studies majors in the College of Education and Human Development can take ENGL 203 (ENGL 1302) rather than ENGL 210 (ENGL 2311).
5. MATH 1325 is not acceptable as the mathematics prerequisite for medical or dental school. Students planning to apply for these professional programs should complete MATH 2413.
6. Humanities for the College of Architecture are limited to arts or architecture courses.
7. Environmental Geoscience majors in the College of Geosciences are not required to take PHYS 218, 219. See the section of this catalog pertaining to Environmental Geosciences for other science requirements.
8. COMM 205 is not required for Agricultural Economics (AGEC) or Agribusiness (AGBU) majors.
9. MGMT 211 is not required for Agricultural Economics (AGEC) majors.
10. Agricultural Economics (AGEC) majors fulfill this requirement by completing AGEC 105.
11. The Dwight Look College of Engineering requires ENGR 482 Engineering and Ethics for all majors except Industrial Distribution (IDIS).

Change of Curriculum to Another Campus

Texas A&M offers course work off campus. Participation in such programs or course work does not give the participant automatic campus enrollment privileges.

Students are eligible to change to another campus, center or location only after completion of a minimum of 30 graded hours earned while enrolled as a student in residence at the campus, center or location of admission. The 30 hours should include 29 graded hours (may include one pass/fail KINE course), with a minimum GPR of 2.50. For a change of curriculum to be approved, students must meet the conditions of their desired curriculum and space must be available at the campus, center or location of desired enrollment. Final approval is granted by the academic dean of the college that administers the curriculum.

Transfer Course Credit Policies

Transfer credit on course work complete at the time of application to Texas A&M University is transferable only when an official transcript from the originating institution is presented as part of the application for admission or readmission process.

The transfer of course credit will be determined by the Office of Admissions and Records on a course-by-course basis. Credit submitted for transfer must be on an official transcript received by the Office of Admissions and Records from the registrar of the institution where the credit was earned. Course content will be determined from the catalog description or the syllabus. The transfer of credit decision will be based on the following criteria. All criteria are to be considered together; for example, criteria 10 may be qualified by criteria 7.

Credit from Institutions Accredited by One of the Regional Accrediting Associations

1. A course that is normally considered as part of a bachelor's degree program (not including the bachelor of technology or similar terminal degree) may be transferred. The following criteria, taken together, are used:
 - a. The course is applicable to a bachelor's degree at Texas A&M.
 - b. The course is similar to a course or courses offered for degree credit by Texas A&M.
 - c. The course content is at or above the level of the beginning course in the subject matter offered by Texas A&M.
2. A course that is intended for use in a vocational, technical or occupational program will normally not transfer. In certain cases, credit for occupational skill courses will be considered. Transfer of this credit requires either that the student's Texas A&M major is engineering technology or industrial distribution or that the student's major department and dean approve the course for use in the student's degree program.
3. Credit for support courses such as math, science and English intended specifically for use in an occupational program will not be transferred.
4. Credit for the course must be shown on the official transcript in semester hours or in units that are readily converted to semester hours.
5. A graduate-level course will not be transferred for undergraduate credit unless approved for use in the student's undergraduate degree program by the student's major department and dean. This also applies for a course offered in a professional degree program such as nursing, law or medicine.
6. Credit by examination courses which are transcribed from other colleges or universities may be transferred if sequential course work with credit is also indicated. If there is evidence that the credit by examination courses are part of the student's program of study at that institution, credit will be awarded for those courses that meet the transfer guidelines.
7. Courses similar to ones offered by the Colleges of Agriculture and Life Sciences, Business, Engineering or Geosciences at the junior or senior level transfer by title only. Such courses may be used in the student's degree program only if approved by the department head and dean of the student's major field. Validation of such credit, either by examination or the completion of a higher level course, may be required.
8. A field experience, internship or student teaching course may be transferred by title only.
9. Credit for cooperative education will not be transferred.

10. A course that is substantially equivalent to a Texas A&M course transfers as an equivalent course. Two or more courses may be combined to form one or more equivalent courses. If there is doubt about the equivalency of a course, the Texas A&M department offering the course subject matter is asked to determine if the course is equivalent.
11. As a general policy, credit for admission will be given for transfer work satisfactorily completed with a passing grade at another properly accredited institution.
12. Grade Point Ratio (GPR) for any period shall be computed by dividing the total number of semester hours of transferable courses for which the student received grades into the total number of grade points earned in that period. Credit hours to which grades equivalent to Texas A&M grades of W, WF, F, I or U are assigned shall be included; those having grades equivalent to Texas A&M grades of WP, Q, S, X and NG shall be excluded.
13. In any case where a decision cannot be made using the above criteria, the Office of Admissions and Records will determine the transfer of credit based on University policy, previous actions of the University and prior experience.

Resolution of Transfer Disputes for Lower Division Courses Between Public Institutions in Texas

The following procedures shall be followed by public institutions of higher education in the resolution of credit transfer disputes involving lower-division courses:

1. If an institution of higher education does not accept course credit earned by a student at another institution of higher education, the receiving institution shall give written notice to the student and to the sending institution that transfer of the course credit is denied. A receiving institution shall also provide written notice of the reasons for denying credit for a particular course or set of courses at the request of the sending institution.
2. A student who receives notice as specified in subsection 1 may dispute the denial of credit by contacting a designated official at either the sending or the receiving institution.
3. The two institutions and the student shall attempt to resolve the transfer of the course credit in accordance with Board rules and guidelines.
4. If the transfer dispute is not resolved to the satisfaction of the student or the sending institution within 45 days after the date the student received written notice of denial, the institution that denies the course credit for transfer shall notify the Commissioner of its denial and the reasons for the denial.

The Commissioner of Higher Education or the Commissioner's designee shall make the final determination about the dispute concerning the transfer of course credit and give written notice of the determination to the involved student and institutions.

Credit from Nonaccredited Schools

Students who transfer to Texas A&M from an institution of higher education that is not accredited by one of the regional accrediting associations may validate the work taken at the institution by one of the following methods:

1. Successful completion of a comprehensive departmental examination or nationally standardized examination that is approved by the department.
2. Successful completion of a higher level course in the same subject area when approved by the head of the department and the dean of the college.

Credit will be given to students transferring from nonaccredited public colleges in Texas for work completed with grades of C or better if they earn a grade point of 2.0 (C average) on the first 30 hours of residence work at Texas A&M.

Credit from Abroad

Transfer work from institutions following other than the United States educational system with instruction in English will be evaluated on an individual basis. A-level examinations with a grade of “C” or better will transfer. Baccalaureate II examinations will not transfer; however, these students may take placement and proficiency examinations to receive credit by examination. Credit will be given for work satisfactorily completed at international institutions offering programs recognized by Texas A&M. Official credentials submitted directly from the Office of the Registrar and a listing of courses completed and grades awarded must accompany any request for transfer credit. Transfer work will be awarded by course title unless previous arrangements have been made using the Texas A&M University Study Abroad Transfer Credit Agreement Form. Courses must be equivalent in character and content to courses offered at Texas A&M.

No English composition courses will be transferred from institutions located in non-English speaking countries. American history and American political science (government) courses will not transfer from foreign institutions.

Courses taken at language training centers or institutes are generally not awarded transfer credit. A transcript from such an institution must be issued through the office of a Texas A&M recognized university, institute or language training center. Carefully check the credentials of all language centers and language institutes.



Credit for Military Experience

The University follows, with limitations, the recommendations of the American Council on Education (ACE) as published in the Guide to the Evaluation of Educational Experiences in the Armed Forces in granting credit for military service schools. At a minimum, the following guidance applies:

Courses must be in the “baccalaureate/associate degree category” as defined by the ACE guide. This precludes acceptance of almost all vocational, technical or certificate category courses, or military occupational specialties or job experience.

Students who have completed one year of active duty in the armed forces of the United States may be given academic credit for 4 semester hours for basic ROTC and 4 semester hours of Physical Activity (KINE 199).

For consideration of credit for military service schools, the applicant may submit the following military records:

1. a certified original of the DD Form 295, or
2. a copy of the DD Form 214, or
3. course completion certificates.
4. Army/ACE Registry Transcript System (AARTS)
5. Sailor/Marine ACE Registry Transcript System (SMARTS)

Extension and Correspondence Courses

Students may apply a maximum total of 30 semester hours of approved extension class work and correspondence study toward a degree. Students may apply up to 12 hours of correspondence credit earned through an accredited institution toward the requirements for an undergraduate degree, even though Texas A&M does not offer courses by correspondence.

Correspondence courses taken through the Defense Activity for Nontraditional Education Support (DANTES) may be accepted and included in the 12 hours allowed.

In order for a student in residence at Texas A&M to receive credit for correspondence work toward a bachelor's degree, he or she should:

- obtain advance written permission from the dean of his or her college;
- present appropriate evidence of having completed the course.

Measurement and Research Services is authorized to act as an agent to receive correspondence courses.

International Admission Criteria

Transcripts/Examination Results

Official academic records (transcripts, marksheets, etc.) are required for all secondary and any university work completed. Records should include all courses taken in high school and every college or university the applicant has attended.

Official records require the original seal or signature of the registrar, principal, headmaster or director of student records. Official records should be mailed from the school directly to Texas A&M University, Office of Admissions and Records. Examination results should be sent directly from the examination agency. In addition to the original records in a language other than English, Texas A&M requires official translations in English. Translations sent directly from the institution attended or from a recognized translator will be accepted. For students enrolled in the United States, we will accept copies of official transcripts from other countries that are on file and verified by the U.S. institution. Unofficial photocopies, fax copies and notarized copies of records, examination results or translations will not be accepted.

Admission Criteria for International Applicants with U.S. Based Credentials

International applicants that are completing their education at an institution that is accredited by the U.S. will be reviewed in accordance with the guidelines determined for domestic admission. However, these applicants must still meet international deadlines and testing requirements. (See item 2 below.)

Admission Criteria for International Applicants with Foreign Credentials

International applicants that are completing their education at an institution that is not accredited by the U.S. will be reviewed based on the following criteria:

1. Academic Achievement

- International applicants are expected to complete an educational program that will permit them to be considered for admission to a university in their home country. Examples include the completion of Grade 13, Form 6 or 3 A-level exams following O-levels. Predicted A-level exam results must be received by the application closing date.
- Successful applicants will rank near the top of their country's educational system (B average or better) and score well above average on national exams.
- Secondary school courses: Appropriate college preparatory course work is required.

2. Testing

SAT or ACT scores (with writing component) will be considered in the review criteria for international freshman applicants. Applicants whose native language is not English are required to demonstrate English proficiency by meeting any one of the following requirements:

- TOEFL scores of 550 paper-based test, 213 computer-based test, or 80 internet-based test
- IELTS with a 6.0 overall band score
- SAT Critical Reading score of 480 or higher
- ACT English score of 19 or higher
- Completed all four years of high school from a U.S. accredited high school.



3. Individual Achievement and Recognition

- Leadership positions held
- Honors/awards received
- Major national, state or Texas A&M scholarships received

Unofficial photocopies, fax copies and notarized copies of records, examination results or translations will not be accepted.

Additional Requirements for International Applicants After Admission

If admitted, international applicants must fulfill the following additional requirements before enrollment:

1. Declaration and Certification of Finances and Transfer-in Form

A Financial Resource Statement is sent with a letter of acceptance. This form must be completed and returned to Texas A&M University before the Certificate of Eligibility (I-20 or DS-2019) is issued. The Transfer-in Form is also mailed with the acceptance letter to all international applicants who are attending a school in the United States.

2. Advance Deposit

Because of monetary restrictions in some countries, a full year's expenses may be required as a deposit from some accepted applicants. When the student enrolls, the deposit is applied to the first semester expenses. The deposit is refunded to admitted applicants who do not attend Texas A&M.

3. English Verification/Certification

Texas A&M requires International undergraduate students to demonstrate the ability to speak, write and understand the English language. Undergraduate students may meet this requirement in one of five ways:

- A. official TOEFL score of 600 paper-based test, 250 computer-based test, or 100 internet-based test;
- B. official IELTS score of 7.0 overall band;
- C. have an official SAT critical reading score of 480, or ACT English score of 19;
- D. transfer from an accredited U.S. institution of higher education with at least 30 semester credit hours, including the equivalent to Texas A&M ENGL 104; or
- E. achieve English Language Proficiency Verification by taking the English Language Proficiency Examination (ELPE) prior to registration for the first semester at Texas A&M University. If remedial English classes are necessary, it will extend the time required to complete a degree.

Scholarship Information for International Students

Texas laws allows a limited number of admitted applicants who are citizens of Mexico and who can document financial need to receive an award which allows them to pay the same tuition as residents of the State of Texas. Some scholarships are not available for first-time international students, but all students are encouraged to complete online scholarship applications through the Student Financial Aid office. Additional information is available from:

International Student Services
Texas A&M University
1226 TAMU
College Station, TX 77843-1226
(979) 845-1825
iss@tamu.edu
international.tamu.edu/iss/

For additional information, please contact:

International Admissions
Texas A&M University
P. O. Box 40002
College Station, TX 77842-4002
(979) 845-1060
international-admission@tamu.edu

Admission Criteria for Other Application Types

Readmission Criteria

Admission decisions for readmission are based on the following:

- GPR on Texas A&M course work;
- GPR on course work since leaving Texas A&M;
- desired major; and
- information presented in the application.
- If you were previously admitted but did not attend class through the official census date, you must apply as either a freshman or transfer student.

Transcripts from institutions attended since the last enrollment at Texas A&M are required as follows:

If desired Readmission Term is	Must have transcripts through
2009 Spring semester	2008 Summer session
2009 Summer semester	2008 Fall semester
2009 Fall semester	2008 Fall semester if applying by June 1 or 2009 Spring semester if applying after June 1

Postbaccalaureate Undergraduate Criteria

Admission is limited and is intended for applicants with a degree who wish to apply for further study at the undergraduate level to pursue a second bachelor's degree.

Additional requirements to complete a postbaccalaureate application:

- an official transcript indicating the receipt of a recognized baccalaureate degree
- a statement explaining why enrollment at Texas A&M is necessary
- official transcripts from all colleges attended (official high school transcript not required)

Admission decisions for postbaccalaureate undergraduates consider:

- GPR on transferable college course work
- completion of prerequisite course work
- information presented in the application

Priority is given to qualified applicants for their initial degree; therefore, **postbaccalaureate undergraduate admission may be limited or may not be available**. See the Classification section of this catalog for the enrollment rights and privileges of this classification.

Undergraduate Non-degree Criteria

Admission is limited and is intended for applicants with a high school diploma (with the exception of high school concurrent enrollment participants) or for degree applicants who do not intend to pursue a baccalaureate degree at Texas A&M. This includes:

- local residents or University employees taking courses on a part-time basis
- applicants completing established Texas A&M University requirements for teacher or other certification
- applicants completing a prescribed set of courses as preparation for application to graduate study or professional programs (i.e., medical school, veterinary school, law school or CPA exam)
- others as deemed appropriate by the Office of Admissions and Records and the college or program of admission

Additional requirements to complete an undergraduate non-degree application:

- a statement explaining why enrollment at Texas A&M is desired
- a complete, official transcript showing high school graduation or the highest and latest collegiate course work attempted or completed
- additional information presented in the application may be considered

Priority is given to qualified applicants for their initial bachelor's degree; therefore, **non-degree admission may be limited or not available**. See the Classification section of this catalog for the enrollment rights and privileges of this classification.

Transient Session Only Criteria

Admission is considered for applicants who wish to attend one specific session only and who present appropriate credentials for the level of specified course work and apply within the processing period for the specific session.

Additional requirements to complete transient session only application:

- a statement explaining why enrollment at Texas A&M is desired
- a complete, official transcript showing the highest and latest collegiate course work attempted or completed

Academic Fresh Start Policy

Applicants for admission or readmission to Texas A&M may choose to have academic course work that was completed at least 10 years prior to their term of application removed from consideration in the admission decision (Texas residents only). All other admission requirements apply. Should a Fresh Start applicant be admitted, he or she will forfeit all credit earned prior to 10 years from the term of admission.

Admitted Fresh Start applicants have "Academic Fresh Start" indicated on their official Texas A&M transcript, are required to satisfy THEA requirements, and will follow the academic requirements of the Undergraduate Catalog of record for the term of admission.

Forfeited course work cannot be considered as prerequisites, but placement examinations are allowed for courses which were not considered for admission because of the Fresh Start Policy. Once admitted on Academic Fresh Start, the applicant or student cannot subsequently request that the Fresh Start policy restrictions be removed.

If an applicant has used the Academic Fresh Start Policy at a previous school, the Academic Fresh Start will remain in effect at Texas A&M upon transfer.

Upper-Level Entry into Colleges of Architecture, Business, Engineering and Veterinary Medicine and Biomedical Sciences– Biomedical Science

College of Architecture

Students who meet the entrance requirements for the College of Architecture enter with a lower-level classification in Construction Science (COSL), Environmental Design (ENDL), Landscape Architecture (LANL), or Urban and Regional Sciences (URSL). The lower level consists of University Core Curriculum requirements and introductory courses. Admission into the upper level, which consists of advanced work in the major field of study, will be based on the following criteria:

1. Students must have satisfactorily completed at least 54 hours of course work with a minimum GPR of 2.5 for those courses completed at Texas A&M University.
2. Students must have satisfactorily completed the following courses as part of the 54 hours of course work with a minimum of a 2.5 GPR for those completed at Texas A&M University.

MAJOR FIELDS OF STUDY		
Environmental Design		
<i>ARCH Studies</i>		<i>Visual Studies</i>
CARC 481		VIST 105, 106, 205, 206
ENDS 105, 106, 115, 116		MATH 151, 152
ARCH 205, 206, 212, 249, 250		VIST 201, 271
ENGL 104		ARTS 212
MATH 141, 142		ENDS 115
PHYS 201		PHYS 201
Construction Science	Landscape Architecture	Urban and Regional Studies
CHEM 101/111	ARCH 250	ENGL 104, 210
COSC 153, 253, 254, 275	COSC 253	MATH 141, 142
ENGL 104	ENDS 101, 150	POLS 206, 207
ENGL 210 or COMM 203	ENGL 104	ENDS 150 or ARCH 345
MATH 141, 142	LAND 200, 254, 255	PLAN 360, 365
PHYS 201/211	LAND 240 or 340	URSC 325
	MATH 141, 142	STAT 201
	RENRE 205, 215	RENRE 205, 215, 375
	Natural science elective	

3. **For Construction Science and Environmental Design Majors:** Students must make a grade of C or better in every College of Architecture course (ARCH, ARTS, CARC, COSC, ENDS, LAND, LDEV, PLAN, VIST) used to satisfy degree requirements. Students must also make a grade of C or better in any course used as an equivalent substitution for College of Architecture courses that satisfy degree requirements. **For Landscape Architecture Majors:** Students must make a grade of C or better in all required courses in a degree program.

4. **For Environmental Design Majors:** Students applying for the upper level must submit a portfolio that provides documentation of the applicant's design representation and creative problem solving abilities. Portfolios will be reviewed as evidence supporting design ability. Guidelines are outlined on the application form and in the college undergraduate advising office. Students will be admitted according to available space in the Architectural Studies and Visual Studies Options.
5. Students must apply for admission to the upper level through the department. The application is to be submitted the semester or summer session in which all of the above criteria will be met.
 - March 1 for summer admittance (for Construction Science, Landscape Architecture, and Urban and Regional Sciences students)
 - March 1 for summer and fall admittance (for Environmental Design students)
 - June 15 for fall admittance (for Construction Science, Landscape Architecture, and Urban and Regional Sciences students)
 - October 1 for spring admittance (for Construction Science and Landscape Architecture students)

Admission will be effective upon successful completion of in-progress courses. If all requirements are not met prior to the start of the following semester, admission will not be granted and registration in all upper-level course work in the College of Architecture canceled. Admission is not guaranteed. If there are more qualified applicants than there are spaces available, preference will be given to students based on their academic achievement.

Transfer Students

Transfer students, who meet the University entrance requirements and who desire to enter a major field of study in the College of Architecture, will be admitted based on available space and current College of Architecture entrance criteria. Following admission, all transfer students are placed on a 2.5 GPR probation for a minimum of 12 credit hours to substantiate competency in required lower-level courses. Transfer students will be admitted into the college with a lower-level classification and may apply for upper-level status after at least one semester at Texas A&M University.

Change of Major

Students currently enrolled in another major at Texas A&M University who desire to change their major field of study into the College of Architecture must fill out a Change of Curriculum application. Deadlines for applications are as follows:

- March 1 for summer admittance (for Construction Science, Environmental Design, Landscape Architecture, and Urban and Regional Sciences students)
- June 15 for fall admittance (for Construction Science, Landscape Architecture, and Urban and Regional Sciences students)
- October 1 for spring admittance (for Construction Science, Landscape Architecture, and Urban and Regional Sciences students)

Students will be notified of action on their applications within 30 days of the deadline date. **The college will admit the best-qualified applicants based on the number of spaces available in their program of choice.**

Mays Business School

Students who meet the University and college entrance requirements enter Mays Business School in the BUAD (lower-level business) classification. Enrollment of Mays Business School students in junior- and senior-level business courses is limited to those who have been admitted to upper level (also referred to as upper division) in one of the eight majors (B.B.A.: accounting, business honors, finance, management, management information systems, marketing, supply chain management or B.S.: agribusiness) in the college.

All GEST (General Studies) students are treated as BUAD students for consideration when pre-registering in upper-level business courses. GEST students must be admitted to Mays Business School prior to the first day of the semester for which they have pre-registered in upper-level business courses that are designated for business majors only.

Note: The degree of Bachelor of Science (B.S.) is offered in Agribusiness. B.S. (agribusiness) degree requirements and upper-level entry requirements are different than those for the B.B.A. and are found beginning on page 310.

The B.B.A. (accounting, business honors, finance, management, management information systems, marketing and supply chain management) upper-level entry requirements and application procedures are as follows:

1. To be admitted to an upper-level major, a student must be admitted to Mays Business School and must have:
 - a. Satisfactorily completed at least 60 semester credit hours.
 - b. Satisfactorily completed the following eight courses:

ACCT 229	Introductory Accounting—Financial
ACCT 230	Introductory Accounting—Managerial
ECON 202	Principles of Economics—Microeconomics
ECON 203	Principles of Economics—Macroeconomics
INFO 210	Fundamentals of Information Systems
MATH 141	Business Mathematics I
MATH 142	Business Mathematics II
MGMT 211	Legal and Social Environment of Business
 - c. BUAD students apply for upper level in the semester before they expect to enter upper level. Application deadlines are:
 - April 15 for June (summer semester) entry*
 - July 15 for September (fall semester) entry
 - November 15 for January (spring semester) entry
 *To enter upper level in the summer, all requirements must be completed by the beginning of the first summer session.
 - d. Admission to an upper-level major may be restricted by the availability of instructional resources.
 - e. Students are encouraged to complete the freshman and sophomore sequence of courses as listed under Curriculum in Business. BUAD and GEST students may pre-register for upper-level courses for the semester for which they have applied for upper level. However, BUAD and GEST students failing to complete upper-level requirements prior to the start of the semester shall not be permitted to remain enrolled in upper-level classes.

2. Transfer students:

Transfer students admitted to Mays Business School will be classified as BUAD (lower-level Business) students until they complete all requirements listed previously in item 1, at which time they may apply for admission to an upper-level major field of study in the business school. Transfer students may immediately apply for upper level when admitted to Mays Business School if, and only if, they meet all upper-level requirements at that time.

3. Change of curriculum students:

Texas A&M students who change curriculum into Mays Business School from another college or department at the University will be classified as BUAD (lower-level Business) students until they complete all requirements listed previously in item 1. Change of curriculum students who, when admitted to the business school, qualify to apply for admission to the upper level may do so.

4. Preference for available seats in junior- and senior-level business courses will be given to students who have been admitted to a degree granting major in Mays Business School. GEST students are treated as BUAD students and thus are not eligible for enrollment in upper-level business courses. All ineligible students who pre-register for upper-level business classes are subject to cancellation of their enrollment in these courses.

Dwight Look College of Engineering

Students who meet the University and college entrance requirements enter the Look College of Engineering with a lower-division classification. Enrollment in sophomore-, junior- and senior-level engineering courses will be restricted to those students who have been moved from that lower division to a major degree sequence within the Look College of Engineering. As noted below, students enrolled in engineering technology will take a limited number of sophomore-level engineering technology courses while in the lower-division classification. Admission to a major degree sequence may be limited by the availability of instructional resources. To be considered for admission to a major degree sequence a student must be in good academic standing and have received credit for specific courses referred to as the Common Body of Knowledge (CBK) courses.

Students seeking major degree sequence admission to Computer Science must have credit for CPSC 121, 181 and 221, ENGL 104, MATH 151, 152 and 302, and 8 hours of basic science or equivalent. Students seeking admission to a major degree sequence in Engineering Technology (ET), Electronics or Telecommunications ET option, must have credit for CHEM 107; CPSC 206; ENGL 104; ENTC 210, 219 and 250; MATH 151 and 152; and PHYS 218. Students seeking admission to a major degree sequence in Engineering Technology, Manufacturing and Mechanical ET option, must have credit for CHEM 107; ENGL 104; ENGR 111 and 112; ENTC 181, ENTC 206 or 207; MATH 151 and 152; and PHYS 218. Students seeking admission to a major degree sequence in industrial distribution must have credit for CHEM 107, ENGL 104, IDIS 240, MATH 141 and 151, and PHYS 201. All other students seeking admission to a major degree sequence in engineering must have credit for CHEM 107, ENGL 104, ENGR 111 and 112, MATH 151 and 152, and PHYS 218 and 208 or equivalent.

For most programs acceptance into the upper division of a degree sequence depends on (1) completing all CBK courses with a grade of C or better; (2) achieving the program's desired

grade average for the CBK courses; and (3) achieving the program's desired cumulative grade point average for courses taken at Texas A&M University. For most majors, grades of C or better are required in the CBK courses. For complete details concerning policies for repeating courses and admission to a major degree sequence in the Look College of Engineering, students should contact the Engineering Student Services and Academic Programs Office or the departmental advisor in their major department. Students may be allowed to remain as a lower-division student up to 60 hours, provided that they are in good standing and making progress as defined by their major department. At the 60-hour limit, students may be blocked from further registration in that department if the CBK and overall GPR requirements for upper division have not been achieved.



Transfer students, regardless of transfer hours, are admitted with a lower-division classification and must meet the same standards and criteria for admission to a major degree sequence as described above.

Although students are required to declare an intended major, many students enter engineering without a firm choice of major. As an aid to making a decision, the freshman courses ENGR 111 and 112, Foundations of Engineering, introduce students to engineering problems from the various disciplines. In addition, students may participate in career counseling sessions and attend presentations, career fairs and other activities sponsored by student engineering professional societies. Departmental advisors at New Student Conferences will help students select courses to fit their objectives.

College of Veterinary Medicine and Biomedical Sciences—Biomedical Science

1. A Biomedical Sciences (BIMS) major will be admitted into the upper-level courses according to the following criteria:
 - a. Completion of a set of Common Body of Knowledge (CBK) courses (35 hours to include BIOL 111 and 112; CHEM 101, 102, 111, 112, 227, 237, 228 and 238; PHYS 201 and 202; and MATH 131) with a grade of C or better in each course. Normally, for admission to BIMS upper-level courses, a student may have attempted a CBK course no more than twice.

- b. A minimum of 55 completed semester hours with a cumulative resident Grade Point Ratio (GPR) of 2.5 or better.

Process: Each student upon completing 55–65 semester credit hours must have a degree audit to verify upper-level eligibility.

2. The Biomedical Sciences Program will continue to accept changes of major into BIMS according to current Texas A&M University policy, but restrict changes of major into the upper-level courses (BIMS) according to the criteria listed in item 1. Students in other majors requesting a change of major to the BIMS program must also fulfill the criteria in item 1. In addition, the dean must verify availability of resources necessary to insure the student's full-time enrollment in required upper-level courses prior to admission to upper-level status. If such courses are not available, the student will be denied admission to Biomedical Science.
3. To enter BIMS upper-level courses, transfer students must have:
 - a. A minimum GPR of 2.5 in CBK courses with a grade of C or better in each completed course.
 - b. At least 55 semester credit hours with a minimum cumulative GPR of 2.5.
 - c. Transfer students admitted under another major and wishing to change into BIMS must complete one semester of graded course work at Texas A&M University with a cumulative resident GPR of 2.5.
4. Students seeking readmission will be considered on a case-by-case basis, according to current catalog policy. No quotas will be placed on readmission; however, the decision to readmit will be dependent on resource availability and University policy.
5. Any BIMS student admitted to upper-level courses who then falls below the 2.5 GPR requirement will not be considered in good academic standing in their major and will be placed on college probation. All Biomedical Sciences majors must follow established probation rules for the Biomedical Sciences Program.
6. The Dean, Director or Department Head will reserve the right to waive CBK or GPR requirements within the criteria established in *Texas A&M University Student Rules*.
7. No courses other than KINE 199, BIMS 481, 484 and 489, and 285/485s can be taken S/U to be used in the degree plan.
8. BIMS probation is determined at the end of the Spring semester. Students not meeting acceptable GPA requirements (2.5 majors) or (2.0 area of concentration and for BIMS minors) will be required to attend Texas A&M University that summer and repeat courses as needed to raise their GPA.
9. Students may only attempt CVM courses a total of three (3) times.

Course Credit

Measurement and Research Services

Measurement and Research Services has primary responsibility for conducting research about students' learning and development at Texas A&M and for management of testing programs. The unit serves as the center for credit by examination, placement testing and correspondence testing, as well as national standardized testing. Other services include publication of research reports about student characteristics and abilities, test validation studies and evaluation studies, scanning and scoring services, and student ratings of faculty.

Credit by Examination

Undergraduate students at Texas A&M may earn course credits by demonstrating superior achievement on tests offered through several examination programs. Credit by examination is available to freshmen who plan to enter the University and to students who are currently enrolled. Credit earned by examination does not contribute to a student's grade point ratio. The University awards credit for scores on certain tests published by the Advanced Placement Program (AP), the College Level Examination Program Computer-Based Testing (CLEP CBT), the SAT Subject Tests, DANTES Subject Standardized Tests (DSST) and the International Baccalaureate (IB) Program. Texas A&M also offers qualified students opportunities to earn credits by taking departmental examinations prepared by the faculty. Information concerning credit by examination may be obtained from Measurement and Research Services, (979) 845-0532.



Advanced Placement Program (AP)

Examinations offered by the AP are administered during late spring by high schools. Students usually take the examinations after completing Advanced Placement courses, although experience in an AP course is not required. Interested students should contact their high school counselors for information concerning registration and test sites. High school students and currently enrolled students should have the College Board forward their scores to Measurement and Research Services. Advanced Placement scores of entering freshmen are generally received in late July.

The following list includes all AP examinations currently accepted for credit.

AP Examination	Minimum Score Required	Texas A&M Course(s)	Credit Hours
Art History	4	ARTS 149, 150	6
Biology	4	BIOL 111, 112	8
Calculus AB	4*	MATH 151	4
Calculus BC	3*	MATH 151	4
	4*	MATH 151, 152	8
Chemistry	3	CHEM 101	4
	4	CHEM 101, 102	8
Comparative Governments	4	POLS 329	3
Computer Science A	4	CPSC 110	4
Computer Science AB	4	CPSC 110	4
Economics: Macroeconomics	4	ECON 203	3
Economics: Microeconomics	4	ECON 202	3
English Lang. and Comp.	3	ENGL 104	3
	4	ENGL 104, 241	6
English Lit. and Comp.	3	ENGL 104	3
	4	ENGL 104, 203	6
Environmental Science	3	GEOS 105	3
European History	4	HIST 102	3
French Language	3	FREN 101, 102	8
	5	FREN 101, 102, 201	11
German Language	3	GERM 101, 102	8
	5	GERM 101, 102, 201	11
Human Geography	3	GEOG 201	3
Latin: Vergil	3	CLAS 121, 122	8
	5	CLAS 121, 122, 221	11
Music Theory	4	MUSC 102	3
Physics B	3	PHYS 201, 202	8
Physics C: Mechanics	3†	PHYS 201 or 218	4
Physics C: Elect. and Magnetism	3†	PHYS 202, 208 or 219	4
Psychology	3	PSYC 107	3
Spanish Language	3	SPAN 101, 102	8
	5	SPAN 101, 102, 201	11



AP Examination	Minimum Score Required	Texas A&M Course(s)	Credit Hours
Spanish Literature	3	SPAN 202	3
	5	SPAN 202, 320	6
Statistics	3	STAT 301, 302 or 303	3
Studio Art: Drawing	4	ARTS 103, 111	6
Studio Art: 2-D	4	ARTS 103, 111, 112	9
U.S. Government and Politics	3	POLS 206	3
U.S. History	4	HIST 105, 106	6
Visual Arts	5	ARTS 103	3
World History	4	HIST 104	3

* Credit in MATH 151 may be substituted for MATH 131, 142 or 171. Credit in MATH 152 may be substituted for credit in MATH 172.

† Credit in physics is based on the curriculum of a student's intended major.

College Level Examination Program Computer-Based Testing (CLEP CBT)

CLEP CBT tests are designed to evaluate nontraditional college-level education such as independent study, correspondence work, etc. Both enrolled undergraduate students and entering freshmen may receive CLEP CBT credit for the courses which are listed below. Only examination titles below are currently accepted. The minimum scores listed below are based on the current version of CLEP CBT Examinations.

CLEP CBT Subject Examination	Minimum Score Required	Texas A&M Course(s)	Credit Hours
Algebra	50	MATH 102	3
American Government	50	POLS 206	3
American Literature	52†	ENGL 228	3
Biology	50	BIOL 111/112	8
Calculus with Elementary Functions	50	MATH 151 or MATH 171	4
Chemistry	45	CHEM 101	4
English Literature	53†	ENGL 231	3
Financial Accounting	50	ACCT 209	3
French	50	FREN 101	4
Freshman Composition	50*†	ENGL 104	3
German	50	GERM 101	4
History of the United States I: Early Colonization to 1877	65	HIST 105	3
History of the United States II: 1865 to the Present	65	HIST 106	3
Human Growth and Development	50	EPSY 320 or PSYC 307	3
Macroeconomics	50	ECON 203	3
Microeconomics	50	ECON 202	3
Pre-Calculus	50	MATH 150	4
Psychology, Introductory	50	PSYC 107	3
Sociology, Introductory	50	SOCI 205	3
Spanish	50	SPAN 101	4
Western Civilization I: Ancient Near East to 1648	65	HIST 101	3
Western Civilization II: 1648 to Present	65	HIST 102	3

* Students are not eligible to earn ENGL 104 credit by examination if they have earned more than 90 semester hours.

† Students must qualify on both the essay and objective portions of the test. The essay portion is an additional 90-minute test that may be taken immediately following the multiple-choice test, or may be scheduled at a later date and time. Students who fail a portion of any English test must retake both sections after a 6-month wait.

Dantes Subject Standardized Tests (DSST) Program

The DSST Program is available to all interested persons. These tests are untimed. Enrolled undergraduate students and entering freshmen may receive DSST credit for the courses listed below. For more information about the test, please contact Measurement and Research Services.

DSST Examination	Minimum Score Required	Texas A&M Course(s)	Credit Hours
Art of the Western World	50	ARTS 149, 150	6
Astronomy	48	ASTR 101	3
Business Law II	52	MGMT 212	3
Lifespan Develop. Psyc.	47	PSYC 307	3
Physical Geology	46	GEOL 103	3
Principles of Statistics	48	STAT 201 or PSYC 203	3

International Baccalaureate (IB)

Texas A&M University, in compliance with SB111, will grant at least 24 semester credit hours of course-specific college credit in subject-appropriate areas on all International Baccalaureate (IB) exam scores of 4 or above as long as the incoming freshman has earned an IB diploma. While some course credit will be awarded regardless of a student's IB diploma status, some course credit at Texas A&M University may be subject to the successful completion of the IB diploma.

Entering freshman students should submit their International Baccalaureate transcript to Texas A&M University, score recipient code: 01355, for review. Students should contact Measurement and Research Services regarding their eligibility for course credit. Students should work with an academic advisor to determine the use of the IB credits in their individual degree plan and the impact accepting the credit may have upon tuition rebate eligibility, tuition charges for excessive total hours, and preparedness for sequential course work based on IB test scores. Students will need to contact Measurement and Research Services in order to accept or deny the credit earned via IB tests.

Texas A&M University will notify IB applicants of their eligibility to receive credit by posting information on the Web site, www.tamu.edu/mars/testingsite/HTMLfiles/highschool.htm, and by establishing links to other web pages that are relevant to applicant students.

The evaluation of IB courses in order to identify the appropriate course credit is continuing and will be posted as it becomes available.

IB Higher Level Examination	Minimum Score Required	Texas A&M Course(s)	Credit Hours
Biology SL	4 w/diploma	BIOL 113/123	4
Biology HL	4	BIOL 111	4
	5	BIOL 111, 112	8
Business Management SL	4 w/diploma	MGMT 309	3
Business Management HL	4 w/diploma	MGMT 309	3
Chemistry SL	4 w/diploma	CHEM 106/116	4
Chemistry HL	4	CHEM 101	4
	5	CHEM 101, 102	8
Chinese: Language A or B SL	4 w/diploma	CHIN 101	4
	5 w/diploma	CHIN 101, 102	8
Chinese: Language A or B HL	4	CHIN 101, 102	8
	5	CHIN 101, 102, 201, 202	14
Computer Science SL	4 w/diploma	CPSC 111	4
Computer Science HL	4	CPSC 111	4
Economics SL	4 w/diploma	ECON 203	3
Economics HL	4	ECON 203	3
English: Lang. A SL	4 w/diploma	ENGL 104	3
English: Lang. A HL	4	ENGL 104	3
	5	ENGL 104, 222	6
Environmental Systems	4	GEOS 105	3
French: Lang. A or B SL	4 w/diploma	FREN 101	4
	5 w/diploma	FREN 101, 102	8
French: Lang. A or B HL	4	FREN 101, 102	8
	5	FREN 101, 102, 201, 202	14
Fundamentals of Music	5	MUSC 102, 202	6
Further Mathematics SL	4 w/diploma	MATH 102	3
	5	MATH 150	4
Geography SL	4 w/diploma	GEOG 201	3
Geography HL	4	GEOG 201	3
German: Lang. A or B SL	4 w/diploma	GERM 101	4
	5 w/diploma	GERM 101, 102	8
German: Lang. A or B HL	4	GERM 101, 102	8
	5	GERM 101, 102, 201, 202	14
History HL			
Africa	4 w/diploma	HIST 289	3
Americas	4 w/diploma	HIST 105	3
	5 w/diploma	HIST 105, 106	6
E & SE Asia and Oceania	4 w/diploma	HIST 289	3
Europe	4 w/diploma	HIST 102	3
South Asia & Middle East	4 w/diploma	HIST 289	3
History SL			
Islamic History	4 w/diploma	HIST 289	3

IB Higher Level Examination	Minimum Score Required	Texas A&M Course(s)	Credit Hours
Info Tech in a Global Society SL	4 w/diploma	PHIL 205	3
Info Tech in a Global Society HL	4	PHIL 205	3
Italian: Lang. A or B SL	4 w/ diploma 5 w/diploma	ITAL 101 ITAL 101, 102	4 8
Italian: Lang. A or B HL	4 5	ITAL 101, 102 ITAL 101, 102, 201, 202	8 14
Japanese: Lang. A or B SL	4 w/ diploma 5 w/diploma	JAPN 101 JAPN 101, 102	4 8
Japanese: Lang. A or B HL	4 5	JAPN 101, 102 JAPN 101, 102, 201, 202	8 14
Mathematics SL	4	MATH 150	4
Mathematics HL	4 5	MATH 150 MATH 150, 151	4 8
Mathematical Methods SL	4 w/diploma 5	MATH 102 MATH 150	3 4
Mathematical Studies SL	4 w/diploma 5	MATH 102 MATH 150	3 4
Music SL	4 w/diploma	MUSI 201	3
Music HL	4	MUSI 201	3
Other Languages SL	4 w/diploma 5 w/diploma	MODL 289 MODL 289	4 8
Other Languages HL	4 5	MODL 289 MODL 289	8 14
Philosophy SL	4 w/diploma	PHIL 251	3
Philosophy HL	4	PHIL 251	3
Physics SL	4 w/diploma	PHYS 205	4
Physics HL	4	PHYS 201, 202	4
Psychology SL	4 w/diploma	PSYC 107	3
Psychology HL	4	PSYC 107	3
Social and Cultural Anthropology SL	4 w/diploma	ANTH 210	3
Social and Cultural Anthropology HL	4	ANTH 210	3
Spanish: Lang. A or B SL	4 w/diploma 5 w/diploma	SPAN 101 SPAN 101, 102	4 8
Spanish: Lang. A or B HL	4 5	SPAN 101, 102 SPAN 101, 102, 201, 202	8 14
Theater Arts SL	4 w/diploma	THAR 101	3
Theater Arts HL	4	THAR 101	3
Visual Arts SL	4 w/diploma	ENDS 101	3
Visual Arts HL	4	ENDS 101	3

* Credit for MATH 151 may be substituted for MATH 131, 142 or 171.

SAT Subject Tests

Credits are offered to entering freshmen who score high on the SAT Subject Tests. High school students who are interested in taking these tests should contact their school counselors or write College Board ATP, Box 592, Princeton, NJ 08541.

Subject Test	Minimum Score Required	Texas A&M Course(s)	Credit Hours
Chemistry	630	CHEM 101	4
French	640	FREN 101	4
	740	FREN 101, 102	8
German	630	GERM 101	4
	740	GERM 101, 102	8
Italian	630	ITAL 101	4
	750	ITAL 101, 102	8
Latin	630	CLAS 121	4
	730	CLAS 121, 122	8
Physics	680	PHYS 201, 202	8
Spanish	630	SPAN 101	4
	750	SPAN 101, 102	8

* The minimum score required is based on the recentered scale. Students who took tests before April 1, 1995, should contact Measurement and Research Services to determine the minimum score required.

Departmental Examinations for Entering Freshmen and Currently Enrolled Students

Qualified entering freshmen may take departmental tests the day before their New Student Conferences prior to initial enrollment at Texas A&M. Entering freshmen and currently enrolled students can also take the exams throughout the year. Contact Measurement and Research Services for registration information. The tests are prepared by participating Texas A&M departments. Check the Credit by Examination brochure for eligibility requirements.

CHEM 101, 102

CPSC 110

PHYS 201, 202, 208, 218, 219

POLS 206, 207

Foreign Languages

(up to four semesters of course work

in French, German, Italian, Japanese,

Latin, Russian and Spanish)

Please note these regulations concerning credit by examination:

1. Test scores and/or credit eligibility must be reported formally to Measurement and Research Services for credit by examination to be awarded. Credit is posted to the academic record once appropriate scores are received by Measurement and Research Services and the student has officially enrolled in the University.
2. Students may not receive credit by examination for courses that are prerequisites to courses for which they already have credit except with the approval of the department authorizing the examination.
3. A student may not have credit posted for credit by examination for a course in which he or she is currently registered or has acquired a grade other than Q, W or NG.

Texas Success Initiative (TSI)

The Texas Success Initiative (TSI) was instituted to ensure that students enrolled in Texas public colleges and universities possess the necessary academic skills to perform effectively in college and to provide diagnostic information about reading, writing and mathematics skills of each student. All undergraduate students who did not meet one of the allowed exemptions must take the Texas Higher Education Assessment (THEA) test or an approved alternative.

Students who do not meet established cutoff scores or other approved exemptions for the THEA test are required by Texas law to be enrolled in, and actively attend, an academic skills course and/or program each semester prior to completing all TSI requirements. Academic skills courses in each of the three TSI areas are offered by Texas A&M. Failure to meet the attendance requirements of the academic skills course will result in withdrawal from Texas A&M. The hours for these courses will not count toward any degree program but may count toward determining full-time status.

Students required to take the THEA or alternative test should have their scores sent by the testing agency to Texas A&M University.

More information can be obtained from testing centers at most Texas public colleges and universities or by contacting:

National Evaluation Systems, Inc.

P. O. Box 140347

Austin, TX 78714-0347

or

Student Learning Center

1st Floor Hotard Hall

4230 TAMU

College Station, TX 77843-4230

(979) 845-2724

Texas A&M University at Galveston

Texas A&M University at Galveston offers undergraduate and graduate curricula leading to Texas A&M University degrees in maritime studies, marine biology, marine engineering technology, marine fisheries, marine sciences, marine transportation, maritime administration, maritime systems engineering, ocean and coastal resources, and marine resource management (master's level). Applicants who wish to enroll must meet all requirements for admission as specified in the current catalog for Texas A&M University at Galveston. Admission information for Texas A&M University at Galveston may be obtained from the Office of Student Relations in Galveston. Results of the Scholastic Aptitude Test (Code 6835) or American College Test (Code 6592) should be sent directly to Texas A&M University at Galveston. A program leading to licensing as a Merchant Marine officer is offered as an option in four of the curricula at Texas A&M University at Galveston.

For further information, see the section on Texas A&M University at Galveston.

Office of Student Relations
Texas A&M University at Galveston
P. O. Box 1675
Galveston, TX 77553-1675
(409) 740-4428
Toll free: 1-87-SEAAGGIE
seaaggie@tamug.edu
tamug.edu

Graduate Admission

For information or applications for graduate admission, please contact:

Office of Admissions and Records
Graduate Admissions
Texas A&M University
P. O. Box 40001
College Station, TX 77842-4001
graduate-admission@tamu.edu
admissions.tamu.edu
(979) 845-1060

The Graduate Catalog is available at the Texas A&M Bookstore at:

Texas A&M Bookstore
Texas A&M University
TAMU 1241
College Station, TX 77843-1241
tamu.bkstore.com

College of Veterinary Medicine and Biomedical Sciences

For admission information regarding the professional curriculum, please contact:

College of Veterinary Medicine and Biomedical Sciences
Office of the Dean
Texas A&M University
4461 TAMU
College Station, TX 77843-4461
(979) 845-5038
cvm.tamu.edu

Senior Citizens

Senior citizens, 65 years old or older may, with the permission of the instructor, audit courses if space is available in the assigned classroom. It is not necessary for senior citizens to be admitted to the University and academic records of their attendance will not be maintained.

Registration and Academic Status

Registration for the fall and spring semesters is accomplished at several times. In the preceding fall and spring semester (during November and April), a preregistration period is held for currently enrolled and readmitted students to register for the next semester. There are periods of announced open registration for students who were unable to preregister during the scheduled preregistration period. New Student Conferences serve as an opportunity for new undergraduate students to register. During the week before classes begin for a particular semester, there is a delayed registration period for students who have not already registered. Further information concerning registration may be obtained from the academic calendar published in this catalog or from the Office of the Registrar. The schedule of classes is available on the Internet at courses.tamu.edu.

Full-Time Student

A full-time undergraduate student is defined as one who is registered for 12 semester hours during a fall or spring semester, 4 hours in a five-week summer term and 8 hours in a 10-week summer semester. A Q grade or W grade does not count toward the certification of enrollment status. Only hours for which a student is currently enrolled at Texas A&M University can be used toward certification of enrollment.

Undergraduates Registering for Graduate Courses

A senior undergraduate student with a cumulative grade point ratio of at least 3.0 or approval of his/her academic dean, is eligible to enroll in a graduate course and reserve it for graduate credit by filing a petition obtained from the student's undergraduate college and approved by the course instructor, the student's major department head, the dean of the college offering the course, and the dean of the student's undergraduate college.

An academically superior undergraduate student with a cumulative grade point ratio of at least 3.25 or approval of his/her academic dean, is eligible to apply graduate credit hours toward his/her undergraduate degree programs by filing a petition obtained from the student's undergraduate college and approved by the course instructor, the student's major department head, the dean of the college offering the course, and the dean of the student's undergraduate college. Graduate credit hours used to meet the requirements for a baccalaureate degree may not be used to meet the requirements for a graduate degree.

Maximum Schedule

An undergraduate student with an overall grade point ratio of 3.0 or better may register for a course load in excess of 19 hours in a fall or spring semester or 6 hours (7 if part is laboratory) in a summer term with the approval of his or her advisor. An undergraduate student with an overall grade point ratio of less than 3.0 must obtain approval of his or her dean before registering for a course load in excess of 19 hours in a fall or spring semester or 6 hours (7 if part is laboratory) in a summer term.

Classification

Each student has a classification which indicates the type of degree program in which the student is enrolled (undergraduate, graduate or professional), and reflects the student's progress within that program at the undergraduate and professional levels. The classifications are:

Code	Classification Definition
U0	<p>Undergraduate Non-degree</p> <p>Students with a high school diploma (with the exception of high school concurrent enrollment participants) who do not intend to pursue a baccalaureate degree at Texas A&M University. This includes:</p> <ol style="list-style-type: none"> a. Summer session only students. b. Local residents or university employees taking courses on a part-time basis. c. Others as may be deemed appropriate by the Office of Admissions and Records and the college or program of admission. <p>Undergraduate non-degree students are not permitted to enroll in courses until all degree seeking students have had the opportunity to enroll. Undergraduate non-degree enrollment begins on the first day of open registration. Enrollment may be limited by college or program policies. Undergraduate non-degree students are limited to part time status except for summer session or because of extenuating circumstances which result in the approval of full-time status at the time of admission. Admitted students are not eligible for refund of the admission processing fee regardless of course availability.</p> <p>An undergraduate non-degree student must maintain a 2.0 GPR on all course work attempted to remain eligible to register. Enrollment is subject to review at the end of each semester of enrollment. Enrollment beyond two years of attendance will be approved only in exceptional cases.</p> <p>Should an undergraduate non-degree student desire admission to a degree program, regular formal application is necessary, including: a complete application for admission, the required application processing fee, the submission of all required credentials, and the meeting of all admission requirements.</p> <p>An undergraduate non-degree student may not take graduate-level course work.</p> <p>Undergraduate non-degree students are subject to TSI and English proficiency requirements.</p> <p>An undergraduate non-degree student does not qualify for financial aid through the University.</p> <p>With few exceptions, undergraduate non-degree status is not available to international students.</p>
U1	Freshman 0–29 hours
U2	Sophomore 30–59 hours
U3	Junior 60–94 hours
U4	Senior 95+ hours

Code	Classification Definition
U5	<p>Postbaccalaureate Undergraduate</p> <p>Students with a recognized baccalaureate degree who wish to complete requirements for a second baccalaureate degree at Texas A&M University or to complete established Texas A&M University certification requirements.</p> <p>The postbaccalaureate undergraduate classification (U5) has all the privileges and responsibilities of a senior classification (U4).</p> <p>Recipients of a Texas A&M University baccalaureate degree are not eligible for continued enrollment unless they have the specific approval of the college offering the second bachelor's degree or certification. Should they break enrollment, they must apply for readmission as second bachelor's degree candidates.</p> <p>A candidate for a second baccalaureate degree must complete all the essential work of the second degree not covered in the first. In all such cases, the total semester hours required must be at least 30 semester hours additional to the greater number required for either degree (see the section on Two Degrees in this catalog). To pursue a second baccalaureate degree concurrently with the pursuit of the initial degree, all essential work required for a second degree must be defined in advance in writing by the dean of the college granting the second degree. To pursue a second baccalaureate degree sequentially requires admission to a second bachelor's degree classification. Pursuit of a second baccalaureate degree may be limited or may not be allowed by some colleges.</p>
E0	<p>Extension, Undergraduate</p> <p>Up to 30 hours of extension work may apply toward an undergraduate degree.</p>
I0	<p>English Language Institute Only</p>

Code	Professional Classifications
V1	Veterinary Medicine, First Year
V2	Veterinary Medicine, Second Year
V3	Veterinary Medicine, Third Year
V4	Veterinary Medicine, Fourth Year

Academic Status

Distinguished Student and Dean's Honor Roll

An undergraduate student who completes a semester schedule of at least 15 hours or a summer session schedule of at least 12 hours with no grade lower than C and with a grade point ratio of not less than 3.5 for the semester or for a summer session shall be designated “distinguished student.” A student who, under the same circumstances, achieves a grade point ratio of at least 3.75 shall also be designated as a member of the “dean’s honor roll.” First semester freshmen must complete a semester schedule of at least 15 hours with no grade lower than a C, no Q-drops and with a grade point ratio of not less than 3.5 for “distinguished student” designation and a 3.75 for “dean’s honor roll.” Official notification of these designations will be issued to the student by the dean of the student’s college. The hours earned with a grade of S shall not be included in determining minimum hours required for the designation of “distinguished student” or “dean’s honor roll.” A grade of I or U disqualifies a student from being considered as a “distinguished student” or for the “dean’s honor roll.” Students who use grade exclusion must still meet the minimum of requirements in hours and grades to qualify for the appropriate honors. Grades of Q, W, and NG may not be included in the 15 graded hours. Only undergraduate courses or graduate courses used for the undergraduate degree will be used in either honors calculation.

Scholastic Probation

Scholastic probation is a conditional permission for an undergraduate student to continue in the University after he or she has become scholastically deficient. For university policy regarding scholastic deficiency and scholastic probation, see the Texas A&M University Student Rules at student-rules.tamu.edu.



Withdrawal from the University

A student wishing to withdraw from the University before the completion of a semester or summer term is required to comply with the official withdrawal procedure. This process is initiated with the dean of the student's college. Students may not withdraw after the Q-drop deadline. The student's dean will retain the authority to support a student withdrawal after the deadline.

During the summer session, a student must withdraw from the University under the following circumstances:

1. If the student is currently enrolled in only one of the following terms and decides to drop to zero hours (withdraw) in that term:
 - first 5-week summer term
 - second 5-week summer term
 - 10-week summer semester
2. If the student is currently enrolled in the 10-week summer semester and either of the 5-week terms and decides to drop to zero hours (withdraw) in both terms.

When a student withdraws from the University between the first class day, but before the Q-drop deadline, the Office of the Registrar will assign a grade of **W** to all courses enrolled in that semester. Any courses previously graded for that semester will be changed to **W**, and the **W** grades will be displayed on the permanent record.

Correct Addresses

It is necessary to have a correct residence address on file with the University. Students may change their address on the Web site myrecord.tamu.edu. International students must have a correct physical and permanent address. International students must go to the International Student Services Office to change the physical and the permanent address. The University assumes no obligation for failure of a student to receive communications.

Texas A&M uses email for official communications with currently enrolled students. It is each student's responsibility to claim his/her Texas A&M University email account at gateway.tamu.edu.

Grading System

Because students attend a college or university to extend their education, grades are usually taken as an indication of the proficiency of their endeavors. The student's semester grade in a course shall be based upon performance and/or participation in class, exercises and tests, laboratory work and final examination as applicable to the course. The proportionate weight assigned to each of the factors shall be determined by the department administering the course.

The basis upon which the final grade will be determined shall be distributed in written form to the class during the first two weeks of a semester and during the first week of a summer term.

There are five passing grades at the undergraduate level, A, B, C, D and S, representing varying degrees of achievement; these letters carry grade points and significance as follows:

A	Excellent, 4 grade points per semester hour
B	Good, 3 grade points per semester hour
C	Satisfactory, 2 grade points per semester hour
D	Passing, 1 grade point per semester hour
F	Failing, no grade points (hours included in GPR)
I	Incomplete, no grade points (hours not included in GPR)
NG	No grade, course dropped without penalty (hours not included in GPR)
Q	Dropped course with no penalty (hours not included in GPR)
S	Satisfactory (C or above), hours not included in GPR
U	Unsatisfactory (D or F), no grade points (hours included in GPR)
X	No grade submitted (hours not included in GPR)
W	Withdrew, hours not included in GPR (effective Spring 1996)
F*	Aggie Honor Code violation

There are two failing grades, F and U, indicating work of unsatisfactory quality.

Repetition of a Course to Improve Grade

Any undergraduate student who wishes to repeat a course must do so before he or she completes a more advanced course in the same subject. What constitutes a more advanced course will be determined by the head of the department offering the course.

Credit for a course failed may be obtained only by registering for and repeating the course in class. The original grade will remain on the student's permanent record, and both grades will be used in computing the GPR. An F or U previously made is not removed once the course is passed. Credit for each repeated course may only be used once toward degree requirements.

A student repeating a course in which a grade of B or better has been earned will not receive grade points for the repeated course, unless the catalog states the course may be repeated for credit.

First Year Grade Exclusion Policy

A fully admitted, currently enrolled Texas A&M undergraduate student as defined by the Texas Higher Education Coordinating Board as “first time in college”* may elect to exclude from his/her undergraduate degree and cumulative GPR calculation grades of D, F, or U. This exclusion shall be permitted for up to a maximum of three courses taken for credit at Texas A&M University during the twelve month period beginning with the student’s initial enrollment at Texas A&M.

The first year grade exclusion option may be used by current “first time in college” freshmen for courses taken in the twelve months beginning with their initial enrollment at Texas A&M. Sophomores, juniors and seniors also may use the exclusions for courses taken in their first twelve months as “first time in college” freshmen, dating from initial enrollment. All courses chosen for first year grade exclusion shall remain on the official transcript and be designated on the transcript as excluded.

First year grade exclusion cannot be invoked after a baccalaureate degree has been conferred upon the student. First Year Grade Exclusion requests for degree candidates must be received in the Office of the Registrar not later than 5 p.m. the day midterm grades are due when the student is graduating in a fall or spring semester or not later than 5 p.m. Friday of the third week of class for the second summer session when the student is graduating in August.

Additional information may be found at student-rules.tamu.edu or admissions.tamu.edu/Registrar/Current/GradeExPolicy.aspx.

* First time in college: an undergraduate, degree seeking student who applied and enrolled in college for the first time regardless of whether the student has acquired college level credit through testing, advanced placement or summer enrollment.

I and X Grades

A temporary grade of I (incomplete) at the end of a semester or summer term indicates that the student (graduate or undergraduate) has completed the course with the exception of a major quiz, final examination or other work. The instructor shall give this grade only when the deficiency is due to an authorized absence or other cause beyond the control of the student. When an instructor reports an incomplete grade to the Office of the Registrar, he or she will fill out an “Incomplete Grade Report,” which is filed with the department head. Copies are sent to the student and to the student’s academic dean. This report includes (1) a statement of the instructor’s reason for awarding the incomplete grade and (2) a statement concerning the remaining work to be completed before the last day of scheduled classes of the next fall or spring semester in which the student enrolls in the University unless the student’s academic dean, with the consent of the instructor (in the absence of the instructor, the department head), grants an extension of time for good reason. If the incomplete work is not completed within this time or if the student registers for the same course again, the I will be changed to an F by the Office of the Registrar. Grades of I assigned to 684, 691, 692 or 693 are excluded from this rule.

The X notation is assigned to a course by the Office of the Registrar at the end of a semester or summer term only when a grade is not submitted by the instructor. The Office of the Registrar will notify the dean of the college in which the course is taught that an X notation has been made. The dean of the college offering the course will request, through the department head, that the instructor submit a Grade Change Report Form removing the X notation and assigning a letter grade. The instructor will have 30 days from the beginning of the succeeding semester or summer term to report a change of grade to the Office of the

Registrar. If a Grade Change Report is not received during this time period, the Office of the Registrar will automatically remove the X notation and assign a grade of F. Grades of X assigned to 684, 691 or 692 are excluded from this rule.

Q-Drop and Add and Drop

1. A student may enroll in a class during the first five class days of a fall or spring semester or during the first four class days of the summer terms or a 10-week summer semester. A student requesting to add a course after these deadlines must have the approval of the student's dean and department.
2. A student may drop a course with no record during the first five class days of a fall or spring semester and during the first four class days of a summer term or a 10-week summer semester. Following this period, if approved by the dean of the student's college, a student may drop a course without penalty through the 50th class day of a fall or spring semester, the 15th class day of a summer term or the 35th class day of a 10-week summer semester. The symbol Q shall be given to indicate a drop without penalty.

Under section 51.907 of the Texas Education Code, "an institution of higher education may not permit a student to drop more than six courses, including any course a transfer student has dropped at another institution of higher education." This statute was enacted by the State of Texas in spring 2007 and applies to students who enroll in a Texas public institution of higher education as first-time freshmen in fall 2007 or later. Any course that a student drops is counted toward the six-course limit if "(1) the student was able to drop the course without receiving a grade or incurring an academic penalty; (2) the student's transcript indicates or will indicate that the student was enrolled in the course; and (3) the student is not dropping the course in order to withdraw from the institution." Some exemptions for good cause could allow a student to drop a course without having it counted toward this limit, but it is the responsibility of the student to establish that good cause.

Undergraduate students at Texas A&M University will normally be permitted three Q-drops during their undergraduate studies. However, in order to comply with this statute a student who has dropped courses at other Texas public institutions may not be permitted three Q-drops if the student's total number of dropped courses would exceed the State limit of six.

3. Any course taught on a shortened format or between regularly scheduled terms will have add/drop, Q-grade and withdrawal dates proportionally the same as if the course were offered in a regular term. These dates will be determined by the Office of the Registrar.
4. A student who drops a course after the Q-drop period has elapsed will receive a grade of F unless unusual circumstances exist as determined by the student's dean. A grade of W may be recorded by the dean of the student's college if it is determined such circumstances do exist.

Satisfactory/Unsatisfactory

1. Students must register for courses on an S/U basis during the official registration periods and shall not be permitted to change the basis on which their grades will be recorded on their official transcripts, except for unusual circumstances and with the approval of the student's academic dean.

Students entering Texas A&M University in the fall 2001 semester and later must enroll in their first KINE 199 on an S/U basis. Effective fall 2003, Health and Kinesiology majors must enroll in KINE 199 as a graded course.

Students registered for KINE 198 or additional classes of KINE 199 who wish to change the grade type from a graded course to S/U or from S/U to a graded course, may do so on the Web site myrecord.tamu.edu. All requests for KINE 198 and 199 changes must be completed on or before the Q-drop deadline for the fall, spring or summer semester.

2. Undergraduate Students
 - a. Undergraduate students may be permitted to take courses in their degree programs at Texas A&M University on a satisfactory/unsatisfactory (S/U) basis consistent with the requirements of the student's college.
 - b. The hours for which a student receives a grade of satisfactory shall not be included in the computation of the student's semester or cumulative grade point ratio; a grade of unsatisfactory shall be included in the computation of the student's grade points per credit hour as an F. A grade of satisfactory will be given only for grades of C and above; a grade of unsatisfactory will be given for grades D and F. The hours earned on a satisfactory/unsatisfactory basis shall not be included in the designation of distinguished student or dean's honor roll.
 - c. Students on probationary standing may be required to take KINE 199 or electives on an S/U basis as determined by published college policies.
3. Graduate students
 - a. Graduate students will not receive graduate degree credit for undergraduate degree courses taken on a satisfactory/unsatisfactory basis. Graduate students may take any graduate courses that are not used on their degree plans on an S/U basis.
 - b. A grade of satisfactory (S) will be given only for grades of A and B in graduate courses, and for grades of C and above in undergraduate and professional courses; a grade of unsatisfactory (U) will be given for grades of C and below in graduate courses, and for D and F grades in under-graduate and professional courses.
 - c. S/U grades are not included in the grade point ratio calculation for graduate students.
4. Courses numbered 681, 684, 690, 691, 692, 693, 695 and 697 are graded on an S/U basis only.

Semester Credit Hour

A lecture course which meets one hour per week for 15 weeks is worth 1 semester credit hour. Thus, a course worth 3 semester credit hours, meets three hours per week. Credit hours for laboratory courses are determined to be some fraction of the number of hours spent in class.

Grade Point Ratio (GPR)

For undergraduate students, only the grade made in course work for which the student was registered in this institution shall be used in determining his or her grade point ratio. Students anticipating graduating with honors should refer to that section of this catalog for information concerning the computation of grade point ratios for that purpose.

An undergraduate student's grade point ratio for any period shall be computed by dividing the total number of semester hours for which he or she received grades into the total number of grade points earned in that period. Semester credit hours to which grades of F or U are assigned shall be included; those involving grades of W, Q, S, X, NG and I shall be excluded.

Classification

Classification for academic purposes shall be based solely on scholastic progress as shown by the official records in the Office of the Registrar. Sophomore, junior and senior classification will be granted students who have passed 30, 60 and 95 semester hours, respectively.

Grade Reports

Midsemester Report

Near the middle of the fall and spring semesters, a preliminary report, showing the current progress of all undergraduate students who have completed less than 30 semester credit hours of course work at Texas A&M, and of a selected group of other undergraduate students that the academic deans/departments are monitoring will be made available. Preliminary grades are not recorded on the student's permanent record. Grades are available on myrecord.tamu.edu.

Final Grade Report

End of semester final grades are available on myrecord.tamu.edu. No student grade that is personally identifiable may be posted unless the student has given written consent in advance.

By means of reports at regular intervals and frequent conferences with the deans, the Office of the Registrar, personnel in the Office of the Vice President for Student Affairs and members of the teaching staff, university officials keep in close touch with the student's progress. Advice and counsel are offered from time to time as seem justified in each case. For failure to keep up with studies, the student may at any time be dropped from the rolls of the University.

Parent/Guardian Access to Grades

A parent or guardian may access midterm and final grades at myrecord.tamu.edu after the student sets the parent access password. Please discuss this with your student. The Office of the Registrar cannot see the passwords created by students for parental access; therefore, you must receive a password from your student.



Degree Audit

One degree audit will be produced on all undergraduate students during the semester that their total registered hours and earned hours are equal to or greater than 95 semester hours. No other complimentary audit will be automatically produced for currently enrolled students unless students become degree candidates. The audit is distributed by the dean of the college through the major department. The audit shows degree requirements completed or in progress, requirements remaining, and completed courses which will not apply toward this degree without approval of the dean. The audit is intended for use in advising and may contain errors. It remains the responsibility of the student to fulfill all published catalog requirements. Undergraduate degree audits may be obtained through Degree Audit, General Services Complex, 750 Agronomy Road, Suite 1501, College Station, TX 77843, at any time during a student's academic career.

Transcripts

Students applying for admission to Texas A&M are required to submit transcripts of previous academic work and in some cases, results of standardized tests. The submission of altered documents or the failure to furnish complete and accurate information on admission forms will be grounds for disciplinary action.

Individuals who have attended the University may obtain an official transcript of their completed work, provided they have no financial obligations to the University. A fee, which, according to state law must be paid in advance, will be charged for each copy. During grading and degree posting at the end of a semester or summer term, official transcripts may be produced for currently enrolled students only if all courses for that semester or term are shown as in progress (IP) or have all final grades posted. If both grades and IP are on the transcript in the same term, it will not be produced until all grades are available and the official GPR is calculated. Students and former students may request an official transcript in person, by mail, by fax or by completing the transcript request form at myrecord.tamu.edu. A faxed or internet request must be paid by using a credit card from a United States bank. Requests made in person or by mail may be paid with check, money order, Aggie Bucks or a credit card.

Tuition, Fees and Other Financial Information

General Information

Educational expenses for nine months will vary according to personal needs and course of study. The Financial Aid Office's basic budget for new undergraduate students including tuition and fees, books, supplies, transportation, on-campus room and board, incidental and living expenses comes to about \$19,035. Total expenses for returning students during an academic year should be slightly less than those for new students. The cost for new nonresident and international students is about \$27,482. All tuition and fee amounts provided herein represent the most accurate figures available at the time of publication and are subject to change without notice. University Rules in place at the time of publishing are reflected here. All are subject to change. The most current information available will be maintained on the Web site financialaid.tamu.edu.

Payment of Tuition and Fees

Students must meet all financial obligations to the University by their due dates to avoid late penalties. Failure to pay amounts owed may result in cancellation of the student's registration and their being barred from future enrollment and receiving official transcripts. State law requires that tuition and fees be paid prior to the first day of classes. Students who wish to pay fees in installments can select the option during registration or at aggie-pay.tamu.edu.

Tuition Rebates After Graduation

Certain undergraduate students who attempt no more than three hours in excess of the minimum number of semester credit hours required to complete the degree under the catalog under which they were graduated may be entitled to a \$1,000 tuition rebate after graduation. Several conditions apply and students must meet all of the specified criteria. If you wish to try and qualify for this program, please see the Web site sbs.tamu.edu for a complete set of student and institutional responsibilities and other criteria.

Obligation to Pay Tuition, Required Fees, Other Fees and Charges for Optional Services

By registering for classes, students agree to pay all tuition and required fees associated with their registration, optional services and other fees, whether paying in full or utilizing the installment payment option. Failure to pay tuition, fees and other charges may result in penalties, late registration fees and/or possible cancellation.

Financial Obligation for Graduating Students

According to Texas A&M University Student Rules and Chapter § 54.007 (c) of the Texas Education Code, all financial obligations to the University must be paid by the end of the semester. Failure to settle all financial obligations will result in withholding a student's diploma at graduation. Additionally, a block will be placed on the student's account which will prohibit registration in subsequent semesters and receipt of official transcripts.

Citations:

Section 14.15 of the Texas A&M University Student Rules states "The student must have settled all financial obligations to the University."

Chapter § 54.007 (c) of the Texas Education Code states "A student who fails to make payment prior to the end of the semester may be denied credit for the work done that semester."

Scholarships, Grants and Loans

All scholarships, grants and loans are applied to any outstanding charges before installments are calculated.

Payment Methods

Student account payment options include online e-checks and credit cards (American Express, Discover, and MasterCard) through Aggie-Pay (aggie-pay.tamu.edu), cash, personal checks, money orders, and Western Union Quick Collect. Visa credit cards are not accepted.

Personal checks:

- May be used to pay tuition and fees unless barred from doing so due to previous returned checks. Payment of tuition and fees with a returned check may result in cancellation of the student's registration and restrictions on use of personal checks across campus.
- May not exceed student account balance.

Installments

Tuition, most required fees, room, board and parking are payable in full, or in installments. A \$15 per semester service charge to cover the cost of handling will be assessed to each student who chooses to use the installment plan. Students may pay their account in full any time during a semester; however, the service fee will not be refunded once a payment is made under the three-payment installment plan.

Penalties and Late Registration Fees

Late Payment Penalty

There are severe penalties for failure to pay student account balances and installments by their specified due dates. If a payment is delinquent when a semester ends, the student will be blocked and may not receive credit for academic work performed. Students will not be readmitted to the University until all past due balances, including late charges, are paid. A \$25 late fee will be assessed for each payment not received on or before it is due. If a student is removed from the rolls of the University or is withdrawn for failure to pay amounts owed the University, a \$50 reinstatement fee will be assessed in addition to any other late fees or penalties already incurred and must be paid before the student will be reinstated.

Late Registration Fees

Students who register on or after the first day of classes are assessed a \$100 late registration fee. Students who register after the official census date (12th class day for fall or spring and 4th class day for summer) are assessed a \$200 late registration fee. Students who add classes after the official census date are assessed a \$50 late add fee. **Note: Penalties, late registration and late add fees also apply to students who are required to reenroll because their registrations were canceled for nonpayment.**

Use of Collection Agencies and Credit Bureau

If amounts become past due, the University reserves the right to report the account to the Credit Bureau. This will also initiate internal collection efforts and could cause the University to employ an outside collection agency to recover the debt. If any collection efforts must be made, the student will be required to pay all collection costs, including collection agency fees, legal fees and other costs incurred in collecting the amounts due.

Cancelling Registration

Once students have registered for classes, they must select one course of action from the following to remain in good standing with the University:

- pay all amounts due by the specified due date;
- use the online registration to drop all classes prior to the first day of classes; or
- contact the Dean's office of their college to begin the withdrawal process from the University after the first day of classes; then contact the Registrar's Office at (979) 845-7117 and request that their registration be canceled.

Following this procedure is especially important for students who have been awarded scholarships or financial aid since the aid may automatically pay tuition and fees and cause the registration to be held even though the student has decided not to attend. Failure to request cancellation of an unwanted registration may result in grades of F or I in all courses for the semester. The student will be required to reimburse the University for scholarships and other financial aid applied to his or her account and will be held responsible for paying all fees for the semester, regardless of whether he or she attended classes.

Cancellation for Nonpayment of Tuition or Fees

The University reserves the right to cancel registrations not paid by their due date, or the official census date for a semester or summer term, to comply with state laws requiring payment of tuition and fees, to free the classroom spaces for other students, and to ensure the most efficient use of university resources.

Tuition and Required Fees

All rates are the most current available at the time of printing and are subject to change. Please refer to the Web site sbs.tamu.edu for the latest tuition and fee information.

Tuition—Residents of Texas

Resident students pay \$156 per semester credit hour. Graduate students pay \$206 per semester credit hour.

Tuition—Nonresident and International

Nonresident and International students pay \$434 per semester credit hour. Nonresident and International graduate students pay \$484 per semester credit hour.

Nonresident Tuition Exemption

If you have any questions concerning your eligibility for exemption from nonresident tuition, you may contact the Student Accounts and Billing Services Office at (979) 845-8127 or your department.

Advising Services Fee

This \$9.10 per semester credit hour fee is a university-wide fee assessed to provide advising services not provided to students by members of the faculty. This fee includes but is not limited to support for General Academics, Honors Program, Professional School Advising, Cooperative Education, Student Learning Center, Placement Center, Office of Graduate Studies, various college advising offices and the infrastructure to support these offices and programs.

Bursar Services Fee

This \$0.55 per semester credit hour fee is assessed to provide effective and efficient support services for the assessment and collection of student tuition and fees, cashiering services, student long-term and short-term loan management, and student financial debt management.

Computer Access/Instructional Technology Fee

The computer access/instructional technology fee is charged at the rate of \$20.30 per semester credit hour to support equipment and services for student access to computing, networking and instructional technology at the University. The fee will be used to keep the classroom instructional multimedia equipment near state-of-the-art and to support faculty in utilizing instructional technology.

Distance Education Fee

Students registering for distance education courses will be assessed a \$40 per hour charge. This fee is to provide funding for computers, networking and other costs associated with distance education.

Energy Fee

This \$65 per semester fee (\$32.50 per summer 5-week term and \$65 for a 10-week summer semester) is required of all students to cover rising utility costs for Educational and General facilities on the Texas A&M University Campus.

Field Trip Fees

Field trip fees are assessed to cover the cost of providing trips and vary depending on the course taken and expected expenses.

Health Center Fee

This \$66 per semester fee (\$25 for a 5-week summer term and \$66 for a 10-week summer term) is required of all students for the purpose of operating, maintaining and equipping the University Health Center and entitles the student to its services. These services do not include surgical operations or charges for consultations with outside physicians requested by parents.



Identification Card (Aggie Card) Fee

Every student is required to have a student ID card. ID cards are permanent and students are responsible for maintaining a working ID throughout their career at the University. The Aggie Card is used for Aggie Bucks, residence hall access, registration, fee collection, financial aid disbursement, dining halls, athletic event and recreational sports admittance and library privileges. The charge is \$3 per semester. Replacement ID cards are \$12. Students who lose their IDs can report the loss immediately online at aggiebucks.tamu.edu and deactivating their card or by contacting:

Student Business Services
 Aggie Card Office, General Services Complex
 (979) 845-4661
 8 a.m.–5 p.m., Monday through Friday
 or
 The Network Availability Center (NAC)
 (979) 862-4884
 24 hours a day, seven days a week

You can now deactivate your Aggie Card online. Go to aggiebucks.tamu.edu, log in, and select the “deactivate Aggie Card” function.

Instructional Enhancement/Equipment Access Fees

The instructional enhancement/equipment access fees are charged to students enrolled in certain courses in the colleges/department listed below. The fee is used for the purchase and maintenance of equipment, visual aids, other supplemental materials and educational supplies to provide students with a rich learning environment.

College	Non-Distance	Distance
Agriculture and Life Sciences	\$0–200 per course	\$0–1,500 per course
Architecture		
Business		
Education and Human Development		
Engineering		
Geosciences		
Liberal Arts		
Science		
Veterinary Medicine and		
Biomedical Sciences		
Bush School		

International Education Fee

This \$4 per semester fee (\$2 for a 5-week summer term and \$4 for a 10-week summer semester) is assessed to all students to support student scholarships to pursue academic activities outside a student's country of citizenship.

International Student Services Fee

This \$46 fee (\$23 for a 5 week summer term and \$46 for a 10 week-summer semester) is required of all students who are not U.S. citizens or who are not U.S. permanent residents to offset the cost of specialized services International Student Services provides to these students, such as immigration advising, certificate of eligibility document issuance (I-20/DS-2019), verification and monitoring of legal status, status changes, extensions of legal status, approve or help with the approval of on and off campus work authorizations, social/academic adjustment, administration of special scholarships and programs for these students.

International Student Orientation Fee

This \$35 fee is a one-time fee charged to cover the cost of orientation programming for international students during their first semester of enrollment.

Laboratory Fees

The University is required to assess and collect a laboratory fee not to exceed \$30 for each laboratory course to cover in general the cost of laboratory materials and supplies used by a student.

Late Penalties

Students who fail to pay fees and installments when due are assessed a \$25 late payment fee for each payment or installment paid late.

Late Registration/Add Penalties

- Students who register on or after the first day of classes, but before the 13th day of classes are assessed a \$100 late registration fee.
- Students who register after the 12th class day are assessed a \$200 late registration penalty.
- Students who add classes after the 12th class day that result in a net increase in hours enrolled are assessed a \$50 late add fee.

Library Access Fee

All students pay this fee at the rate of \$23.30 per hour. These funds are used to provide new acquisitions, materials, etc. for campus libraries.

Reinstatement Fee

Students who fail to pay all fees by the last day of the semester will be administratively withdrawn from the University and charged a \$50 reinstatement fee.

Recreational Sports Center Fee

This \$98 per semester fee (\$49 for a 5-week summer term and \$98 for a 10-week summer semester) is assessed to all students attending the University for use of the recreational sports center.

Software Licensing Fee

This \$1.25 per semester credit hour fee (\$0.63 for 5-week summer term and \$1.25 for a 10-week summer semester) is assessed to provide campus-wide software site licenses for students and the associated administrative costs of managing these licenses.

Student Center Complex Fee

This \$40 fee (\$20 for a 5-week summer term and \$40 for a 10-week summer semester) is required of all students for operating, maintaining, improving and equipping the Student Center Complex.

Student Services Fee

All students pay this fee at the rate of \$13.83 per semester credit hour not to exceed \$165.96 per semester. It entitles the student to receive *The Battalion* newspaper, reduced admission to many Memorial Student Center (MSC) programs and the services of the Student Legal Advisor, MSC, Student Counseling Service, Student Activities Office and Recreational Sports.

Supplementary Fee for Courses Attempted More than Twice

A course that is repeated by a student more than twice at a public institution of higher education in Texas may not be reported for state funding. As a result, the institution must either pass the non-funded portion to all students, or charge a supplementary fee to the student who is repeating the course. Texas A&M has chosen to assess a supplementary fee to those students repeating a course more than twice.

A student attempting certain courses more than twice at Texas A&M University will be subject to a supplementary fee of \$125 per semester credit hour (\$375 for a 3 hour course) for the repeated course, in addition to tuition and required fees associated with the course. The general criteria for determining which courses are subject to the supplementary fee are:

- A course is subject to the fee if a student has completed it twice at Texas A&M University with a grade of A, B, C, D, F, F (academic dishonesty), S (satisfactory), U (unsatisfactory), I (incomplete), Q (authorized drop after the add/drop period) or X (no grade submitted).
- Courses identified by the University as repeatable for credit are not subject to the fee. A schedule of repeated courses can be found at admissions.tamu.edu/registrar/general/threepat.aspx.
- Courses dropped with no record (NR), no grade (NG) and withdrawals (W) are not counted as repeated courses.

Students will be notified at the time they register for a course that it has been taken twice at Texas A&M and is subject to the supplementary fee.



Transportation Fee

This \$70 per semester fee (\$35 for a 5-week summer term and \$70 for a 10-week summer semester) is assessed to provide unlimited fare-free access to all students to on-campus and off-campus services, and expanded service and revenue for a long-term bus replacement plan. In addition, revenue will pay for operating expenses and the enhancement of bus facilities on campus. Fee subject to change.

Undergraduate Tuition and Fees (estimate based on 2007–2008 Academic Year)

No. of Hours	Resident Student	Nonresident Student	International Student
3	\$1,016.99	\$1,850.99	\$1,896.99
6	\$1,689.98	\$3,357.98	\$3,403.98
9	\$2,362.97	\$4,864.97	\$4,910.97
12	\$3,517.46	\$6,853.46	\$6,899.46
15	\$3,667.46	\$7,837.46	\$7,883.46
18	\$3,817.46	\$8,821.46	\$8,867.46

Special Notes: “Residence” refers to whether you were a Texas resident at the time you enrolled in the University or a resident of another state or a foreign country. Rates used are the most current available at the time of printing and are subject to change. Please see information about equipment access fees and lab fees which may affect a student’s total charges. Actual fees may vary.

University Writing Center Fee

This \$8 per semester fee is assessed to provide support for the administrative and tutorial costs of the University Writing Center. The Center was established to enhance students’ writing skills and to incorporate “writing-in-the-disciplines” approaches to instruction.

Optional Campus Services

Installment Payment Option

Students who choose to pay using the installment plan pay a \$15 installment payment service charge per semester. This charge is non-refundable once a payment has been made.

Aggie Bucks

Aggie Bucks are a convenient way to purchase food, books and other services almost anywhere on campus. Students access Aggie Bucks using their student ID card (Aggie Card). The Aggie Bucks system tracks deposits and expenditures and reports the cardholders account balance with every purchase. There is no service fee for using Aggie Bucks. You receive \$1 worth of goods or services for each \$1 of Aggie Bucks purchased.

Aggie Bucks are fully refundable by request at the end of the semester and unused amounts will carry over from semester to semester. Graduating seniors' Aggie Buck accounts will automatically be refunded. Please allow four weeks for processing. Aggie Bucks accounts which remain inactive for 6 months will be charged a service fee of \$3 per month beginning with the 7th month and continuing through the 11th month or until account activity resumes. If, at the end of this 11-month period, there is still \$15 or more in the account, it will be automatically refunded to the cardholder's last known address. If the balance is less than \$15, it will be forfeited and placed in an Aggie Bucks Scholarship Fund.

For more information, call the Aggie Bucks office at (979) 845-4661, or visit the Web site aggiecard.tamu.edu. Report lost or stolen IDs at aggiebucks.tamu.edu.

Athletic Events

- Football only—student tickets for home football games (fall only) \$199.50.
- All Sports with Football—student tickets for all home sports (for all fall and spring sports) \$325.
- All Sports without Football—student tickets for all home sports (fall and spring) \$175.

Campus Dining Options/Meals

Campus Dining

Dining Services, with more than 40 locations available throughout the day, serves students in fulfilling their daily needs. With convenient locations near residence halls and class rooms, there are many diverse eateries available in a variety of formats—from all-you-can-eat dining centers, to food courts, snack bars, coffee shops and convenience stores. We are happy to cater to student's special needs—whether for health and nutrition information, organic or vegetarian options, even kosher and gluten-free meals. Contact us at (979) 845-3005 for any questions or special requests.

Meal Plans

Whether living on or off campus, Dining Services' meal plans offer increased flexibility and value in campus dining. Meal plans include individual meals and "Dining Dollar" options. Meal plan participants receive the lowest price for meals on campus (at least a dollar less per meal than retail buyers). Also, if using Dining Dollars instead of other forms of payment (cash, credit card, Aggie Bucks), plan users will receive an 8% discount on all purchases. Plans are valid from the first day of move-in (as designated by the Department of Residence Life) and ending after finals. All plan pricing listed includes 8.25% sales tax.

210 Meals/\$125 Dining Dollars	\$1,400
10 Meals/\$1,250 Dining Dollars	\$1,400
150 Meals/\$150 Dining Dollars	\$1,100
20 Meals/\$900 Dining Dollars	\$1,100
105 Meals/\$200 Dining Dollars.....	\$880
30 Meals/\$600 Dining Dollars	\$880
75 Meals.....	\$525
45 Meals.....	\$325

Average meal price in a campus dining facility without a meal plan: \$7.50; with a meal plan: \$5.75.

Meal plans are purchased each semester. Both meals and Dining Dollars can be used at any time throughout the semester for the purchase of food and beverage items only. Students can choose the meal plan that best fits their needs. Additional meals and Dining Dollars may be added on at any time throughout the semester.

Corps Meal Plans

Members of the Corps of Cadets are required to dine within Corps regulations. The Corps Commandant's Office requires that a specified number of meals be automatically deducted at the beginning of each semester for dining exclusively in Duncan Dining Center. Approximately 9 meals per week (or 126 meals per semester) are designated. Meals include breakfast and dinner, Monday through Thursday and breakfast on Friday (while classes are in session). Additional meal deductions may occur for FOW, SOW or other events as specified by the Corps. Any meals remaining from the original total purchased, after all requested meals are deducted, may be utilized on campus as needed in all dining facilities. Dining Dollars can be used at any on-campus dining location for the purchase of food and beverage items only throughout the semester.

240 Meals/\$125 Dining Dollars.....	\$1,600
210 Meals/\$75 Dining Dollars	\$1,360

Additional Meals and Dining Dollars

Dining Dollars and meals may be added at any time during the semester to an existing meal plan. Any purchases made following the published University payment deadlines are payable immediately.

10 Meals	\$60
1 Meal/\$25 Dining Dollars	\$30
4 Meals/\$100 Dining Dollars	\$110

For All Meal Plans

A maximum of \$100 Dining Dollars can be carried over each semester, with the purchase of another meal plan. No Dining Dollars will be carried over after the end of the Summer Sessions in August (Summer Session II and 10-week Session). Meals not eaten do not carry over to the next semester.

The students' University Identification Card (Aggie Card) must be presented to dining facility cashiers for meal plan/ Dining Dollar participation. According to University policy, no one is permitted to use or borrow another student's identification card; therefore, meal plan use is not transferable between students.

To purchase a meal plan, students may select the plan of their preference through the official university registration site under "Fee Options" during their class registration period or visit the Dining Services Web site diningservices.tamu.edu. Once the university registration is closed and/or meals have started for the semester, students will need to make all meal plan additions through the Dining Services Web site. All meal plans will be added to your university student account and are payable according to Student Business Services information under "Tuition and Fees" as published by Texas A&M University. Any purchases added following the published financial deadlines, including additional Dining Dollars, are payable immediately. Changes or drops/cancels to a meal plan require an email request and are permitted only through the fourth week of classes according to the University's schedule for tuition and fee adjustments.



For questions and assistance, please email dining@tamu.edu (include name, UIN and instructions if meal plan related) or contact our office at (979) 845-3005. Additional information on Dining Services and meal plans can be found on our Web site diningservices.tamu.edu.

MSC OPAS Tickets

This exciting optional fee enables Texas A&M students to purchase vouchers for tickets to MSC OPAS programs. This option is only available during fall registration but allows students to attend any six programs during the season. A limited number of students will be able to purchase this option due to seating capacity. For more information, please contact MSC OPAS at (979) 845-1661 or logon to www.MSCOPAS.org.

Parking Permit

All vehicles parked on the Texas A&M University campus are required to have a parking permit, unless they are parked in a pay visitor area. Permits are issued online by Transportation Services located in Room 108, Koldus Building. Costs of permits are subject to change. For more information, visit the Transportation Services Web site at transport.tamu.edu.

Student Parking Permit including West Campus Garage (12-month permit).....	\$264
Night Permit.....	\$85
Garage Non-Reserved Space.....	\$432
Motorcycle Permit—including mopeds and scooters.....	\$85
University Apartments.....	\$216

Residence Hall Room Rates

All students living in residence halls are required to pay room rent. Rooms are furnished with beds, mattresses, desks, chairs and dressers. Students are expected to furnish their own pillows, blankets, telephones and linens. Room rates include heat, air-conditioning, lights and cleaning of common areas. Rates are subject to change.

Commons: Aston, Dunn, Krueger, Mosher.....	\$4,400
Modular: Appelt, Clements, Eppright, Haas, Hobby, Lechner, McFadden, Neeley, Rudder, Underwood, Wells	\$4,806
Legett	\$3,050
Balcony (double occupancy): Fowler, Hughes, Keathley, McInnis, Schuhmacher.....	\$3,364
Balcony (single occupancy): Fowler, Hughes, Keathley, McInnis, Schuhmacher.....	\$5,046
Corridor: Dorms 1 through 12, Briggs, Crocker Davis-Gary, Moore, Moses, Spence	\$3,050
Corridor (single occupancy).....	\$4,575
Ramp: Hart, Walton.....	\$2,646

Student Directory

The cost is \$3.25 and includes sales tax.

Yearbook

The cost is \$64.90 including shipping and sales tax.

Fees for Other Special Items or Services

Application Fees

Graduate: \$50; Undergraduate: \$50; International: \$75

Career Center Fee

This \$50 fee is required for students in the semester they register for on-campus interviews to support full-time and internship placement services.

Cooperative Education Fee

A fee of \$75 is charged to all participants of the Cooperative Education program.

Diploma Fee

A non-refundable fee of \$40 per degree sought is assessed the semester a student applies for graduation. This fee is payable each time a student applies for graduation. The diploma fee is charged at the rate of \$50 to those who apply for graduation after the set deadline.

International Student Health Insurance

International students (students who are not U.S. citizens or permanent residents of the United States) enrolled at Texas A&M are required to have an approved health insurance plan. This is to ensure that medical treatment will be available in the event of injury or illness during enrollment at the University. This requirement includes students enrolled in extensive English language programs. Full-time English Language Institute (ELI) students should contact ELI for information about this. All other international students can receive more detailed information about this requirement by visiting the Web site at international.tamu.edu.iss/issheal.asp. Specific questions may be directed to:

International Student Services

First Floor Bizzell Hall East

(979) 845-6409

Fax (979) 862-4633

HealthInsurance@tamu.edu



Microfilming, Binding and Collating

Binding, collating, microfilming theses and dissertations—Masters: \$95, Doctoral: \$155

New Student Orientation Fee

A non-refundable new student orientation fee of \$75 is charged to all students.

ROTC Uniform Rental

Qualifying cadets enrolled in Army, Air Force or Naval ROTC will be reimbursed the cost of basic cadet uniforms. Cadets who are not enrolled in ROTC (Drills and Ceremonies Cadets) are required to pay for use of uniforms.

Sponsored International Students

An administrative fee not to exceed \$500 per semester or summer session (all or part thereof) will be required to support international sponsored students whose programs are coordinated through Sponsored Student Programs, unless these fees are waived as part of negotiated contractual agreements.

Teacher Education Admission Fee

A fee of \$200 is charged to all students entering the teacher education program.

Distance Education and Other Nontraditional Course Offerings

- | | |
|----|---|
| DE | Distance Education Instruction: This group includes traditional off-campus classes, all university centers and telecommunications, video and other nontraditional Distance Education Instruction delivery models. |
| IA | In Absentia: The traditional student who is performing individual research or completing degree requirements that do not require classroom instruction. |
| CE | Cooperative Registration: Students participating in the Cooperative Education Program at Texas A&M University. |
| GG | Texas A&M University Graduate Students—Galveston: Texas A&M graduate students who enrolled at College Station, but who are taking courses exclusively at Galveston. |
| SA | Study Abroad: Students participating in the Texas A&M University Study Abroad Program. |

Required Tuition and Fees	DE	IA	CE	GG	SA
Tuition	Yes	Yes	Yes	Yes	Yes
Advising Services Fee	Yes	Yes	Yes	Yes	Yes
Bursar Services Fee	Yes	Yes	Yes	Yes	Yes
Computer Access Fee	Yes	Yes	Yes	Yes	Yes
Cooperative Education Fee	No	No	Yes	No	No
Distance Learning Fee	Yes	No	No	No	No
Equipment Access Fees	Yes	Yes	Yes	Yes	Yes
Field Trip Fees	Yes	Yes	Yes	Yes	Yes
Health Center Fee	No	No	No	No	No
ID Maintenance Fee	Yes	Yes	Yes	Yes	Yes
International Education Fee	Yes	Yes	Yes	Yes	Yes
International Student Services Fees	Yes	Yes	Yes	Yes	Yes
Laboratory Fees	Yes	Yes	Yes	Yes	Yes
Library Access Fee	Yes	Yes	Yes	Yes	Yes
Property Deposit	Yes	Yes	Yes	Yes	Yes
Recreational Sports Fee	No	No	No	No	No
Sponsored International Student Fee	Yes	Yes	Yes	Yes	Yes
Student Services Fee	Yes	No	No	Yes	Yes
Transportation Fee	No	No	No	No	No
University Center Complex Fee	No	No	No	Yes	No
Writing Center Fee	No	No	No	N/A	No

Deposits

Property Deposit

Every student, unless registered in absentia, must make a property deposit to protect the University from damage to or loss of university property. Charges will be billed directly to the student or collected by the department upon reissue of supplies or property. Failure to pay the charges promptly will cause the student to be barred from re-admission and receiving an official transcript from the University. **If a student withdraws from the University without paying the charges, the deposit will be held for 30 days after the close of the semester or a student's withdrawal, so that all charges and fines may be totaled from the various departments. This deposit, less outstanding charges, will be returned upon request to the student graduating or withdrawing from school. Deposits not requested within four years from date of last attendance will be forfeited into a student deposit scholarship account.**

Residence Hall Deposit

A deposit of \$300 and a nonrefundable \$25 application fee are required to apply for a room in a residence hall. The deposit will be retained as a deposit against damage or late cancellation or to keep the application on an active waiting list. A reservation may be canceled and the deposit refunded upon request prior to signing a housing contract. After a housing contract has been signed for the next academic year, deposit refunds are made according to the following proposed schedule: Returning Students—April 1 for 100% refund, April 2–15 for 75% refund, April 16–May 1 for 50% refund, May 2–15 for 25% refund and after May 15 no refund; New Students—May 1 for 100% refund, May 2–15 for 25% refund and after May 15 no refund. The amount of the room deposit and the deposit refund schedule are subject to change per university administration approval.

Refund Policy

Fee Adjustments for Courses Added and Dropped

A student may drop courses during the first four days of a fall or spring semester. Students also may drop classes with special permission of the dean between the 6th and 12th class days. Full refunds will be given for courses dropped during these periods. Refunds will not be issued for classes dropped after the 12th class day. As of the first day of the semester, students may not drop all of their courses through the drop/add process, but instead must go to the office of their dean to officially withdraw. A student may add courses during the first five days of a fall or spring semester. Refunds are mailed to billing or local addresses.

Withdrawal from the University

Once a payment for tuition and fees has been accepted by the University, a student is considered officially enrolled unless otherwise restricted from enrolling. Stopping payment on a check for fees or allowing the check to be returned unpaid by the bank for any reason does not constitute official withdrawal. The withdrawal process is done in the Dean's Office of the college in which a student is registered. A withdrawal form will be issued in the Dean's Office that will explain exactly what the student needs to do. Failure to follow procedures for withdrawing from the University may result in financial penalties and delays with future enrollment in the University. Once a student registers, he or she is responsible for the total fees assessed regardless of whether the installment option is used. Refund percentages are applied to total fees assessed and not the amount paid. This means that students who withdraw before paying all installments may, in the event of withdrawal, receive a bill with a balance due rather than a refund.

International students must go by the International Student Services Office before withdrawing to determine if doing so will affect their visa status.

Recipients of financial assistance should talk to a Financial Aid Advisor before withdrawing. Students receiving funds awarded by Scholarships & Financial Aid should be aware of policies regarding withdrawal from the University. These policies are consistent with Federal regulation. Federal regulations require a return calculation for all students who receive Title IV student assistance at a post-secondary institution of higher education who withdraw during a payment period (semester). The length of time during which a return

must be calculated is up to 60 percent of the payment period. Students withdrawing prior to 60 percent of the payment period may be required to return funds not earned. Athletes should see their academic advisor in the Athletic Department before initiating the withdrawal process. Additionally, students who do not successfully complete any courses for the semester may be considered unofficially withdrawn and may be subject to a return calculation.

Tuition and Fee Adjustments

Tuition and fee adjustments shall be made to students officially withdrawing from the University for charges listed below according to the following refund schedule: Tuition and Required Fees, Residence Hall Rent, and Meal Plans (excluding Aggie Bucks).

Fall and Spring Semester and 10-Week Summer Semester

By 5 p.m. on the last business day before the first day of class	100%
During the first five class days	80%
During the second five class days	70%
During the third five class days	50%
During the fourth five class days	25%
After the fourth five class days	None

5-Week Summer Term

By 5 p.m. on the last business day before the first day of class	100%
During the first, second or third class day.....	80%
During the fourth, fifth or sixth class day.....	50%
Seventh day of class and thereafter.....	None

Residence Hall Rent/Deposit

If a student withdraws, moves off campus or in any other way terminates the housing contract, a refund of residence hall rent may be made according to the above schedules. Any changes to the rent refund schedule will be detailed in the housing contract. If a student cancels the academic year housing contract during the contract period, the \$300 deposit is subject to forfeiture. The academic year contract period is from the time the contract is signed to the end of the fourth week of classes in the spring semester. Exceptions to this policy may be made for students who cancel their contract for the following reasons: co-op or student teaching assignment, academic restriction, graduation and medical withdrawal.

Athletic Refunds

Refunds are not allowed for individual games or games missed. A prorated refund is permitted until the option is used to pick up a ticket for any one game. Once a ticket option has been used, prorated refunds will be given only in the event of withdrawal from the University. For information on refunds, contact the Athletic Business Office at (979) 845-2313, 113 G. Rollie White Coliseum.

Department of Dining Services Meal Plans Add/Change/Drop Policies

Dining Services' meal plans and options listed are based on information available at time of printing and are subject to change. The Department of Dining Services follows the University's refund schedule for Tuition and Fee Adjustments. Refunds are given on the percentage basis listed for students dropping fee options or officially withdrawing from the University.

Students may purchase a meal plan, change to a larger plan or add on to a plan during registration for classes or at any time through Dining Services. Changes to a smaller meal plan or requests to cancel/drop are permitted only through the fourth week of classes. The appropriate fee is to be paid to the Office of Student Business Services or by using the Web site AggieE-Pay.tamu.edu. Members of the Corps of Cadets are required to select one of the Corps Meal Plans and dine according to Corps regulations.

Meal plans are valid for one semester starting with the first day of campus move-in (as designated by the Department of Residence Life) and ending after finals. Check with Dining Services for posted dates for meal plan access. Location hours may vary during class breaks and meal availability may exclude official University holidays.

Following University policy, no one is authorized to use or borrow a student's identification card (Aggie Card); therefore, meal plans are not transferable between students. The Aggie Card must be presented to dining cashiers for meal plan participation. If an Aggie Card becomes lost, report it immediately using the 24-hour hotline at (979) 862-4884 or contact the Aggie Card Office.

For questions and assistance, please email dining@tamu.edu (include name, UIN and instructions if meal plan related) or contact our office at (979) 845-3005. Additional information on Dining Services and meal plans can be found on our Web site at diningservices.tamu.edu or in this catalog under Campus Dining Options.

Identification Card Maintenance Fee

No refund available for this fee.

Yearbook

Yearbook charges are refundable in full during the semester in which payment is made. Thereafter, no refunds will be made on orders canceled in subsequent semesters. Yearbooks must be picked up during the academic year in which they are published. Students who will not be on campus when the yearbooks are published must pay a mailing and handling fee. Yearbooks will not be held, nor will they be mailed, without payment of the mailing and handling fee. Refunds will not be made on books not picked up within one semester of the publication date. Refunds will not be made before 21 days from the date of payment. Refund policies contained herein reflect policies in effect at the time of publication and are subject to change.

Reductions in Rates for Late Entry to the University

No reduction will be made in the charge of room rent and board in case of entrance within 10 days after the opening of a semester or summer term, nor will a refund be made in case of withdrawal during the last 10 days of a semester or summer term, or the last days for which payment is made.

Financial Assistance and Scholarships

Financial Assistance

The financial assistance program is designed for all students who have a demonstrated financial need for assistance to meet college expenses and who are making satisfactory academic progress, as defined by Scholarships & Financial Aid. The Satisfactory Academic Progress policy is available on Scholarships & Financial Aid Web site at financialaid.tamu.edu. Students who are on conduct probation are not eligible for University-awarded scholarships.

In determining the type and amount of financial assistance necessary to meet a student's financial need, the University expects parents, students, and spouses to make a maximum effort to assist with college expenses. Financial assistance resources of the University should be viewed only as supplementary to the financial resources of the applicant and family.

To apply for financial assistance, a student must submit a Free Application for Federal Student Aid (FAFSA). Students are encouraged to submit their FAFSA on the Internet at www.fafsa.ed.gov as soon as possible. Only those students who have been accepted for enrollment and whose FAFSA results and other documents requested by Scholarships & Financial Aid are on file will be sent a financial aid offer. Financial aid offers will be sent beginning in March for the following academic year. Requests for financial assistance for the summer session must be processed prior to April 1. To apply for summer financial assistance, complete the Summer Supplement form online at myfinancialaid.tamu.edu.

The FAFSA is available via the Internet at www.fafsa.ed.gov, most college or university student financial aid offices, high school counselors or by contacting:

Scholarships & Financial Aid
Texas A&M University
P. O. Box 30016
College Station, TX 77842-3016
(979) 845-3236
financialaid@tamu.edu
financialaid.tamu.edu
FAFSA School Code 003632



Please visit our Web site for the most current information on programs and any associated deadlines at financialaid.tamu.edu.

Grants

The Federal Pell Grant is available to undergraduate students who have not received a baccalaureate degree and have demonstrated financial need as determined by the FAFSA. The Federal Pell Grant provides a foundation of financial assistance to which assistance from other sources may be added. The Academic Competitiveness Grant (ACG) and the National SMART Grant are also available to Pell eligible students who meet specific program requirements.

The Federal Supplemental Educational Opportunity Grant (FSEOG), and the Texas Public Education Grant (TPEG) are available to students, provided the results of their financial aid application show evidence of financial need and funds are available. These funds are awarded on a first come, first served basis. The Towards EXcellence, Access and Success (TEXAS) grant is available to Texas residents who have financial need according to the FAFSA and have completed the recommended or distinguished curriculum from an accredited public or private high school; it is also subject to funds availability.

Student Part-Time Employment

The Student Employment Office in Scholarships & Financial Aid coordinates student part-time employment, both off- and on-campus. Students may visit the Employment Resource Center in the Pavilion to access the online job database or may access it 24 hours a day on the Internet at jobsforaggies.tamu.edu. Work Study, assistantships and regular part-time positions are posted. Students secure their employment through job leads provided by Scholarships & Financial Aid or through their own initiative. Employment counseling is available to those students who have not had previous job seeking experience.

On-campus student employees are paid minimum wage or higher and are paid bi-weekly along with regular University employees. Student employees are not eligible for paid holidays, retirement, vacation or sick leave.

The Federal/Texas College Work Study Program

Both federal and state programs provide part-time employment for U.S. citizens, permanent residents and eligible non-residents, within fund limitations, who have an established financial need and desire campus employment.

To qualify for the Federal/Texas College Work Study Programs, a student must have submitted a FAFSA, have financial need, be enrolled or accepted for enrollment and be making satisfactory academic progress if enrolled.

The Community Service Program allows students who qualify for the Federal Work Study Program to work part-time with various local non-profit, governmental and community-based organizations. This program is designed to improve the quality of life for community residents, particularly low-income individuals or to solve particular problems related to their needs.

The Texas A&M University Reads and Counts program is a partner of the national No Child Left Behind initiative. It is based on the philosophy that children are our nation's greatest asset. It calls all Americans to support teachers and help ensure that every child can read well by the end of the third grade. Eligible and dedicated college students are called to serve as reading and math tutors, as well as mentors and role models for area elementary and middle school students.

All Work Study students are paid minimum wage or higher, work an average of 20 hours per week and do not receive fringe benefits. For more information on Federal/Texas College Work Study, the Community Service Program or Texas A&M University Reads and Counts, visit the Student Employment Office on the second floor of the Pavilion.

Loan Programs

The Federal Stafford Loan Programs and Federal Perkins Loan Program are available to students who have submitted a FAFSA. Students will be notified of their eligibility for the Stafford Loan program(s) and the Perkins Loan program through a financial aid offer. The Texas B-On-Time Loan program is available to Texas residents having completed the recommended or distinguished curriculum from an accredited public or private high school. Application information and/or promissory notes will be furnished with the financial aid offer, if applicable.

Students and parents seeking the Parent Loan for Undergraduate Students (PLUS), may obtain information from the financial aid Web site at financialaid.tamu.edu/PLUS.

Graduate students may apply for the Graduate Plus loan to assist with educational costs. This program requires the FAFSA to be on file with our department.

Short-term loans are available to provide assistance to students who experience temporary financial difficulties with educationally related expenses. Funding for this program is provided by The Association of Former Students and the Class of 1926 and other sources. This program is not meant to provide long-term assistance or to replace other assistance available through Scholarships & Financial Aid. Students must be degree-seeking and enrolled half-time to be eligible for short-term loans. The Emergency Tuition and Required Fees loan program is available to help students pay their Texas A&M University tuition and required fees. The loan is applied directly to the student's tuition and fee account.

Please refer to our Web site at financialaid.tamu.edu for detailed information on all of the mentioned programs and more.

Other Services

The Money Wise Aggie, Texas A&M University's personal finance advising and educational program, is designed to help students make smart personal finance decisions while pursuing their academic degrees and to lay a foundation for financial success throughout life.

The Money Wise Aggie is a free service to students that provides personal advising and presentations in the following areas:

- Creating a Budget
- Credit Cards and Credit Scores
- Premarital Money Discussions
- Financial Challenges After College
- Debt Reduction Strategies
- Identity Theft
- Financial Aid
- Saving and Investing
- Major Purchases (Cars and Homes)

All advisors participating in The Money Wise Aggie program are financial aid counselors who have been awarded the Accredited Financial Counselor™ or Certified Financial Planner™ designations. Each advisor provides objective, unbiased advice to help students make informed decisions about their finances. Advisors also provide scheduled presentations on-campus throughout the semester, as well as presentations to fraternities, sororities and other Texas A&M University organizations by request. Individual student advising is available by appointment. For more information, please visit moneywise.tamu.edu.



Scholarships

College/Departmental Level Scholarships

A number of colleges and departments at the University award scholarships on a merit basis to incoming freshmen interested in particular major fields of study. The sizes of the awards vary, and the term of scholarships range from one to four years. Selection criteria are determined by each awarding college and department. Students may enter college or departmental scholarship competitions in their proposed field of study. Completed scholarship applications must be received no later than specified deadlines during a high school student's senior year; awards are announced mid-April. Scholarships are reserved for U.S. citizens and permanent residents.

Valedictorians

Valedictorians from Texas high schools accredited by the Texas Education Agency are entitled to a tuition exemption during their freshman year at Texas A&M. To receive this award, the student must be certified as valedictorian and Texas A&M must be the first college or university of full-time enrollment. No formal application is required. Qualified students must present their official valedictorian declaration to Scholarships & Financial Aid at Texas A&M during the new student conferences or at the beginning of the fall semester.

Incoming Freshmen Scholarship Program

This program provides awards to high school graduates exhibiting outstanding academic achievement in high school and/or needing financial assistance to attend the University. The scholarships are made possible through endowments created by the generosity of friends and former students of Texas A&M University. Financial benefits range from \$500 to \$7,500 and vary in length from 1–4 years. Some of the awards are restricted as to course of study or degree objective.

High school graduates who have not attended another college or university are eligible to apply for this scholarship program prior to the fall semester of entrance.

To be considered for such an award, an applicant must have been admitted to the University.

Recipients are selected by the University Scholarship Committee on the basis of the applicant's academic record in high school, test scores, activities, leadership and, if applicable, financial need. To apply, complete the Incoming Freshman Scholarship application online at scholarships.tamu.edu or through ApplyTexas.org by the specified deadline. Address requests for additional information to:

Texas A&M University
 Scholarships & Financial Aid
 P. O. Box 30016
 College Station, TX 77842-3016

The Regents' Scholarship program is an institutional scholarship for low-income, first-generation college students. The scholarship is based on the results of the FAFSA and is awarded in the fall to entering freshmen for four years.

The Terry Scholarship is also administered through the incoming Freshman Scholarship Program. It is available to incoming freshmen from the state of Texas. It requires three essays and three letters of recommendation. Awards are typically made to fund the cost of attendance; these are four year awards.

Continuing Student Scholarship

Awards range in value from \$500 to \$1,500 are available to undergraduate, graduate and professional students currently enrolled in the University. Some of these awards are limited to certain fields of study and to individuals who have attained a necessary academic classification, while others are unrestricted. To apply for this scholarship, complete the Continuing Student Scholarship Application available during October on the Web site scholarships.tamu.edu. Deadline for submitting applications is February 1.

Transfer Scholarship

Transfer students who are entering Texas A&M University for the spring 2008, summer 2008 or fall 2008 semesters are eligible to apply for the Aggie Transfer Scholarship. The application deadline for Spring admits is in November and for Fall admits in April. For more details, visit scholarships.tamu.edu.

Scholarship Recipients and Non-Resident Tuition Waivers

A student who is awarded a competitive University scholarship of at least \$1,000 for the academic year or summer for which the student is enrolled and who is either a nonresident or a citizen of a country other than the United States of America is entitled to pay the fees and charges required of Texas residents without regard to the length of time the student has resided in Texas. This scholarship must be awarded by a scholarship committee officially recognized by the Texas A&M University Administration, and each waiver must be approved.

Early High School Graduation Scholarship Program

This program is subject to state funding from the State Legislature and may not be available. Texas residents who attended public high school only in Texas and completed grades 9–12 in no more than 36 consecutive months are eligible for a \$1,000 tuition scholarship. The high school counselor must send a letter to the Texas Higher Education Coordinating Board certifying the student's eligibility. A letter is sent to Scholarships & Financial Aid confirming the student is eligible for the graduation scholarship.

Miscellaneous Scholarship Information

Fellowships and scholarships for graduate students are handled by the Office of Graduate Studies, the individual colleges and the major departments. All students should contact their college and major department for information. Most major libraries own scholarship information books. Additionally, Scholarships & Financial Aid has information regarding other scholarship resources available online at scholarships.tamu.edu.

Housing

On-Campus Housing

Texas A&M University provides rooms on campus for approximately 9,800 students. Admission to the University is required prior to application for campus housing. Information about how to apply for campus housing is provided at the time of admission for undergraduates, or application can be made on-line at reslife.tamu.edu. On-campus housing is assigned on a first-come, first-served basis. Applications should be completed as soon as possible following admission since the date of application for housing is important in the housing assignment process. An application fee and security deposit (or applicable waiver) are required at the time of application. Contract terms and provisions should be read carefully to avoid unnecessary penalties.

Questions about on-campus housing may be directed to:

Housing Assignments Office
Texas A&M University
1258 TAMU
College Station, TX 77843-1258
(979) 845-4744 or toll free 1-888-451-3896
Fax (979) 862-3122
housing@tamu.edu
reslife.tamu.edu



Campus Dining

Dining Services, with more than 40 locations available throughout the day, serves students in fulfilling their daily needs. With convenient locations near residence halls and class rooms, there are many diverse eateries available in a variety of formats—from all-you-can-eat dining centers, to food courts, snack bars, coffee shops and convenience stores. We are happy to cater to student's special needs—whether for health and nutrition information, organic or vegetarian options, even kosher and gluten-free meals. Contact us at (979) 845-3005 for any questions or special requests.

Whether living on or off campus, Dining Services' meal plans offer increased flexibility and value in campus dining. Meal plans include individual meals and "Dining Dollar" options (see Campus Dining Options). Meal plan participants receive the lowest price for meals on campus (at least a dollar less per meal than retail buyers). Also, if using Dining Dollars instead of other forms of payment (cash, credit card, Aggie Bucks), plan users will receive an 8% discount on all purchases.

Meal plans are purchased each semester. Both meals and Dining Dollars can be used at any time throughout the semester for the purchase of food and beverage items only. Students can choose the meal plan that best fits their needs. Additional meals and Dining Dollars may be added on at anytime throughout the semester.

To purchase a meal plan, students may select the plan of their preference through the official university registration site under "Fee Options" during their class registration period or visit the Dining Services Web site at diningservices.tamu.edu. Corps regulations require members to select one of the Corps Meal Plans. Payment is made to the Office of Student Business Services or using the AggieE-Pay Web site.

For more information, visit diningservices.tamu.edu or email dining@tamu.edu. Services and information listed are subject to change.

University Apartments

The University Apartments are available to married students with or without children, single-parent families and single graduate students. Apartments consist of furnished and unfurnished one and two-bedroom units. Application forms, rental rates and additional information may be obtained on line at reslife.tamu.edu/ua or by contacting:

Department of Residence Life
 Texas A&M University
 University Apartments Office
 202 Charles Haltom Avenue
 3365 TAMU
 College Station, Texas 77843-3365
 (979) 845-2261
university-apartments@tamu.edu
reslife.tamu.edu/ua



Off Campus Student Housing and Services

Adult, Graduate and Off Campus Student Services keeps up-to-date information on apartment listings, rooms and houses for rent, maps, shuttle busses and other resources pertinent to the off-campus student. An interactive internet service called Aggie Search (aggierearch.tamu.edu) provides students access 24/7 to apartment listings and roommate search options. The *Off Campus Living Survival Manual* introduces students to the community and covers leases, transportation, security deposits, cost estimates, eating arrangements, and more. Staff members are available to assist students experiencing problems with their roommates or property managers and help students become informed consumers.

Adult, Graduate and Off Campus Student Services
Offices of the Dean of Student Life
(979) 845-1741
agoss@tamu.edu
studentlife.tamu.edu/agoss

Orientation

Aggie Honor System Office

Integrity is a fundamental core value of Texas A&M University. Academic integrity requires a commitment by all faculty, students, and administrators to:

- Remain constantly focused on the quality of our academic programs;
- Achieve and maintain academic excellence in all courses and programs to assure the value of Texas A&M degrees;
- Demand high academic standards from all members of the Aggie community.

All Texas A&M students, graduate and undergraduate, part-time or full-time, in residence or in distance education, are expected to follow the guiding rule of the Aggie Honor Code: “An Aggie does not lie, cheat, or steal or tolerate those who do.”

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Aggie Honor System Office (see tamu.edu/aggiehonor). Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the Texas A&M community from the requirements or the processes of the Aggie Honor System Office.

The Aggie Honor System Office is charged with promotion of the honor code and administration of academic dishonesty cases. The Honor Council, comprised of students and faculty from colleges and offices across the University, will investigate all such infractions of the honor code and recommend appropriate sanctions.

For more information about the Aggie Honor System, please contact:

Aggie Honor System Office
102 Henderson Hall
(979) 458-3378
tamu.edu/aggiehonor



Prospective Student Centers

Texas A&M University has eight Prospective Student Centers throughout the state. You can meet one-on-one with an admissions counselor or a financial aid advisor and learn more about academic programs, admissions, financial aid and scholarships, housing, and student services at Texas A&M University. Call the Prospective Student Center (PSC) nearest you to set up an appointment to learn more about your future at Texas A&M.

Main Campus – College Station

Prospective Student Center

109 John J. Koldus Building
Texas A&M University
1265 TAMU
College Station, TX 77843-1265
(979) 458-0427
admissions@tamu.edu

Corpus Christi Regional

Prospective Student Center
5262 South Staples, Suite 115
Corpus Christi, TX 78411
(361) 289-7905

Dallas/Fort Worth Regional*

Prospective Student Center
5787 South Hampton, Suite 430
Dallas, TX 75232
(214) 623-9039

Houston Regional

Prospective Student Center
1225 North Loop West, Suite 200
Houston, TX 77008
(713) 454-1990

Houston Regional Prospective Student Center—Power Center

12401 South Post Oak Rd.
Houston, TX 77045
(713) 551-8719

Laredo Regional

Prospective Student Center
107 Calle del Norte, Suite 102
Laredo, TX 78041
(956) 795-0412

Rio Grande Valley Regional

Prospective Student Center
5237 North 23rd St.
McAllen, TX 78504
(956) 683-8647

San Antonio Regional

Prospective Student Center
40 NE Loop 410, Suite 605
San Antonio, TX 78216
(210) 212-7016

Office of Admissions and Records

Admissions Counseling
217 John J. Koldus Building
Texas A&M University
1265 TAMU
College Station, TX 77843-1265
(979) 845-3741
admissions@tamu.edu

* Location will change. Please call (979) 458-0427 for more information.

New Student Conferences

Each year New Student Conferences (NSC) are held for undergraduate students entering Texas A&M University. New students are required to register for and attend a conference in order to accept their offer of admission and register for classes. Families are encouraged to attend the conference with their students and participate in programs designed especially for them to learn more about what their student will be experiencing as a new Aggie.

New Student Conference programs provide students with the tools they will need to get started on their career at Texas A&M and offer a chance to learn about the many opportunities available to members of the Aggie community. During the conference, new students will meet with academic advisors for curriculum advisement and selection of their first semester courses. Since their first year is important to their continued success at Texas A&M, conferences will acquaint new students with student life activities and services available at the University. In addition, conferences offer social programs that provide students an opportunity to interact with other students. Each year current Texas A&M students volunteer as Orientation Leaders (OLs) to help new students and their families connect with Texas A&M University.

New Student Programs (NSP) acts as a liaison for first year students and as an important conduit for student services across the campus. In addition to referral services for students during their first year, NSP coordinates the following programs: New Student Conferences (NSC); Gig' Em Week: Aggieland's Week of Welcome, full of events and opportunities for new and returning students; First Time Aggie Contact Team (FACT) that attempts to personally call all new Aggies several weeks into their first semester; and ATmentors.

In addition, New Student Programs produces several publications designed to ease the transition to the University community for new students and their family members. These publications include: New Aggie News newsletter for newly admitted students; the New Student Conference Handbook with details about the New Student Conferences, tips for making a smooth transition into university life, and campus services and resources; the WhoopStart, the official New Student Handbook of Texas A&M University; Fresh News, an electronic newsletter sent to first year students; Family Handbook designed specifically for family members of newly admitted students; and the Aggie Connection Newsletter, which provides family members information on campus events, issues facing first year students, and updates on campus resources. Direct questions concerning the New Student Conference to:

Offices of the Dean of Student Life

New Student Programs

(979) 845-5826

nsp@tamu.edu

studentlife.tamu.edu/nsp

Fish Camp

Fish Camp began in 1954 when YMCA Director Gordon Gay took a few incoming cadets on a camping trip near Mexia, Texas. From its small beginning, the program continues to be the most significant transitional experience in the lives of freshmen. Fish Camp, held at the Lakeview United Methodist Conference Center, involves 5,000-plus students—including more than 900 upper-class counselors and staff members—as well as many members of the Texas A&M faculty and staff who volunteer their time to introduce incoming freshmen to Aggieland.

Held during the three-week period preceding the fall semester, each four-day session is designed to aid students in the transition from high school to college and particularly to Texas A&M. It is an optional program intended to provide incoming students the opportunity to establish friendships, meet student leaders, become familiar with Aggie traditions and learn about Texas A&M campus life. Faculty and staff members speak on topics such as study habits, personal goals, Aggie traditions and history, involvement and campus services.

In addition to providing educational programs, group activities and small group discussions, the camp allows students to get to know each other through recreation, intramural sports and evening theme mixers. Fish Camp is not just a four-day activity in August. It is a year-round event where upper-class students remain in contact with their new friends, providing mentor support, motivation and friendship.

Fish Camp
(979) 845-1627
fishcamp@stuact.tamu.edu
fishcamp.tamu.edu



Transfer Camp (T-Camp)

T-Camp began in 1987 and was sponsored by the Student “Y” Association. The founding director staff consisted of six students who responded to the growing need for a similar tradition-based experience to Fish Camp for incoming transfer students. The concept of T-Camp was presented to the Student YMCA and after being approved by the university began work in March 1987.

T-Camp is now a three-day, two-night extended orientation camp experience for transfer students entering Texas A&M in the summer and fall semesters. Held in August each year, T-Camp seeks to create a fun and open atmosphere in which students are welcomed into the Aggie Family. At T-Camp, campers are introduced to the many opportunities that exist at Texas A&M and the long-standing traditions that embody the true meaning of being an Aggie. This optional orientation program provides incoming transfer students the opportunity to connect with other new and current students and to learn about Aggie traditions and campus life. Through staff presentations, student skits, and small group discussion time, new students will leave camp with knowledge about Texas A&M campus resources and many new friends.

T-Camp is a student-run organization composed of over 120 current students chosen through an application and interview process. T-Camp leadership positions are selected in the fall and the counselors are selected in the spring. The counselors lead small group discussions, answer questions and present information about being a student at Texas A&M University. In addition to their work at camp, the student staff serves as resources to transfer students throughout the year.

T-Camp
(979) 862-2521
t-camp.tamu.edu
t-camp@stuact.tamu.edu

Howdy Camp

Howdy Camp is a student-run, three-day, two-night extended orientation camp program for freshman and transfer students entering Texas A&M University in the spring semester. Howdy Camp is designed to illustrate the history and traditions of Texas A&M, provide an opportunity for new Aggies to build lasting friendships, introduce them to the many opportunities that exist at Texas A&M, and alleviate any anxieties about transitioning into a new environment.

Over 2,000 students have benefited from this program since its inception in 1991. Howdy Camp includes transfer students as well as freshmen students and is the spring semester's equivalent to Fish Camp and T-Camp. Held over a three-day period in January prior to spring classes, new Aggies are introduced to the many traditions, indescribable spirit, and customs of Aggieland. Speakers and special interest programs are brought in to inform students of the endless activities and opportunities available to them at Texas A&M and in the Bryan-College Station community.

Current students serve as counselors to the new students. They share their personal experiences and actively encourage campers to interact with one another so that by the end of camp, they are more comfortable with their transition and have an extensive network



of friends. Counselors serve as friends and mentors to the new students during and after Howdy Camp.

Howdy Camp
 (979) 862-1785
howdycamp.tamu.edu
howdycamp@stuact.tamu.edu

ExCEL Student Success Program

Texas A&M University's Excellence uniting Culture, Education, and Leadership (ExCEL) Student Success Program is a student organization and student support program housed in the Department of Multicultural Services. ExCEL focuses on freshman students by helping them discover the academic, social, and personal balance necessary to facilitate their success at Texas A&M University and beyond. ExCEL helps build a sense of community by assisting freshmen in making a smooth transition from high school to college.

ExCEL kicks-off with a two-day orientation conference, held the weekend before fall classes begin, familiarizing participants with the program and life at Texas A&M University. Following the orientation conference, bi-monthly developmental workshops and social activities begin and continue through the fall semester. These workshops have a variety of educational and developmental goals, including, but not limited to: improving study and time management skills; developing and clarifying academic and personal objectives; fostering an inclusive and supportive environment; adjusting to institutional culture; and nurturing lasting friendships from students of the same, as well as differing cultural and ethnic backgrounds.

ExCEL Student Success Program
 Department of Multicultural Services
 (979) 862-2000
ExCEL@stuorg.tamu.edu
excel.tamu.edu

Services for Students

Academic Advising

The primary purpose of academic advising at Texas A&M University is to assist students in the development of meaningful educational plans that are compatible with their personal abilities and goals. The ultimate responsibility for making decisions about personal goals and educational plans rests with the individual student. The academic advisor assists by helping to identify and assess alternatives and the consequences of decisions. Academic advising is a continuous process of clarification and evaluation.

The objectives for academic advising for the University and its component units include facilitating the following for each student:

- clarifying personal and career goals;
- developing suitable educational plans;
- selecting appropriate courses and other educational experiences;
- interpreting institutional requirements;
- increasing student awareness of available educational resources;
- evaluating student progress toward established goals;
- enhancing decision-making skills;
- reinforcing responsible student self-direction;
- using referrals to other institutional and community support services, where appropriate.

The advising system of Texas A&M University includes professional staff advisors, faculty advisors and administrators working together to ensure the total educational development of students by meeting intellectual, academic, personal, and career needs.

Student Learning Center

The Student Learning Center is committed to enhancing the educational experience of students at Texas A&M by providing a variety of programs and services that promote retention and academic success.

The Center offers credit-bearing courses including **STLC 101: Application of Learning Theories to College Studies**, which examines critical theories of learning with application to academic performance, and **STLC 102: Career Awareness**, which explores career planning, employment trends, and methods of researching and preparing for the job market.

Supplemental Instruction (SI) is an academic assistance program designed to improve the student's academic performance and increase retention. The SI program targets traditionally difficult core curriculum courses and provides regularly scheduled, out-of-class, peer-facilitated group study sessions. SI leaders are required to attend an intensive training seminar at the start of each semester, attend all class lectures, take notes, read assignments, and conduct three 50-minute study sessions per week. All students enrolled in the course section are eligible to attend the free SI study sessions.

Tutor Zones (TZ) are provided in various locations on campus. TZ tutors provide assistance to students studying for courses ranging from math and science to liberal arts.

Free, **one-on-one tutoring** for currently enrolled Texas A&M University students in various undergraduate math and lower level physical science courses is available by appointment. The goal of the program is to help students become independent learners by providing guidance and instruction while reinforcing positive study skills. The tutoring program is certified by the College Reading and Learning Association and meets internationally accepted standards for tutor selection, training, and evaluation, as well as for overall program management and evaluation.

The **Independent Study Lab (ISL)** is available for students who need help in improving math, writing, and study skills, including preparation for exams required for the state-mandated Texas Success Initiative. Most importantly, the ISL faculty works with students in developing the academic skills they need for successful completion of college-level course work. In addition to assisting students with basic skills preparation, software is available to help students prepare for the GRE, GMAT, and TOEFL exams, and GRE preparation courses are offered. Assistance is also available to students who are interested in earning course credit through credit-by-exam.

Student Learning Center
(979) 845-2724
slc.tamu.edu

Office of Professional and Graduate School Advising

Each year, hundreds of Texas A&M graduates begin further study in the health professions, veterinary, law, or graduate school. Students completing undergraduate degrees at Texas A&M are well-prepared to excel in further study in a wide array of disciplines. While degree planning is conducted with an academic advisor in the student's major department, the Office of Professional and Graduate School Advising (OPGSA) assists all students and former students who wish to further their educations after the bachelor's degree. Advising experts in the OPGSA possess the most up-to-date information on admissions requirements and application strategies. They use this expertise to assist students who plan to enter graduate or professional school by advising on course selection, specific prerequisites, admissions test, trends, and application essays. OPGSA also collects and disseminates letters of recommendation for most health professions programs.

Most health professions require that applicants complete particular courses and participate in observation or research programs. Law schools do not favor particular majors, but prefer students with broad-based experiences. Graduate programs are the most diverse in their preferences and requirements, in part because they cover every area of study, from engineering and business, to social studies and education. Students are encouraged to contact an OPGSA advisor as soon as they contemplate additional education.

Pre-Medical, Pre-Veterinary and Pre-Health Professions Advisory Services

The Office of Professional and Graduate School Advising offers advising services for students in all academic majors preparing for careers in medicine, dentistry, optometry, pharmacy, veterinary, and podiatry and other health careers. The office is available to all students seeking information regarding pre-professional course requirements, admissions tests and applications to professional schools. In addition, recommendation letters are kept on file and disseminated to professional schools at the student's request. Medical and dental schools require that students submit application materials through the Texas A&M Health Professions Advisory Committee which is based in this office.

Pre-Law Advisory Services

Schools of law do not require a particular major nor any specific course prerequisites. Pre-law students are encouraged to seek a broad-based education with particular emphasis on communication skills, both written and oral, and on analytical skills. Courses and majors in areas such as the humanities, social and natural sciences, business and mathematics familiarize students with issues that affect society and skills to address them. The Office of Professional and Graduate School Advising is equipped to provide students with information about law schools, the LSAT, letters of recommendation and financial aid as well as to advise pre-law students on application procedures and professional objectives.

Library Facilities

Sterling C. Evans Library

The University Libraries complex consists of the Sterling C. Evans Library and Annex, the Cushing Memorial Library and Archives, the West Campus Library, the Policy Sciences and Economics Library, and the Medical Sciences Library. The University's principal research collections, numbering nearly 4 million volumes and 5.4 million microforms, are housed in the centrally located Sterling C. Evans Library and Annex with seating for more than 4,000 readers. Currently more than 50 group study areas are available for students, faculty and staff.

The Information and Collection Services staff provide assistance in using the reference collections as well as the general collection and specialized collections such as government documents and microform materials. Over 550 national and international electronic citation databases are available to students in the library and remotely. Scores of these files comprise citations to research literature, and a growing number of databases of full-text information from journals and other information sources are also available. Reference services provide a broad program of library instruction, ranging from orientation tours to class sessions on subject-specific resources and research techniques.

The Cushing Memorial Library and Archives, repository for rare books, manuscripts, special collections and archives, is located on the west side of Evans Library, across from the Academic Building.

The Educational Media Services (EdMS) on the fourth floor of the Annex provides audiovisual and multimedia services and videotape resources. It offers database and Internet searching for reference purposes. Multimedia authoring and development software such as Authorware, Director and Photoshop is also available.



Through the online catalog, LibCat, users can access the Library's books and thousands of journal articles by author, title, subject and keyword searching. Collections are organized according to the Library of Congress classification system. An "open stack" arrangement allows free access to all materials except those in Special Collections and Archives.

Nearly 46,000 serial titles are currently received, including some 150 state, national and foreign newspapers. The library is a depository for selected U.S. Federal documents. The library is also a depository for Texas State documents and U.S. patents. An extensive collection of technical reports is also housed in the library.

The West Campus Library primarily serves the Mays Business School. It has a limited, specialized collection of 650 periodicals, reference works and current monographs in business. The Library has reading space for 1,000. A document delivery service delivers materials between the Evans Library, the West Campus Library, and the Medical Sciences Library. The focus of the West Campus Library is the R. C. Barclay Reference and Retailing Resources Center. The Barclay Center offers a variety of electronic resources, including compact disk and online databases as well as access to the Internet to serve the needs of business. Staff offer instruction on searching databases and consultation for specific information needs.

The Policy Sciences and Economics Library in the Annenberg Presidential Conference Center has a limited, specialized collection of periodicals, reference works and current monographs in political science, government and public service and economics. It also offers several hundred electronic journals and databases.

Information and services for these libraries can be accessed on the web at library.tamu.edu.

Medical Sciences Library (MSL)

The Medical Sciences Library serves the College of Veterinary Medicine and Biomedical Sciences, Texas A&M Health Science Center, and the College of Agriculture and Life Sciences. The library houses a specialized collection of biomedical books, journals, and electronic resources as well as related materials in the areas of agriculture and the life sciences, such as biochemistry, animal science, nutrition, and the plant sciences. The Medical Sciences Library's collection includes over 129,000 volumes of journals and books in print and other

media, including electronic formats. As one of the Texas A&M University Libraries, the Medical Sciences Library offers access to more than 40,000 electronic journals, over 400,000 electronic books, and over 700 databases from its Web site.

MSL also offers access to biomedical information to local health institutions, as well as health care professionals in the community and immediate region. In addition, as the only veterinary library in Texas, MSL serves veterinarians state-wide. The staff also works with remote extension service sites to meet information needs for agricultural uses throughout Texas.

The MSL provides reference and education services to local and remote users, as well as interlibrary loan services available through the DeliverEdocs service. Known as the “quiet study spot” on campus, MSL has group and individual study rooms and study space.

Open extensive hours to serve students, staff and faculty of the Texas A&M University System, the Medical Sciences Library offers remote access to its catalog and other electronic resources through its Web site at library.tamu.edu. For more information about the MSL's services and policies, please visit its Web site or call (979) 845-7428.

George Bush Presidential Library Center

In 1997, Texas A&M became the home of the George Bush Presidential Library Center, comprised of the George Bush Presidential Library and Museum, the George Bush School of Government and Public Service, and the George Bush Presidential Library Foundation. The George Bush Presidential Library and Museum, a 69,000 square foot state-of-the-art facility, is dedicated to the preservation, research, and exhibit of the official records, personal papers, and memorabilia of George Bush, the 41st President of the United States. The Library also sponsors numerous exhibits. The George Bush School is a graduate school that offers a master's degree in public service and administration and a master's degree in international affairs, conducts research, performs service, and is the setting for numerous academic conferences. The activities of the Library and the George Bush School are supplemented by a wide variety of programs supported by the George Bush Presidential Library Foundation. Since its opening, the Library Center has attracted over one million visitors to the Texas A&M University campus.

Computing Resources

Students can take advantage of Texas A&M University's vast computing resources, including access to the Internet, campus wireless network, email, personal web pages, computer labs, discounted software, software training, and 24-hour support.

Access to the Internet is part of each student's resources. Each on-campus residence hall room is wired with two Ethernet connections. Wireless access is available in classrooms, libraries, dining facilities, Open Access Labs, and many other campus locations. Off-campus dial-up access is provided through the university's modem bank of 56K V.90 modems or by high-speed connections through commercial Internet Service Providers. Texas A&M's Computing and Information Services (CIS) department offers virtual private network (VPN) service to give off-campus users a secure, convenient way to connect to campus resources.

At six Open Access Labs located around campus, students can use computers (PC and Mac), software, printers, digital video workstations, and peripherals. The labs are available up to 24 hours a day throughout the week and are all connected to the network at high speed.

The university's network is connected directly to the Internet via a 10-Gigabit connection. Texas A&M is a member of and connected to the Internet2's high-speed network, the Lonestar Education and Research Network's (LEARN's) high-speed, fiber optic network, and the National Lambda Rail research network. Over 35,000 computers are connected to the campus computer network, ranging from departmental computers to the university's supercomputers.

Each student is provided with a Texas A&M University Email account, which can be accessed online from any computer. A web server is provided for students to create personal web pages. Students can purchase discounted software including Microsoft Office and Windows. Many classes provide online information and communication using the Blackboard Learning System Vista Enterprise course management system.

The university's supercomputing facility includes two IBM and two SGI supercomputers. Texas A&M also provides adaptive technology support resources for students with disabilities including textbook scanning, adaptive software, specialty hardware, and equipment training. Departmental computing systems also provide support to particular groups of users.

Students have easy access to training and support as well. Students can take free software training classes to learn new computing skills including Web site design, using statistical analysis programs, and more. Help Desk Central answers computing questions any time, day or night, 365 days a year. Call (979) 845-8300 or email helpdesk@tamu.edu, or visit hdc.tamu.edu. For more information about student computing resources, visit cis.tamu.edu/students.

University Writing Center

The University Writing Center (UWC) supports efforts to promote writing instruction in all disciplines at Texas A&M University. The UWC provides undergraduates with the opportunity to enhance written communications skills through consultation with experienced writers and through the Online Writing Lab, an array of electronic resources and tools. Services to students include face-to-face and online consultations, and the UWC also provides in-class workshops on many writing topics in courses throughout the University curriculum.

UWC consultants promote active, independent learning. Through conferencing, students become involved with the process of writing and learn to draw on personal resources and to make editorial decisions. Consultants do not edit or proofread, but they do teach editing and proofreading skills and help students learn to identify strengths and weaknesses in their writing.

Faculty members are invited to use the UWC to assist in the development of writing ("W") courses. They will find information about "W" courses and help with writing pedagogy on the UWC website. Faculty consultations or workshops on topics related to "W" courses can be scheduled online at writingcenter.tamu.edu.

The UWC is located on the second floor of the Sterling C. Evans Library (1.214) and on the second floor of the West Campus Library, Room 205. Appointments can be made by calling (979) 458-1455 or by visiting writingcenter.tamu.edu. In addition to regular daytime office hours, the UWC also is open weeknights (Sunday-Thursday) until 10 p.m.

ATMentors

ATMentors is a volunteer organization composed of over 200 faculty, staff and administrators who have agreed to be available to students who “just want to talk to someone.” ATMentors listen to students’ questions and concerns, advise students in their areas of experience and competence, and inform students about services and programs offered by Texas A&M University. There are ATMentors in almost every department and building on campus. Mentors can be identified by the plaques on their doors. If you need a mentor just look for the ATMentors sign, visit our Web site, or send an email to atmentors@tamu.edu.

ATMentors
 (979) 845-6900
mentors.tamu.edu

Student Counseling Service

Students are invited to talk with counselors, psychologists, and psychiatrists about any concerns that affect their academic progress, educational goals, choice of career, personal-social effectiveness or emotional well-being. In counseling, the focus is on assisting students with developing academic, career choice and personal skills; understanding themselves and their concerns; and making decisions and changes that they judge are best for them.

Academic Counseling provides individual and group assistance with study skills, test taking, time management, etc. Also available is a self-help lab containing handouts and study skills videos and computer programs that are available for use without an appointment.

Career Counseling programs allow students to increase awareness of their interests, abilities, values, and personality characteristics as they apply to the workplace. Services include computer-assisted career exploration, individual and group counseling, workshops, and educational handouts. In addition, the Academic and Career Resource Center contains occupational information helpful in career planning and decision-making.

Personal Counseling is a process that facilitates self-discovery and growth. It can help to increase self confidence, improve relationships, achieve educational goals, and aid in making good decisions for emotional, intellectual, physical, and spiritual well-being. Most students at one time or another can benefit from personal counseling.

The Student Counseling Service provides individual, group, and couples counseling for personal concerns that are common among undergraduate and graduate students. Common concerns that students face include: communication problems, stress of balancing personal and academic demands, dealing with change, personal growth, grief and loss, relationship issues, eating concerns, multicultural/interracial issues, anxiety, self-esteem, and coping with feelings such as loneliness, depression, anger, and guilt.

Crisis Intervention is available for students who have an urgent need for assistance. Students experiencing a crisis may come to the Student Counseling Service anytime the SCS is open, but preferably between 10:00 a.m. and 4:00 p.m. Monday through Friday (979) 845-4427. The Student Counseling Service is open 8:00 a.m. to 5:00 p.m. and is located in Cain Hall. At other times they may call the HelpLine at (979) 845-2700.

How to Receive Services

All students currently enrolled at Texas A&M University who have paid the Student Service Fee are eligible for an initial consultation. The determination of what additional services are appropriate will be made at that time based upon need and availability. If your student has questions about whether or not he or she is eligible for services, please contact the Student Counseling Service. There is no fee for consultation or counseling services. The Student Counseling Service provides short-term treatment; those needing long-term treatment will be referred to other appropriate agencies or individuals.

To request an initial appointment, go to “Student Registration” at scs.tamu.edu and follow the instructions. You may do this from your own computer or from a computer at in the counseling center. When you complete the forms, you will be able to make an appointment that fits your schedule. If you are not able to access online registration, please call (979) 845-4427 for assistance or come to the SCS.

Student Health Services

(Accredited by Accreditation Association for Ambulatory Health Care)

Student Health Services is an accredited ambulatory health care provider serving the Texas A&M University student body by providing primary health care services and promoting health through prevention and education.

All current students who have paid the Student Health Services fee are eligible to receive services at the A.P. Beutel Student Health Services. Visits to medical care providers, ambulance transport service on campus, consultation with contracted medical specialists or health educators, are available at a reduced cost.

Good health is important to achieving full potential in academic, career and personal goals. A variety of services are available to help maintain and promote optimal health.



Clinics:

Medical Clinic/Immediate Care. Health care practitioners provide medical care through the diagnosis and treatment of short-term, acute illness and on-going health problems. Referrals are made as necessary.

Preventive Medicine. Services include immunizations for students, overseas travel, or employment purposes. Tuberculosis screening is also available. Allergy injections can be given at the Health Center. The student must provide the antigen and care orders from their allergist.

Women's Clinic. The clinic offers gynecological services, clinical breast exams, contraception counseling and prescriptions, and other primary care services relating to women's health.

Specialty Clinics. A limited number of specialists may be available for consultation in the Student Health Service upon referral by health care providers.

Ancillary:

Medical Laboratory. Registered medical technologists perform a wide range of routine hematological, chemical, and bacteriological diagnostic tests in the College of American Pathology (CAP) accredited medical laboratory. Laboratory services are available at a reduced cost.

Radiology Services. Registered radiologic technologists provide a variety of diagnostic radiographic procedures (x-rays). Copies of x-ray studies may be provided. Radiological services are available at a reduced cost.

Additional Services:

Ambulance Service/EMS. EMS provides ambulance transport service to all students, faculty, staff, and visitors on the Texas A&M University College Station campus 24-hours a day, 365 days a year. If a situation requires an ambulance, call the campus emergency telephone number 9-911.

Dial-A-Nurse. Staffed by registered nurses, Dial-A-Nurse is available 24 hours a day, 365 days a year by calling (979) 458-8379. Nurses advise students regarding self-care for minor ailments and over-the-counter medications.

Health Education. Health education provides information, presentations, and individual counseling on health issues including HIV/sexual health, nutrition, and general wellness. Health education also coordinates campus-wide health events including the annual Texas A&M Health Fair.

Pharmacy. Staffed by three registered pharmacists, the pharmacy dispenses student prescriptions from Student Health Services providers and personal physicians. Individual counseling on all new prescriptions is provided. Over-the-counter products are also available.

Physical Therapy. Licensed physical therapists provide preventive and rehabilitative services for conditions that affect the muscles, bones, and joints with a prescription from a healthcare provider.

Insurance: Any charges for medical treatment off campus are the responsibility of the student. To supplement the services provided by Student Health Services, students are encouraged to carry a Sickness and Accident Insurance Policy. The Student Health Insurance policy endorsed by Texas A&M University is available for purchase online at www.tamuinsurance.com.

Appointments: Available Monday-Friday, 8 a.m. – 5 p.m. To make appointments, call (979) 458-8250 between 7:30 a.m. – 5 p.m.

Student Health Services
(979) 458-8316
info@shs.tamu.edu
shs.tamu.edu

Career Center

The Career Center provides comprehensive services to students in planning their careers, gaining work-related experience and securing professional employment upon graduation through the programs of Career Education, Experiential Education and Employment Services.

Career Education services are provided to assist students with their career development at every stage of their college careers. Through outreach activities, incoming students are introduced to the Career Library, AggieE-folio, Career Advising and the importance of early career planning. Students can utilize computer-assisted career guidance programs to begin career exploration. Career advising is offered via individual appointments, walk-in advising and email. Several thousand students attend a variety of workshops and sponsored programs given by the Career Center each year, including Internship Job Search, Interview Savvy, Behavioral Interviewing, Electronic Portfolios, Academic Job Search, Jobs in Government



and many, many others. The Center's comprehensive Web site also features extensive occupational and job search information. Additionally, on-site career advisors are available for students in the life sciences, agriculture, business, liberal arts, and engineering.

Experiential Education provides services to students seeking Cooperative Education, Internship, Work Abroad, and Externship experiences related to their major or career choice. Cooperative Education is an academic program that formally integrates classroom studies with applied learning in a work setting under the guidance of experienced professionals. Students are employed in business, industry and government. The Externship program is an inter-session experience that affords underclassmen the opportunity to explore career fields related to majors. These first professional experiences are considered an integral part of the student's educational preparation.

Employment Services provides assistance to all students, both undergraduate and graduate, seeking permanent and experiential employment through on-campus interviewing, electronic resume referral and job listings entered on the Center's homepage. Texas A&M has one of the largest on-campus interviewing programs in the United States. Through the activities of Career Services of Graduate Students and Former Students Career Services, the Center provides targeted services and programs designed to meet the unique needs of these students. Services for graduate students focus on job search skills and strategies for the public and private sectors and academia. Services for former students include job listings on the Internet, electronic resume referral, individual career consultation, on-site programs for A&M clubs and Aggie networking.

Further information about the services of the Career Center can be found at careercenter.tamu.edu, or call (979) 845-5139. Please send inquires to:

Texas A&M University Career Center
209 John J. Koldus Building
1233 TAMU
College Station, TX 77843-1233

The Association of Former Students

The Association of Former Students is the home of the 450,000-member, worldwide Aggie Network. The Association proudly promotes the interests and welfare of Texas A&M University, while maintaining ties of camaraderie among former students. The Association's extensive support of Texas A&M includes nearly \$4 million annually toward the funding of student scholarships and financial aid, student activities and awards, and faculty enrichment. The Association of Former Students has the responsibility of protecting the spirit and integrity of the Aggie Ring, which is possibly the most enduring and visible symbol of Aggie pride.

Aggie Ring

The design of the Aggie Ring is as deep in symbolism as it is in tradition. The shield on the top of the Ring symbolizes protection of the good reputation of the alma mater. The 13 stripes in the shield refer to the 13 original states and symbolize the intense patriotism of graduates and undergraduates of Texas A&M. The five stars in the shield refer to phases of development of the student: mind or intellect, body, spiritual attainment, emotional poise, and integrity of character. The eagle is symbolic of agility and power, and the ability to reach great heights.

One side of the Ring symbolizes the seal of the State of Texas authorized by the Constitution of 1845. The five-pointed star is encircled with a wreath of olive or laurel leaves symbolizing the strength to fight. They are joined at the bottom by an encircling ribbon to show the necessity of joining these two traits to accomplish one's ambition to serve.

The other side, with its ancient cannon, saber and rifle, symbolizes that the citizens of Texas fought for their land and are determined to defend their homeland. The saber stands for valor and confidence. The rifle and cannon are symbols of preparedness and defense. The crossed flags of the United States and Texas recognize the dual allegiance to the nation and state.

You can visit The Association of Former Students and find out more about the Aggie Ring online at AggieNetwork.com.

Employee Services

Employee Services is responsible for human resources and payroll services at Texas A&M University. We are the gateway for prospective employees, current employees, department heads and liaisons, and retirees of the university.

Employee Services provides talented professionals and tools to attract, develop, motivate and retain a diverse workforce within a supportive environment at Texas A&M University. We emphasize courteous, professional service and a commitment to integrity, excellence and innovation.

The Employee Services organization is comprised of the following:

- **Payroll, Tax and Employee Resources Department**—primary employee resource on matters affecting individuals at the university
- **Center for Employee Education**—resource for workshops, programs, and services designed to enhance personal/professional growth for employees
- **HR Management Services Department**—contact for managers on matters like total compensation, recruitment strategies, employee education, employee relations, employment analysis and reporting, and the employee assistance program
- **Policy and Practice Review**—administration's first contact for assistance with the employee complaint and appeal process and other formalized cases, reductions in force, investigations and employee-related policies and procedures

As ways are sought to foster an attitude in university employees that embraces respect, leadership, service and life-long learning, it is reflected in the quality of life for students. These efforts pay off today on campus and tomorrow in the quality of our graduates.

Scholarships & Financial Aid offers student employment services which can assist you in finding student worker positions both on and off campus. Visit their Web site at jobsforaggies.tamu.edu for details.

Students and former student have the opportunity to become part of the Texas A&M staff which supports the mission of the university and the Vision 2020 initiative.

If you are interested in being part of this effort as a staff member of Texas A&M University, job listings are available at the Web site tamujobs.tamu.edu. Computers and staff are available to assist you at our Employee Service Center. For more information, please call (979) 845-4141.

University Police

The Department of Security and University Police is responsible for the protection of persons and property of Texas A&M University, and for the enforcement of the laws of the State of Texas and the rules and regulations of Texas A&M University as promulgated by the Texas Education Code. University police are commissioned peace officers involved in regular foot and vehicle patrol of campus, late-night security escorts, crime prevention programs for the campus community, and criminal investigations for the recovery of property and apprehension of criminals. Non-commissioned security officers provide regular security checks of buildings and property on campus. All university personnel are requested to cooperate with university police officers and security officers.

In addition to the routine police matters, members of the University Police conduct personal safety meetings, drug abuse discussions and engage in other educational activities as requested by recognized student groups.

The University Police Department is located in Research Park on west campus at 1111 Research Parkway.

Disability Services

Texas A&M University does not discriminate on the basis of disabilities in admission or access to its programs. The University has a strong commitment to its students with disabilities and provides a variety of services and resources through the Department of Disability Services. Disability Services (DS) provides services to students with disabilities to ensure accessibility to university programs. DS offers accommodations counseling, evaluation referral, disability-related information, adaptive technology counseling and equipment, and sign language interpreter services for academically related purposes. Students with documented disabilities such as mobility, hearing or visual impairments, learning and/or psychological disorders are eligible for services.

Disability Services
(979) 845-1637
disability@tamu.edu
disability.tamu.edu

Student Conflict Resolution Services

Student Conflict Resolution Services (SCRS) addresses various student disputes. Using SCRS allows students to proactively develop conflict resolution skills and emulate responsibility, respect and fairness. SCRS trains, consults and speaks to student groups about legal issues, conduct processes and resolution skills. Student Mediation Services can provide assistance in resolving individual or group disputes via a personal, confidential consultation with a professional staff member specifically trained in state-certified mediation programs. Student Legal Services helps students explore their options with legal advice from a licensed attorney regarding legal matters including consumer protection, auto accidents and domestic relations law. Legal services are limited in matters of litigation; the attorney cannot represent students in court. Services may not be used in student complaints against another student or the University. Student Conduct Services interprets and upholds community standards as



outlined by the Texas A&M University Student Rules. Following due process and emphasizing fairness, professional staff members conduct confidential student conduct proceedings when a student has allegedly violated a section of the Student Rules.

Offices of the Dean of Student Life
 Student Conflict Resolution Services
 (979) 847-7272
 scrs@tamu.edu
 studentlife.tamu.edu

Veterans' Services

The Office of Veterans' Services is a part of Scholarships & Financial Aid and is located on the second floor of the Pavilion, (979) 845-8075. This service is offered by Texas A&M to assist eligible students in securing the benefits and services provided by the Veterans Administration. For information, please visit financialaid.tamu.edu/veterans.

Vocational Rehabilitation

The Division for Rehabilitation Services (DRS) assists students who have a substantial impediment to employment which results from a physical or mental disability. The student must require Vocational Rehabilitation services to prepare for, enter, engage in or retain employment and must be capable of attaining employment. Inquiries regarding services should be made with DRS located at 1115 Welsh, Suite B, College Station, TX 77840, (979) 680-5270.

Campus Life

Vice President for Student Affairs

The role of Student Affairs at Texas A&M is to maximize the quality and breadth of opportunities for student engagement in the campus community, while maintaining the integration and balance between in- and out-of-class experiences.

Vice President for Student Affairs
Room 117, Koldus Student Services Building
vpsa@tamu.edu
studentaffairs.tamu.edu
(979) 845-4728

The Corps Experience

Texas A&M's Corps of Cadets remains one of the largest uniformed bodies of students in the nation outside the U.S. service academies. Currently, some 1,800 young men and women are Corps members. Those students have realized the Corps of Cadets offers them something extra; an opportunity to live a disciplined lifestyle while gaining practical experience in leadership and organizational management. Their participation in Corps operations allows them to hone these skills daily.

The Corps of Cadets is the heartbeat of Texas A&M. The unique spirit and traditions that make Texas A&M special are deeply rooted in the Corps experience. For that reason, the Corps has long been regarded as the *Founder of Tradition* and *Keepers of the Spirit* of Aggieland. The Corps has also been referred to as the icon, or enduring symbol of Texas A&M.

Cadets are students first. The Corps provides a structured, disciplined environment that is conducive to academic excellence, including required study hours five days per week and quiet hours in the dorms supervised by upperclassmen. The Corps also offers an outstanding academic support program, with academic counseling and free tutoring in certain courses.

Freshmen in the Corps normally enroll during the summer at their New Student Conferences but may enroll at other times through the Office of the Commandant. Membership in the Corps of Cadets carries no military obligation—in fact, traditionally a majority of our cadets are not military bound, but are in the Corps for the esprit, the lifelong friendships and the practical leadership training as they prepare to make their mark in their chosen field of study.

Corps Leadership Excellence Program

The Corps of Cadets has been developing leaders of character for service to the state and nation since 1876. Aggie cadets learn leadership in a military-type environment that complements their academic education and prepares them for a lifetime of success.

The Corps of Cadets Leadership Excellence Program, established in January 2002, operates in conjunction with the Office of the Commandant to develop well-educated leaders of character who are prepared to provide values-based leadership and service in the public and private sectors of society. The certificate in Leadership Study and Development is an academic award that is noted on students' official university transcripts. It verifies participants

have included with formal education, a series of training and development opportunities. The courses and testing of the program are designed to ensure that students can fulfill the requirements essential to their development as a leader in their profession.

Corps Activities

The objective of the Corps of Cadets is to offer a sound collegiate education as well as training for both mind and body under strict military discipline. Administering this military discipline and its extension to all phases of the cadet's nonacademic life is distinctive at Texas A&M.

Cadet organizations provide added opportunities for cadet development. Such organizations include the Fightin' Texas Aggie Band, the largest military marching band in the United States; Ross Volunteers, the official honor guard for the governor of the state of Texas and the oldest student organization; Fish Drill Team, legendary for its precision drill and commitment to excellence and Parsons Mounted Cavalry, the only mounted ROTC unit in the United States.

Cadets who seek the additional challenge of special operations training have the opportunity to participate in Rudders Rangers, Marine Recon Company, Navy SEAL Platoon and Air Force special operations.

All Corps activities, including those listed above, are open to all qualified applicants regardless of race or gender.

The Fightin' Texas Aggie Band

"The Pulse of Aggieland" is nationally famous for its precision marching on the football gridiron. The band also provides music for military reviews, parades, yell practices, special events on and off campus, as well as other athletic contests. As an integral part of Texas A&M University's Corps of Cadets, the band operates under strict military guidelines. All members of the Fightin' Texas Aggie Band are required to be in the Corps of Cadets.



Advanced Course ROTC Contracts

The University offers, but does not require, both four-year and two-year Army, Air Force and Navy/Marine ROTC programs. The advanced course leads to a commission. Students pursuing the four-year ROTC program make application for an advanced course contract after completion of the first two years of ROTC. Acceptance of an advanced course ROTC contract requires completion of the advanced course ROTC curriculum, completion of ROTC summer camp and acceptance of a reserve commission if one is tendered. Texas A&M is well known throughout the military departments for its exceptional officer development program—which includes producing more than 225 generals and admirals as well as seven Aggies that have been awarded our nation's highest honor for wartime valor, the Congressional Medal of Honor. The University's commitment to providing highly skilled and disciplined leaders to the Armed Forces requires all students enrolled in ROTC programs at Texas A&M University to be members of the Corps of Cadets. Additionally, ROTC participants must be Corps members to enroll in Military Science courses.

Corps of Cadets Recruiting Office
1-800-826-8247,
AggieCorps.org

Memorial Student Center/University Center Complex/ Rudder Theatre Complex

As Texas A&M's student union, the Memorial Student Center (MSC) provides students with a place of their own on campus. The MSC is the place to buy books and the place to meet friends, grab a bite to eat, play pool, or go bowling. But the MSC also plays an important role in providing students with "the other education," that important part of education that comes from outside of the classroom.

With two art galleries in the MSC and a performing arts series, the MSC is THE on-campus place to expand your awareness and knowledge about the visual and performing arts. MSC Student Programming Committees also bring well-respected writers, scholars, political leaders, musicians, and films to campus for lectures, readings, concerts, screenings, and roundtable discussions. So if you are looking for a way to get the most out of your time here on campus, or just looking for something to do while you take a break from studying, you'll definitely find something interesting going on at the MSC.

If you want to really get involved on campus and help bring those well-respected writers, scholars, political leaders, musicians, and films to campus, then the MSC Student Programs Office (SPO) has a committee for you. Nine different MSC committees regularly program arts & entertainment and cultural & political educational programs. The MSC SPO is also home to eight different leadership development and service committees, four of which sponsor leadership conferences that are open to all students. So if you are searching for a way to give back to the campus and the greater community and develop your leadership skills in the process, the MSC has a place for you.

For those students who want to go even further and get experience managing and operating a large organization, the MSC Council Resource Areas offer students the opportunity to establish the financial and administrative direction for the entire Student Programs Office. Students help establish the organization's budget, develop funding sources, promote a diverse organization, manage human resources, offer marketing support, and manage technology and facility resources.



All of the Student Programming Committees and Resource Areas offer the type of professional development opportunities that simply cannot be found in many other places. All MSC SPO programs and events are produced and managed by the students. The students bring their ideas, their knowledge, their desire, and their skills to the MSC. They really are the driving force, and their experiences in the MSC help them shape and develop the skills that will carry them into the future.

Although the Student Programs Office is an important part of what the MSC has to offer, the MSC is also the campus community center. The MSC houses a copy shop, a frame shop, the Department of Multicultural Services, a bookstore, several dining areas, a bowling and games center, a post office, a finance center for student organizations, a hotel, piano practice rooms, the Battalion offices, KANM Student Radio, Choral Activities, and conference and meeting rooms. The MSC Box Office, located on the first floor of Rudder Tower, is the place to purchase tickets and things like Maroon Out T-shirts. The MSC Box Office can also help you sell tickets to your event and take some of the hassle out of cash handling for student organizations.

The University Center Hospitality and Events Services can help your campus or student organization plan an event in the MSC, Rudder Tower, or All Faiths Chapel. They can help you reserve a room, help coordinate catering and janitorial service for your event, and will perform setup and teardown for your event.

Spaces in the Rudder Theatre Complex include the Auditorium, the Theatre, the Forum, and the Exhibit Hall, all of which can be used by any campus-affiliated group. In addition, the Rudder Theatre Complex staff have been providing event production support for over thirty years and can help you plan and produce your event, whether you are holding it in the Theatre Complex, elsewhere on campus, or even somewhere off campus. They can help you setup and run audio/visual equipment, electricity, event staging, and many of the other details that are part of putting on an event.

Finally, the MSC is a living part of Aggie Tradition at Texas A&M University. Its most timeless role is that of living memorial. The building is dedicated to all Aggies who have died in wars past, present, and future, and in memory of these brave men and women all visitors to the building are asked to remove their hats and are also asked to please stay off of the grass surrounding the building. The names and stories of some of the Aggies commemorated by the MSC are posted in the north entrance and hallway facing Simpson Drill Field. Those honored in this part of the building include the seven Aggies who have been bestowed with the Congressional Medal of Honor.

Memorial Student Center Student Programs Office
MSC Room 216
(979) 845-1515
www.msc.tamu.edu

University Center Hospitality and Events Services
2nd Floor, Rudder Tower
(979) 845-8904

Rudder Theatre Complex Facilities and Event Production Support
Rudder Theatre Complex Room 107
(979) 845-8903

MSC Box Office
1st Floor, Rudder Tower
(979) 845-1234
boxoffice.tamu.edu

MSC Print 'n' Copy
MSC Room 293
(979) 845-7294
copies@msc.tamu.edu

MSC University Plus Frame Shop
MSC Basement Room 033
(979) 845-4628
uplus.tamu.edu

MSC Guest Rooms
Front Desk – Northwest Lobby
(979) 845-8909
guest-rooms@tamu.edu

Department of Multicultural Services

The Department of Multicultural Services provides multiple support services for current and prospective students from underrepresented populations and offers diversity education programs fostering inclusive learning environments for all students. We promote student success through academic support, diversity education, the enhancement of life and leadership skills, advocacy and mentoring.

The department is home to several student organizations, programs, and courses fostering environments for student development and learning. Our student development and cultural support organizations include Asian Presidents' Council (APC), Black Student Alliance Council (BSAC), Hispanic Presidents' Council (HPC), Excellence uniting Culture, Education, and Leadership (ExCEL) Student Success Program, Maximizing Educational Development through Academic and Leadership Skills (MEDALS), Southwestern Black Student Leadership Conference (SBSLC), and University Awareness for Cultural Togetherness (U-ACT). Outside of student organizations, we offer additional involvement opportunities including African American Student Leadership Institute (AASLI), Institute for the Development and Education of Asian American Leaders (IDEAAL), Diversity Training Institute (DTI), Social Justice seminar, and African American and Mexican American civil rights tours typically occurring during spring semesters. Our department is also home to a free tutorial service providing one-on-one and small group tutoring in specific courses.

A commitment to diversity means a commitment to the inclusion and support of individuals from all groups, encompassing the various characteristics of persons in our community. As we harness the power of diversity, we provide students, faculty, and staff a university experience rich in perspectives and opportunities. For more information, contact us:

Department of Multicultural Services
 (979) 862-2000
dms@aggieculture.tamu.edu
aggieculture.tamu.edu

Recreational Sports

The Department of Recreational Sports is committed to offering a wide variety of opportunities that promote an active, healthy lifestyle for persons of all abilities, experience and interests. All Texas A&M students are automatically Rec Members. All you need is your student ID to utilize the Student Rec Center. We invite persons with disabilities to contact Member Services to inquire about accommodations.

Drop-in recreation encompasses the use of recreational facilities such as swimming/diving pools, walking/jogging track, handball/racquetball courts, indoor soccer, basketball, volleyball and badminton courts located in the Student Recreation Center (Rec Center). The Rec Center also features an indoor rock climbing facility, outdoor basketball courts, outdoor sand volleyball courts, a 14,000 square foot weight and fitness room, a natatorium with three indoor pools with an Olympic venue and spring and platform diving, and an outdoor free-form and lap pool. Facilities may be used on a drop-in basis except when reserved for classes or university functions. Daily guest passes are available for visitors.

The Walk of Champions offers all Aggies the chance to leave their mark on the Texas A&M campus with their name on a brick in front of the Student Recreation Center.

Aquatics offer a variety of water related classes including adult swim instruction, diving, SCUBA, first aid and lifeguard training. Information is available at the Member Services Desk at the Rec Center.

Group exercise classes are offered seven days a week including early morning, afternoon and night classes. A variety of class formats are offered such as step, kickboxing, dance, group strength training, indoor group cycling, athletic conditioning and water aerobic classes.

Personal training is also available to Rec members. Nationally certified Rec Sports Personal Trainers can design a fitness program to meet the client's individual exercise needs. The personal trainer will help assess the client's fitness goals and develop a workout plan that will provide safe and effective techniques that get results.

The Healthy Living Lecture Series offers a variety of free lectures that are offered in the Rec Center on Wednesday evenings at 5:30 p.m. in room 281. These lectures cover issues related to fitness, supplements, nutrition, eating disorders, etc. Schedules are available at the beginning of each semester.

Instructional classes are offered to Texas A&M students, Rec Members and the general public that want to learn a new skill or refine their skills. The class schedule varies each semester due to the availability of instructors. Traditional classes offered are Yoga, Pilates and dance; country western, hip hop and belly dance.

Massage therapy is offered most days of the week to ease your pains or melt away the stress of the day. Our licensed therapists are available to perform both Swedish and deep muscle massage. A brochure is available at the Member Services Desk that explains the benefits of massage and commonly asked questions.

Intramurals is a highly organized, competitive program with various divisions and skill levels of competition. In addition, our sports officiating program allows students the opportunity to learn how to officiate various sports while earning a paycheck.

The Texas A&M Sport Club program consists of 30 clubs that offer skill enhancement and competition for members. Any student may join a club, regardless of his/her ability,



provided the student has an interest in developing the athletic skills necessary to participate. Although the only criterion to be a sport club is to represent Texas A&M at competitive events throughout the state, many have gone on to receive national recognition for their efforts.

TAMU Outdoors, the Department's outdoor adventure program, is comprised of an outdoor equipment rental and retail sales outlet, an indoor rock climbing structure, basic skill development clinics in a variety of outdoor activities, adventure trips and a resource library. All of these areas form a program designed to provide outdoor experiences for Texas A&M students, faculty/staff and the local community.

Texas A&M Golf Course, Pro Shop and Driving Range is available to meet your golfing needs. Whether you are already on campus or coming to visit, the Texas A&M Golf Course is open to the public and offers everyone the opportunity to golf on a great course.

For more information, please contact:

Department of Recreational Sports
(979) 845-7826
recsports.tamu.edu

Student Activities

The Department of Student Activities believes that the first priority of students is to be successful academically and works cooperatively with faculty to support this goal. In addition, the department is committed to students' educational development and offers them endless opportunities for experiential learning through campus involvement. However, there is much more to college life than classes, homework, exams and grades. There are student organizations, clubs, traditions, athletic events and much more.

Involvement in one or more of the University's 750-plus organizations can add an important dimension to one's college experience. It is a way to balance one's life, meet new people and develop interpersonal and leadership skills. In addition, prospective employers often look at what students have accomplished and experienced outside of their course work. The recognized student organizations are categorized into the following: academic, recreation and health, special interest, home town, honor societies, social fraternities/sororities, religious, governance, campus service, community service, spirit and tradition, cultural/international, performing and visual arts, political and social issues, sports clubs, military and student government. The recognized student organizations include a variety of events such as business meetings, conferences, social events, sponsored guest speakers, workshops, and field trips. For all these reasons, Student Activities supports the belief that students can learn from experiences as well as from textbooks.

The Department of Student Activities provides direct advisement to Student Government, COSGA, Fish Camp, Howdy Camp, T-Camp and the student radio station, KANM, among others. Student Activities is committed to providing Texas A&M students with the best possible "other education" through programs and services that meet the needs of all students.

Department of Student Activities
Room 125 Koldus
(979) 845-1133
studentactivities.tamu.edu

Leadership Programs

The Department of Student Activities offers a wide variety of leadership development programs that provide an excellent opportunity for students to develop personal leadership and student organization management skills. Programmatic efforts include specialized training sessions, seminars, and workshops. Examples of leadership programs offered include: Covey's Seven Habits of Highly Effective People (the collegiate version) and the Learning to Lead program.

The All-University Calendar

The Texas A&M All-University Calendar is the official event calendar and planner of Texas A&M University. The All-University Calendars are available beginning mid-May, exclusively at the Memorial Student Center Bookstore. The Department of Student Activities also publishes semester calendars that provide a listing of various university-wide events. These calendars are distributed electronically at the beginning of each fall and spring semester and are available online at studentactivities.tamu.edu/events.

Student Government

The representative governing body for all students at Texas A&M is the Student Government. This body is directly responsible for representing the interests of students to the administration and to the entire university community. The Student Government works with the administration on such issues as changes in rules and regulations, the allocation of student services fees and student membership on university committees. It also conducts many programs that are of service to the students including student elections and voter registration.

Student body officers are elected in the spring each year. They work within the structure of the student government, which is organized into three branches-executive, legislative and judicial. The executive



branch contains a number of committees such as Traditions, Muster, Parents' Weekend, Freshman Programs and the Conference on Student Government Associations (COSGA). The legislative branch is composed of the Student Senate which is the policy-making division of student government. Representatives to the Senate are elected each spring from living areas and academic colleges. The judicial court is appointed by the student body president with the approval of the Senate For more information, contact the Student Government Office at (979) 845-3051 or sga.tamu.edu.

Center for Campus and Community Engagement

The Center for Campus and Community Engagement serves as a resource to all Texas A&M students, faculty, and staff for community service opportunities and volunteer involvement. Staff members are available for assistance on the following:

- Connecting individuals to quality community service opportunities
- Connecting groups to quality community service opportunities
- Making your service experiences more meaningful
- Recognizing outstanding volunteers/servant leaders

Center for Campus and Community Engagement
 125 John J. Koldus Building
 1236 TAMU
 College Station, TX 77843-1236
 (979) 845-1133
 serve@tamu.edu
 serve.tamu.edu

Drama and Debate Organizations

The Aggie Theatre Council

The Aggie Theatre Council is an organization for students interested in the theatre. It supports the Theatre Arts Program Aggie Players productions, stages its own studio productions, arranges theatre arts tours and provides programming related to theatre arts such as workshops, seminars and speakers. Membership is open to all Aggies. Contact the Theatre Arts office in Room 152, Blocker Building, or call (979) 845-2621.

Debate Activities

The Texas A&M Debate Society is sponsored by the Department of Communication. The Debate Society debates issues of current controversy and presents public forums on campus. Interested students may obtain further information in Room 102, Bolton Hall.

Musical Organizations

Century Singers

The Century Singers, an active part of the total choral music program, is the 80-voice mixed concert choir of Texas A&M. Repertoire is selected from traditional and contemporary classical forms as well as modern show tunes. The chorus is open to any student who passes a brief vocal audition. Prior choral experience is helpful. Recent tours have taken the chorus to Greece, New York, Canada, Italy, Spain, France, Austria, Germany and the Czech Republic, as well as surrounding Texas communities. One credit hour is available.

The Show Choir

The Show Choir, the university's show choir ensemble, consists of twenty-four singers and instrumentalists. Bringing a unique style to their performances, they entertain at banquets, conventions, campus-sponsored events and several out-of-town activities.

Singing Cadets

The Singing Cadets, open to all male students at Texas A&M, is the internationally famous "Voice of Aggieland." The all-male group has sung for every living president as well as first ladies. They are frequent guests at many featured programs including special guests for former President and Mrs. Bush, The White House, Miss Texas USA, Shania Twain, and Astros Opening Day. The group also tours and have made premiers recently at Carnegie Hall and The Kennedy Center. In the past ten years, international tours have taken them to England, Scotland, Wales, Australia, Uruguay, Argentina, and Brazil. Membership is by audition at the beginning of each semester. **Open to any male student by audition.**

Women's Chorus

The youngest of the University's choral organizations is the Women's Chorus, organized in 1979. Consisting of 60 members and singing a varied and entertaining repertoire, they represent Texas A&M University in the local communities and throughout the state. A unique annual event is the Women's Chorus Festival held in collaboration with other universities. Their travels outside Texas have taken them to China, Great Britain, and Canada.

For auditions, contact the directors. Auditions are required for the above choral groups and are held during the first two weeks of the fall semester and the first week of the spring semester. For more information, contact Choral Activities at (979) 845-5974. They are located in Room 003 of the Memorial Student Center .

Voices of Praise

Voices of Praise Gospel Choir (VOP) promotes and enriches the lives of the Texas A&M student body, the Bryan/College Station community and people across Texas and United States through inspirational singing and community service.

VOP annually hosts GospelFest (an all-day collegiate conference of spiritual workshops, choir rehearsal and evening concert) and SpringFest (a similar all-day conference organized for the youth of Bryan/College Station and surrounding communities).

Voices of Praise has over fifty active members and is open to any student, staff or faculty member of Texas A&M University. For more information about VOP, please visit the choir's Web site at vop.tamu.edu.

University Wind Symphony, Symphonic Winds, Symphonic Band and Concert Band

These instrumental concert ensembles are open to all students on campus. An audition is required for membership and ensemble placement. A wide variety of both traditional and contemporary band literature is programmed each semester. Each band presents several on-campus concerts each semester and the Wind Symphony tours both throughout the United States and Europe. Academic credit for each band is granted through the College of Liberal Arts and may be used to fulfill core Visual and Performing Arts requirements. For more information or to schedule an audition, please contact the Office of University Bands at (979) 845-3529.

Student Life

The Offices of the Dean of Student Life strives to enhance student opportunities to participate fully in the university experience. The department does this by providing information, services, programs and involvement opportunities that facilitate responsible life choices and promote awareness of self and community. Each of the offices has a specific mission but one common goal: to provide education, outreach and support. The Offices of the Dean of Student Life sponsors a number of programs and events for students throughout the year: National Collegiate Alcohol Awareness Week (NCAAW), Safe Spring Break, Housing Fair, and New Student Conferences.

Additionally, the department sponsors and/or advises the following student organizations: Aggie Orientation Leaders Program (AOLP), Aggies With Kids, Graduate Student Council (GSC), Off Campus Aggies (OCA), and Responsible Aggies Making Decisions (RAD).

Specific services and programs offered include:

- Adult, Graduate and Off Campus Student Services
- Alcohol and Drug Education Programs
- New Student Programs
- Parent/Family Programs
- Critical Incident Response
- Silver Taps
- Student Absence Notification
- Student Conflict Resolution Services (Student Conduct Services, Student Legal Services and Student Mediation Services)
- Student Media
- Gender Issues Education Center

The Offices of the Dean of Student Life

(979) 845-3111

studentlife@tamu.edu

studentlife.tamu.edu

Student Life Studies

The Department of Student Life Studies serves as a consultant to departments and staff in the Division of Student Affairs and to student organizations. The Department facilitates assessment and evaluation of services and programs and assists in expanding the knowledge base about Texas A&M students and their co-curricular experiences. Department staff can assist with the development of assessment instruments and the collection and analysis of data including web-based programs. The Student Organization Assessment Center serves as a resource to recognized student organizations interested in evaluation of their programs and services as well as in the development of missions, goals and strategic plans.

Department of Student Life Studies

(979) 862-5624

sls@tamu.edu

studentlifestudies.tamu.edu

Greek Life

Greek Life at Texas A&M is an integral part of campus life. More than 3,500 Aggies are currently members of Texas A&M's 22 Interfraternity Council fraternities, 7 National Pan-Hellenic Council fraternities and sororities, 16 Multicultural Greek Council fraternities and sororities and 12 Panhellenic Council sororities. Each chapter offers leadership, scholarship, brotherhood/sisterhood, community service and social activities to members. Aggie Greeks actively participate in all aspects of campus life and hold leadership positions in the Aggie Orientation Leader Program, Off Campus Aggies, Fish Camp, Student Government, the Corps of Cadets and many other student and community organizations.

Department of Greek Life
(979) 862-5636
greeklife@tamu.edu
greeklife.tamu.edu

University Art Collections and Exhibitions

The Office of University Art Collections and Exhibitions provides and promotes cultural opportunities that augment the academic experiences of the Texas A&M community. It is responsible for visual art exhibitions at the J. Wayne Stark University Center Galleries and for art inventories at Texas A&M.

The program organizes the major art exhibitions for the University; advises on the selection, display and management of visual art objects on the campus; handles all art and art-related gifts to the University; and provides guidance and support to all exhibitions and collections at the University.

In addition, the Office of University Art Collections and Exhibitions organizes programs to complement exhibitions; has a docent program, which provides guided tours of changing exhibitions on campus and the University's permanent collections to interested community and school groups; and works with the Texas A&M University Commission on the Visual Arts.

University Art Collections and Exhibitions
(979) 845-8501
uart@stark.tamu.edu
stark.tamu.edu

Student Media

Student Media produces the campus newspaper, *The Battalion*; the yearbook, *Aggieland*; and the *Campus Directory*. All are written, edited and produced by students and offer excellent opportunities to gain valuable experience for journalistic and related careers. Participation is not limited to any course of study or classification, but rather is open to all interested students. Student editors, writers and other staff members receive salaries commensurate with their duties and responsibilities.

The Battalion is published Monday through Friday during fall and spring semesters, and Monday through Thursday during the summer session. It is distributed to students, faculty and staff on campus and at many apartments and other high traffic areas in College Station. *The Battalion* also is available via online and radio editions. The *Aggieland* is distributed in the fall but is a year-round project documenting school activities. It is one of the nation's



largest college yearbooks, both in the number of pages and number of copies sold each year. The *Campus Directory*, published each fall, includes listings of students, faculty, staff and other general information. In addition to these University-wide projects, some academic colleges and student organizations sponsor magazines and similar publications which offer interested students an opportunity to participate in more specialized or technical writing.

Student Media
 (979) 845-3313
studentmedia.tamu.edu

Intercollegiate Athletics

Nationally regarded for its outstanding school spirit and unique traditions, Texas A&M University and its athletics department are fully committed to “Building Champions.” Texas A&M provides complete support to help its student-athletes attain their athletic and academic goals.

Texas A&M is a member of the National Collegiate Athletic Association (NCAA) and the prestigious Big 12 Conference, which also includes Baylor University, Iowa State University, Kansas State University, Oklahoma State University, Texas Tech University, University of Colorado, University of Kansas, University of Missouri, University of Nebraska, University of Oklahoma, and the University of Texas.

Texas A&M’s athletic teams are known as “Aggies” and the official school colors are maroon and white. Many of the school’s rich traditions are centered around athletics. The student body, known as the “12th Man,” stands throughout football games to underscore their readiness in case they are needed to go into the game as the original 12th Man, E. King Gill, did in 1922. On Friday nights before home football games, the student body has “Yell Practice” at midnight, with as many as 40,000 people in attendance at Kyle Field. The student body also creates a one-of-a-kind atmosphere in sports such as baseball, basketball, soccer, volleyball and tennis, giving the Aggies a true home field advantage.

Texas A&M sponsors 20 intercollegiate athletics teams and all but equestrian compete in the Big 12. The nine men's programs are football, basketball, baseball, golf, indoor track and field, outdoor track and field, cross country, swimming and diving, and tennis. The 11 women's programs are basketball, cross country, golf, indoor track and field, outdoor track and field, softball, swimming and diving, tennis, volleyball, soccer and equestrian.

Texas A&M consistently ranks among the national leaders in student attendance and its facilities are considered among the finest in the country. As a result, Texas A&M has played host to a variety of national intercollegiate events, including the 2001 NCAA Men's Swimming and Diving Championships, 2002 NCAA Men's Tennis Championships, the 2003 National Varsity Equestrian Championships, the 2004 NCAA Women's Swimming and Diving Championships, the 2005 Men's Tennis Championships and most recently the 2005 Women's Soccer Championships. Texas A&M also has administered many conference and NCAA regional championship events.

Texas A&M has won two Big 12 South Division football titles and won the Big 12 Championship in 1998, advancing to the Nokia Sugar Bowl as part of the Bowl Championship Series (BCS). The baseball team won back-to-back Big 12 titles in 1998 and 1999 and advanced to the 1999 College World Series. Men's tennis won the 2001 Big 12 title while the women's tennis squad captured the league crown in 2005. Texas A&M has won Big 12 titles in women's golf (1998 and 2006) and soccer (2002, 2004, 2005 and 2006).

Including its days as a charter member of the Southwest Conference (1915–1996), Texas A&M captured 99 conference championships in addition to national titles in football (1939), softball (1982, 1983, 1987) and equestrian (2002–05).

Aggie athletes have earned more than 800 All-American citations and hundreds have gone on to successful professional careers in their respective sports. In addition, Texas A&M has produced a number of Olympic athletes, including recent gold medalists Randy Barnes (track and field, 1996), Jennifer McFalls (softball, 2000) and Mike Stulce (track and field, 1992).

The mission of Texas A&M athletics is "Building Champions" and is at the heart of the athletic department's Mission Statement: *"Texas A&M Athletics commits to Building Champions through academic achievement, athletic excellence and national recognition of our student-athletes, teams and programs. We provide our student-athletes with all the necessary tools for them to be Champions in their sport and in life. The integrity of our program takes root in the tradition and spirit of Texas A&M, bringing honor and distinction to our University."*



TEXAS A&M
UNIVERSITY

A black and white photograph of a bronze statue of a man with a beard, wearing a suit and tie. The statue is in the foreground, and in the background, there is a large, domed building, likely the Texas State Capitol, partially obscured by trees.

INTERNATIONAL PROGRAMS FOR STUDENTS

★ 2008–2009 UNDERGRADUATE CATALOG ★

International Programs for Students

Administrative Officers

Associate Vice President for International Programs.....	Emily Y. Ashworth, M.A., Ph.D.
Executive Director of International Programs for Students.....	Suzanne Droleskey, B.S., M.A., Ph.D.

Study Abroad Programs

As a university with a long and proud history of international programs, Texas A&M University is deeply committed to providing 100 percent access to international education opportunities for all students. In the globally interconnected 21st century, the ability to engage successfully across cultures and the development of international leadership skills are crucial for success as graduates enter the work force.

The mission of the Texas A&M University Study Abroad Programs is to provide students in all fields of study, at all levels, a wide variety of educational experiences abroad. Therefore, a wide range of international opportunities is offered, coordinated both in the colleges and centrally through the Study Abroad Programs Office. Whether a student chooses to join other Aggies in a faculty-led study abroad, opt for a reciprocal educational exchange program, work with staff to tailor an independent study program, or do research, language training, internships, work, or leadership programs abroad, Texas A&M can provide an international education opportunity that will enhance the success of our students both personally and professionally.

Faculty-Led Group Study Programs

Every year, many faculty-led programs take Aggies around the world for study, with a special concentration in Latin America, Asia and Europe. Each respective program is designed to provide students with a relevant application of the coursework to the host country, while also enriching the academics with cultural immersion. Most programs take place during the summer, but some programs are also offered during the fall, spring and intersessions. One of the most popular locations for a semester program is at the University's Santa Chiara Study Center, located in the small medieval town of Castiglion Fiorentino, Italy.

Santa Chiara Study Center in Italy

For more than a decade, the Center has provided Texas A&M students and faculty the opportunity to live in and learn about another culture while studying a variety of academic subjects, including Italian and an Arts and Civilization course. The Center, located south of Florence in Tuscany, offers Summer session programs lasting approximately five weeks, as well as Spring and Fall semester programs lasting 15 weeks each. All are open to students from all majors. Courses are taught by Texas A&M faculty and are enhanced by specialized guests lectures and field trips. Special programs for pre-freshman honor students have also been among the offerings at the Santa Chiara Center.

Reciprocal Educational Exchange Programs (REEP)

Both departmental and university-wide reciprocal exchange programs have been developed, allowing students to receive A&M credit while studying at a foreign university, changing places with a student from that university who comes to study at Texas A&M. There are over forty reciprocal exchanges to choose from in Latin America, Europe, and Asia. Proficiency in the language of the host country is required; however, some programs are available in English speaking countries.

Independent Programs Abroad

Independent international programs encompass many possible opportunities, such as applying directly to an international university, applying through a sponsoring U.S. university, institute or organization, or conducting research abroad coordinated by a Texas A&M faculty member. Other opportunities include internships, teaching, and volunteer opportunities. Staff in the Study Abroad Programs Office and extensive web-based and paper resources are available to assist in this search. Students can transfer credit back to Texas A&M University or enroll in 484, 485, 491, etc. courses and go abroad. These must be approved in advance through Study Abroad Programs.

Funding for Study Abroad Programs

Students receiving federal and some state financial aid for on-campus study may use their aid for study abroad. In most cases, aid amounts expand to meet the additional costs of studying abroad, and Financial Aid counselors work with students individually to examine their eligibility. There are also many scholarships specifically for study abroad, including the International Education Fee Scholarship, the Association of Former Students Study Abroad Fellowships, the McCord Scholarship, and numerous prestigious national and regional grants and scholarships such as the Jr. Fulbright, the National Security Education Program, Gilman International Scholarship, and Freeman-Asia Program. Some colleges have special study abroad scholarships. Regents Scholars and Honors students also have special scholarships available to them for study abroad.

Academy for Future International Leaders

This academic program identifies emerging and proven student leaders from all colleges and includes them in a full year of activities targeting international competencies and leadership. Students engage in seminar courses focusing on global issues and taught by industry, government and academic experts in their fields. The course of study also includes an optional international opportunity outside the U.S. and an international leadership challenge project.

How to get involved

For information and applications for faculty-led, reciprocal education exchanges, independent programs, the Academy for Future International Leaders, and study abroad scholarships please visit the Texas A&M Study Abroad Program Office Web site. For more information, please contact:

Texas A&M University
Study Abroad Programs
1st Floor Bizzell Hall West
MS 3262 TAMU
College Station, TX 77843-3262
(979) 845-0544
Fax (979) 458-3623
studyabroad.tamu.edu

Sponsored Student Programs

The Sponsored Student Programs Office provides a variety of support services to international sponsored students whose academic programs are being funded by foreign governments, international agencies, corporations or other entities. Among many other services, the office coordinates admissions, provides assistance with academic program development, oversees the contractual agreements between the students and sponsors, manages financial matters related to student billing and accounts, and provides academic and personal counseling for the sponsored students. In addition, the office serves as the University's liaison between academic departments, the student and the sponsors. For additional information, please contact:

Sponsored Student Programs Office
361 Bizzell Hall
Texas A&M University
1226 TAMU
College Station, TX 77843-1226
(979) 845-2550
Fax (979) 862-7170
ssp.tamu.edu

International Student Services

In addition to the services available to all Texas A&M students, the Office of International Student Services (ISS) strives to assure that international students make a smooth transition to Texas A&M University and have support throughout their matriculation. To respond to the needs of students, this office seeks to build bridges of understanding and mutual respect among the diverse multi-national segments of the University community. Among the many services offered are pre-arrival information, orientation, international student employment information, cross-cultural programming, personal advising, administration of scholarships and loans for international students, community involvement activities and communication as a liaison between student and faculty and between student and community. ISS creates and issues Certificates of Eligibility (Forms I-20 and DS-2019) needed by international students to attend the University and provides a broad range of required services for student non-immigrant visa holders and their families. Fostering the tradition of student leadership development at the University, ISS coordinates and mentors the activities of the International Student Association as well as a wide variety of other international student organizations. For additional information, please contact:

International Student Services Office
Bizzell Hall East
Texas A&M University
1226 TAMU
College Station, TX 77843-1226
USA
(979) 845-1825
Fax (979) 862-4633
iss@tamu.edu
international.tamu.edu/iss



International Organizations

With the primary goal of promoting friendship and understanding among the many cultures represented at Texas A&M, the International Students Association (I.S.A.) serves as communication link for all international clubs and cultural information between U.S. and foreign students as well as the local community.

Other international student associations include:

African Student Association	Israel, Aggie Friends of
Arab Student Association	Japan Club
Bangladesh Student Association	Korean Student Association
Bolivian Student Association	Malaysian Student Association
Brazilian Student Association	Mexican Student Association
Caribbean Student Association	Muslim Student Association
China Club	Nicaraguans at A&M
Chinese Student and Scholar Association	Pakistan Club
Chinese Student Association	Panamanian Student Association
Colombian Student Association	Persian Student Association
Costa Rican Student Association	Peruvian Student Association
Ecuadorian Student Association	Philippine Student Association
Egyptian Student Association	Puerto Rican Student Association
Europe Club	Romanian Club
Guatemalan Student Association	Saudi Student House
Hellenic Student Association	Singapore Student Association
Honduras Student Association	SPIC MACAY
Hong Kong Student Association	Sri Lanka Association
India Association	Thai Student Association
India Business and Technology Consortium	Turkish Student Association
Indian Student Association	Venezuelan Student Association
Indonesian Student Association	



TEXAS A&M
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A black and white photograph of a bronze statue of a man with a beard and mustache, wearing a suit and tie. The statue is positioned in the foreground, looking slightly to the left. In the background, there are trees and a large, domed building, likely the Texas A&M University building.

UNIVERSITY HONORS PROGRAM

★ 2008–2009 UNDERGRADUATE CATALOG ★

University Honors Programs

Administrative Officers

Executive Director of Honors Programs	Edward A. Funkhouser, B.S., M.S., Ph.D.
Associate Director for Honors Programs	Kurt W. Ritter, B.A., M.A., Ph.D.
Associate Director for Scholarships	Myra L. Gonzalez, B.A., M.A.
Associate Director for Professional and Graduate School Advising.....	Anne P. Blum, B.S., M.S., Ph.D.

The University Honors Programs challenges promising students to pursue intellectually stimulating and academically rigorous educational opportunities. The program is campus-wide, encompassing all undergraduate colleges in the University. As a result, honors students have access to the entire spectrum of educational resources available at Texas A&M. Honors courses and individualized research programs bring together outstanding students and faculty in an environment designed to encourage initiative, creativity and independent thinking.

Texas A&M's most selective, competitive academic scholarships are administered by Honors Programs. These include the President's Endowed, Lechner and McFadden, National Merit, and Merit Plus Scholarships for incoming freshmen; the Hazelwood Scholarship and the Collegiate Excellence Scholarship for transfer students; and the Honors Incentive Award Scholarships and the University Scholars Award for currently enrolled students. Texas A&M makes over 1,200 new awards of these prestigious scholarships each year in recognition of academic and leadership achievement. Academically successful Texas high school graduates may also qualify for the valedictorians' tuition waivers coordinated by Scholarships & Financial Aid.

Honors Programs provide recognition for undergraduate academic success at Texas A&M and a full range of support services for participants in the honors curriculum and recipients of academic scholarships. Honors Programs function much like a small college within a comprehensive research university.

Honors Curriculum

Each year, over 300 honors classes are offered by academic departments across the University. Honors courses have limited enrollment and are reserved for highly successful and motivated students. As a result, they encourage participatory learning through the interchange of ideas between students and professors and among students themselves. In honors classrooms and laboratories, students work closely with many of the University's most acclaimed faculty and have the opportunity to explore course material in unusual depth. Small size (usually no more than 25) also allows honors classes to undertake activities and utilize facilities otherwise not readily available to undergraduate students. Honors classes may be special sections of regularly offered courses or courses developed specifically for honors students.



Normally, Honors Programs are not a separate curriculum track. In fulfilling departmental, college and university degree requirements, honors students have the opportunity to choose the combination of honors courses and regular course sections that best meet their needs and interests. Typically, participating students register for one or two honors courses each semester.

For Honors Programs participants interested in pursuing an intellectually challenging sequence of honors courses and research opportunities within their major area of study, the Engineering Scholars Program, the Honors Plan in Liberal Arts and Mays Business School Honors Program offer special, structured honors experiences. The individual college sections of this catalog offer information about these honors study options. In addition, selected academic majors offer honors plans. Additional information on departmental honors programs is available online at honors.tamu.edu.

There is no separate application for admission to the Honors Programs. Rather, students meeting the criteria described below are eligible for participation in honors course work semester by semester.

Qualifications for Participation

To enroll in honors classes, a student must have a 3.5 cumulative GPR at Texas A&M University. First-semester freshmen enrolling in honors classes must have graduated in the top 10 percent of their high school class and present a composite score of at least 1250 on the SAT (critical reading plus math with at least 570 on each), 28 on the ACT (composite with a minimum 27 English and 27 math), or be a National Merit Finalist, National Achievement Finalist or National Hispanic Scholar. Second semester freshmen and more advanced undergraduates may enroll if they attain a cumulative Texas A&M GPR of 3.5 or above. First-semester transfer students are considered for participation on an individual basis. Students with less than a 3.5 cumulative GPR will be dropped from honors courses.

Students who have completed 9 semester hours of honors course work with a cumulative Texas A&M University GPR of 3.5 or higher are designated “honors candidates.” Honors candidacy is a step on the way to graduation with honors and brings with it special privileges, including the right to apply for the Honors Independent Study, Honors Contract and University Undergraduate Research Fellows Program.

Honors Independent Study and Honors Contract

The honors curriculum may be customized to fit individual needs through Honors Independent Study and Honors Contract.

Honors candidates who meet the requirements for honors registration may petition to enroll in Honors Independent Study for individualized instruction or research under the guidance of a faculty advisor.

With the approval of the course instructor and the Honors Programs, honors candidates may obtain honors credit by enrolling in a non-honors, advanced-level course and engaging in a written “Honors Contract” to undertake more challenging work and to meet for individual instruction.

Graduate Courses for Undergraduate Honors Credit

Honors candidates who meet the requirements for honors registration may petition to receive honors credit for graduate course work taken at Texas A&M. To register for graduate classes and apply the credit earned toward an undergraduate degree, a student must file a written petition for approval to the course instructor, the subject matter dean and the dean of the student’s college. The petition should be initiated in the University Honors Programs. Graduate credit hours earned toward an undergraduate degree may not be used again toward a graduate degree.

Honors Recognition and Graduation with Honors

All honors courses are designated on a student’s permanent transcript, showing prospective employers or graduate and professional schools that the student has participated in an enriched curriculum. University Honors and Foundation Honors are conferred at commencement upon students who have completed a substantial body of honors course work and who hold an overall GPR of 3.5 or above and an honors course GPR of 3.25 with no grade less than a C in an honors course. Summa Cum Laude, Magna Cum Laude and Cum Laude, University Honors, Foundation Honors and completion of the University Undergraduate Research Fellows as well as qualified College and Departmental Honors distinctions are recorded on a student’s transcript. Students may graduate with any combination of these honors distinctions and should consult an honors advisor about fulfillment of the requirements for graduating with honors.

University Honors

Students who have completed 36 hours of honors course credit, or 33 hours that include at least 3 hours of 400-level Honors Independent Study, may qualify for graduation with University Honors. Each qualifying student must earn at least 6 hours of honors credit in the humanities, social and behavioral sciences, and/or visual and performing arts, and 6 hours in mathematics and/or natural sciences. A minimum of 12 of the 33–36 honors hours must be taken at the advanced (300–400) course level. With sufficiently high scores in Advanced Placement (AP) courses, a limited number of college credits from those classes may be applied to the requirements for University Honors (maximum of 12 college credits) and for Foundation Honors (maximum of 7 college credits).

Foundation Honors

Completion of a 43-hour University Core Curriculum is required of all students seeking an undergraduate degree from Texas A&M University. Students who choose to fulfill 19 hours of University Core Curriculum course work through honors classes may qualify for graduation with Foundation Honors. The 19 honors hours must include 3 hours from POLS 206, POLS 207 or U.S. history, 3 hours each in communication and mathematics, 4 hours including laboratory in natural sciences, and 6 hours from humanities, social and behavioral science, and visual and performing arts.

University Undergraduate Research Fellows (senior honors thesis)

Honors candidates of junior classification may apply to participate during their senior year in the University Undergraduate Research Fellows Program—a two semester, independent research experience culminating in a senior honors thesis. This is the most challenging research opportunity available to undergraduate students and provides participants with access to faculty supervision and research resources usually extended only to students pursuing graduate degrees. The Fellows Program features a close, mentor relationship between student researchers and faculty advisors and involves interdisciplinary seminars to foster scholarly community. Participants are selected for the Fellows Program based on their academic record and faculty evaluation of a formal research proposal.

B.A. or B.S. Degree in University Studies–Honors

Texas A&M University offers an individualized, interdisciplinary undergraduate honors option in the University Studies degree. Admission is highly selective.

Honors Student Services

Participants in honors study at Texas A&M qualify for academic and career counseling by the University Honors Programs. They have opportunities for recreation, involvement in Honors Program development, and campus leadership through the Honors Student Council. Academic advisors in the Honors Program identify and prepare candidates for major national scholarship competitions, including the Rhodes, Fulbright, Marshall, Truman, Goldwater, Mellon, Udall and National Science Foundation scholarship programs. Participants may also request assignment in Clements Honors Residence Hall.

Competitive Academic Scholarships for Freshmen

Honors Programs administer Texas A&M University's principal four-year competitive academic scholarships. While competition eligibility requirements vary, only one application is needed to apply for the scholarships listed below. Completed scholarship applications must be received no later than the specified deadline during a high school student's senior year; awards are announced at the beginning of March. Scholarships are reserved for U.S. citizens and permanent residents or students who graduate from accredited U.S. high schools. Out-of-state recipients of President's Endowed, Lechner and McFadden Scholarships receive a non-resident tuition waiver. Scholarship recipients also qualify for a \$1,000 stipend applicable for participation in Texas A&M's Study Abroad Program. Scholarship recipients are guaranteed residence hall space, as long as they request it for the freshman year and maintain continuous residence on campus. Scholarship recipients who meet honors eligibility requirements may request assignment to the Lechner Freshman Honors Hall for their freshman year.

Within each of the competition categories, a student's standardized test score is one of many components considered in the review process. In selecting recipients, consideration is given to academic achievement in a college preparatory curriculum within the context of the student's academic environment. Additional factors for selection include, but are not limited to, leadership, community service, special talents, first generation college status and academic achievement under difficult circumstances. Texas A&M seeks to provide opportunities for student leaders from all walks of life who represent the geographic, socio-economic and cultural diversity of the state of Texas and beyond. Students planning to enter the University in the fall of 2009 and after should check with the Honors Programs for the latest scholarship requirements and deadlines.

President's Endowed, Lechner and McFadden Scholarships

Approximately 300 four-year President's Endowed Scholarships, each worth a total of \$12,000, and 150 Lechner and McFadden Scholarships, each worth a total of \$10,000, are awarded annually to incoming freshmen who are U.S. citizens, permanent residents or who graduate from accredited U.S. high schools. Out-of-state recipients also earn a non-resident tuition waiver for the duration of the scholarship. Scholarships are merit-based and are awarded without regard to financial need. Eligibility for competition: SAT 1300 (critical reading plus math with at least 600 on each) or ACT 30 (at least 30 each in English and math), or semi-finalist or commended standing in national scholarship competitions sponsored by the National Merit Scholarship Corporation or College Board. Applicants must submit the scores of the writing component as a part of SAT or ACT test results. The writing component material may be used in the selection process as a writing sample in lieu of a personal statement. Additional essays may be required.

Achievement Awards

Approximately 280 four-year scholarships are awarded each year to incoming freshmen who are Texas residents, who have overcome significant adversity and who, despite that adversity, have performed well academically. Overcoming adversity may mean being the first in the family to go to college, difficult economic circumstances or overcoming a significant personal hardship. No separate scholarship application is necessary.

National Merit Scholarships and Merit Plus Awards

Students named Finalists in the National Merit Scholarship competition who designate Texas A&M as their first choice college to the National Merit Scholarship Corporation under guidelines established by the Corporation are assured a four-year National Merit Sponsorship with a total value of at least \$2,500. National Merit Finalists who name Texas A&M as their first choice college may also earn a Director's Excellence Award and a NM Recognition Award valued at \$10,000 and \$24,000 respectively over four years.

National Merit Semifinalists enrolling at Texas A&M for their freshman year of study will be granted a one-year \$2,000 Merit Plus Award. Designation as a National Merit Finalist, of course, will qualify the recipient for an additional National Merit Sponsorship as described above.

National Merit Scholars needing a fifth year of undergraduate study may receive a Director's Excellence Supplement Scholarship in the amount of \$2,000. Recipients of National Merit, Merit Plus Scholarships and Director's Excellence Awards may combine them with other scholarships, including Texas A&M awards. Holders of these awards are assured on-campus housing in residence halls as long as they request it for their freshman year of study and maintain continuous on-campus residence. They also are eligible for a \$1,000 stipend applicable for participation in Texas A&M's Study Abroad Program.

Valedictorian Tuition Exemption

Valedictorians from accredited Texas high schools are entitled to a tuition exemption during their freshman year at Texas A&M University. To receive this award, the student must be certified as valedictorian and Texas A&M must be the first college or university of full-time enrollment. No formal application is required, but qualified students must present their official valedictorian declaration to Scholarships & Financial Aid at the new student conference or the beginning of their first semester.

College and Departmental Academic Scholarships for Freshmen

A number of colleges and departments at the University award scholarships on a merit basis to incoming freshmen interested in particular major fields of study. The sizes of the awards vary and the term of scholarships range from one to four years. Out-of-state recipients of scholarships valued at \$1,000 or more per year qualify for a non-resident tuition waiver. Selection criteria are determined by each awarding college and department. Students may enter college or departmental scholarship competitions in their proposed field of study by submitting the 2008 Freshman Academic Scholarship application no later than the specified deadline.

Competitive Academic Scholarships for New Transfer Students

Hazelwood Scholarships

The Hazelwood Scholarship program provides competitive academic scholarships for a select number of students transferring to Texas A&M from other four-year colleges and universities. The award begins in the fall semester and is open to those students who have completed one or two full years of undergraduate course work. The scholarship consists of a one-year stipend of \$1,000 and is awarded based on current college grade point ratio (GPR), college course work and high school academic record. Minimally, a 3.6 cumulative grade point ratio for all college course work is required to be considered for an award. After completing one fall semester at Texas A&M, recipients of Hazelwood Scholarships may compete for the Honors Incentive Award Scholarships administered by Honors Programs and the Academic Excellence Awards administered by Scholarships & Financial Aid. Applications for the Hazelwood Scholarship must be received at Honors Programs between April 1 and July 1. Out-of-state scholarship recipients qualify for a non-resident tuition waiver for the duration of the award.

The Collegiate Excellence Scholarship

The Collegiate Excellence Scholarship program provides competitive academic scholarships for transfer students with at least 60 hours of college study. These academic, merit based scholarships are awarded on a rolling basis and consist of a one-year stipend of \$2,000 for undergraduate study (\$1,000 per semester) beginning in the fall semester. Students must be graduates of a Texas two-year community or junior college and its honors program. Candidates must be U.S. citizens or permanent residents. Competitive candidates will have a successful college record as evidenced by current cumulative GPR, college course work, extracurricular activities and leadership. Minimally, a 3.5 cumulative GPR for all college course work is required. Candidates must submit official transcripts and request a letter of recommendation from the director of their colleges' honors program. Applications for the Collegiate Excellence Scholarship must be received at Honors Programs between April 1 and July 1.

Competitive Academic Scholarships for Currently Enrolled Students

Honors Incentive Awards

Each spring, students who will achieve sophomore, junior or senior standing by the following academic year, who have attained a cumulative GPR of at least 3.5, and are enrolled in an honors course are invited to compete for the Honors Incentive Award. These one-year scholarships are valued at \$1,000. The awards are merit-based and competition for them is keen. To qualify for consideration, a student must be participating in honors courses and not hold other Texas A&M scholarships with a combined annual value of \$1,000 or more. Recipients must enroll for at least 12 hours of courses during each of the two semesters that they hold the scholarship. Recipients are eligible to reapply in successive years. Applications must be submitted by the published deadline and are available online at scholarships.tamu.edu.

For additional information, please contact:

Honors Programs
114 Henderson Hall
Texas A&M University
4233 TAMU
College Station, TX 77843-4233
(979) 845-1957
honors.tamu.edu



TEXAS A&M
UNIVERSITY

A black and white photograph of a bronze statue of a man with a beard and mustache, wearing a suit and tie. The statue is in the foreground, and in the background, a large domed building is visible through some foliage.

GENERAL ACADEMIC PROGRAMS

★ 2008–2009 UNDERGRADUATE CATALOG ★

General Academic Programs

Administrative Officers

Dean of Undergraduate Programs and

Associate Provost for Academic Services J. Martyn Gunn, M.I., Ph.D.

Associate Dean Kriss H. Boyd, B.S., M.Ed., Ph.D.

General Academic Programs

The Department of General Academic Programs is part of the Division of Undergraduate Programs and Academic Services. The staff in General Academic Programs provides academic advising and academic programming for General Studies majors, Blinn TEAM majors, the Aggie Gateways to Success Program, and for students in the six Aggie Access Learning Communities.

The General Studies Major

Many freshmen prefer to postpone choosing a major until they have an opportunity to experience a variety of courses at Texas A&M University. Other students are admitted to the university as General Studies majors and must meet grade and course requirements to change into a desired major.

Individualized attention is the hallmark of the services provided for General Studies majors. Advisors work with each student to select courses that fulfill basic requirements in the Core Curriculum and entry-level requirements for majors. They also assist students who were originally admitted to various majors but wish to change to another degree-granting department.

The keynote of General Studies is flexibility. There are more than one hundred bachelor's degrees at Texas A&M, and there are many options and minors available within the majors. The academic advisors can help students become familiar with the options so they can explore potential majors. When General Studies majors make the decision to declare a major, it is an informed decision. General Studies majors must declare a major as soon as they have passed 60 hours and are classified as juniors.



Because the interests of individual students vary, only a suggested first year curriculum is shown below. Courses for following semesters are selected in consultation with an academic advisor in the General Studies Program.

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	American or Texas history	(3-0)	3
HIST 105 History of the U.S.....	(3-0)	3	Behavioral science.....		3
POLS 206 American Natl. Govt.....	(3-0)	3	Humanities		3
Behavioral science or science ¹		3-4	Mathematics or science		3-4
Mathematics ¹		3-4	Course for possible major.....		3
Course for possible major		3	* Military, air or naval science		
* Military, air or naval science.....			** KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>
** KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>			<u>12-19²</u>
		12-19 ²			

NOTES: 1. To be selected in consultation with an advisor on the basis of the student's background, interests and goals.
 2. The total number of credit hours may vary from 12-19 depending on the advisor's consultation with the student. Most first semester students are encouraged to take 12-15 hours.

* See page 27.

** See page 21.

Aggie Gateways to Success (AGS) Program

Some freshmen are required to take classes during the summer prior to their first fall at Texas A&M. These students participate in the Aggie Gateways to Success Program and are assigned a full load of summer classes. They must complete STLC 101—Applied Learning Theory and two classes that count for Core Curriculum requirements such as a history or political science class. Once a student in the AGS Program passes all of the summer classes and has at least a 2.0 grade point average, the student can enroll for the fall semester and attempt to declare a specific major. Financial Aid and on-campus housing is available for students enrolled in the summer sessions.

The Blinn TEAM Program

The Blinn Transfer Enrollment to A&M (TEAM) Program is a collaborative academic initiative between Texas A&M University and Blinn College. To be considered for participation in the Blinn TEAM program, a student must meet all freshman admission criteria and must apply for regular freshman admission. Students who are not offered regular freshman admission due to space limitations may be offered alternate admissions options, such as placement on the Admission Wait List and/or consideration for admission into the Blinn TEAM Program. Students selected for the program will co-enroll in 3 to 5 credit hours at Texas A&M University and 9 to 12 credit hours at Blinn College each semester. At the conclusion of the sophomore year, students who have completed 45 credit hours at Blinn College and 15 credit hours from Texas A&M, with a 3.0 or higher grade point ratio at each school, will be fully admitted to Texas A&M University without an additional application process. Blinn TEAM students may apply for full Texas A&M admission via the transfer admission process before completion of the two-year Blinn TEAM program.

Blinn TEAM students are able to access many student service programs on both campuses. They may apply for on-campus housing at Texas A&M University, and may participate in the Corps of Cadets. Eligible students receive financial aid through Blinn College based upon their combined credit hours from both schools.

Aggie Access Learning Communities

Aggie Access Learning Communities (AALC) focus on the freshman transition into the University. Students in Aggie Access enroll together in four core curriculum classes taught in smaller sections rather than large lecture halls during the freshman year. Freshmen also take a one-credit-hour Learning Communities Seminar each semester to investigate the themes of discovery, community, diversity, and responsibility (among others). Access freshmen benefit from professional staff, co-curricular activities and social gatherings, peer mentors, faculty and staff namesake mentors, and the creation of a home base within the larger University. Students may choose to live in an optional Access Living-Learning Community in either Schuhmacher Hall or Hobby Hall. Freshmen majoring in General Studies or in the College of Liberal Arts, College of Geosciences (Geography and Geology majors), College of Science, and College of Agriculture and Life Sciences may apply to participate in one of the eight Aggie Access Learning Communities during the freshman year. Students apply online at aggieaccess.tamu.edu in the spring/summer prior to enrolling at Texas A&M.



TEXAS A&M
UNIVERSITY

A black and white photograph of a bronze statue of a man with a beard and mustache, wearing a suit and tie. The statue is in the foreground, and in the background, a large domed building is visible through some foliage.

UNIVERSITY STUDIES DEGREES

★ 2008–2009 UNDERGRADUATE CATALOG ★

University Studies Degrees

Students who are currently enrolled at A&M may submit proposals to enroll as University Studies majors. The University Studies Degree format was created to provide students the flexibility to combine areas of study that are of special interest. The combination of courses may not be possible through existing degree plans. This flexibility may be attractive to students who have particular career paths or post-baccalaureate degree paths in mind. All University Studies degree plans require 120 hours for completion.

A University Studies Degree consists of a concentration of 21-24 hours and two minors of 15-18 hours each. Specific courses may be required for the completion of the hours in the concentrations and minors. Some concentrations and minors contain required courses that have additional prerequisites. One of the two minors must be completed in a college outside of the college that provides the concentration for the student's degree.

Students must submit a proposal that lists the courses for the individual degree plan the student hopes to complete to the Office of General Academic Programs. The application includes a required essay in which the student can explain how the degree will help the student meet the desired educational and personal goals. Once it is determined that the proposal has been completed with appropriate information, it will be reviewed by the college that offers the concentration. Students must be in good academic standing, and they must have good academic standing in previous courses that count toward the concentration or minors.

A University Studies major will be considered a student in the college that offers the concentration. If the proposal is approved, the student's major will be listed as one of the abbreviations below. The student's diploma will list Bachelor of Arts or Bachelor of Science in the same place it is currently listed, and University Studies will be listed in the place the major is currently listed. The student's area of concentrations and the two minors will be indicated on the student's transcript.

USAL	College of Agriculture and Life Sciences
USAR	College of Architecture
USBU	Mays Business School
USEH	College of Education and Human Resources
USEN	Dwight Look College of Engineering
USGE	College of Geosciences
USLA	College of Liberal Arts
USSC	College of Science
USVM	College of Veterinary Medicine

For information about the possible concentrations, minors and application process, go to the Web site gest.tamu.edu or contact an advisor in General Academic Programs.



TEXAS A&M
UNIVERSITY

A black and white photograph of a bronze statue of a man with a beard and mustache, wearing a suit and tie. The statue is in the foreground, and in the background, a large domed building is visible through some foliage.

**ENVIRONMENTAL
PROGRAMS FOR
STUDENTS**

★ 2008–2009 UNDERGRADUATE CATALOG ★

Environmental Programs for Students

Administrative Officers

This program is administered by the Council of Participating Deans with co-chairs.

Interim Vice Chancellor and Dean, College of Agriculture

and Life Sciences..... Mark A. Hussey, B.S., M.S., Ph.D.

Dean, College of Geosciences Björn Kjerfve, B.A., M.S., Ph.D.

General Statement

A wide array of Environmental Programs is available for students. These are based upon the expertise of faculty members across the University in various colleges and departments whose professional and research activities focus on environmental issues. The programs come in many forms, designed to offer opportunities for students to obtain in-depth, discipline-specific studies combined in an interdisciplinary education. For example, university-wide programs administered by different colleges are described under the **Environmental Studies** heading. A list of different majors offered by departments is shown under the heading **Other Undergraduate Degree Granting Programs**. Within many degree programs, career tracks and emphases can be found that allow students to make selections from courses with environmental content. Students should consult with faculty and advisors in the programs that are of interest to them.

Environmental Studies

The B.S. degree in Environmental Studies is an Interdisciplinary Degree Program offered by the College of Geosciences and the College of Agriculture and Life Sciences. Goals and career interests of the student will determine the college in which the student will enroll. Both colleges share foundation courses and a selection of courses in environmental policy and management. The common goal is to provide students with a focus on social and political aspects of environmental policy and planning. However, the technical emphasis in the College of Geosciences (page 415) is an earth-science-based approach with study of the earth's land, water and air and the interaction of humans with their environment. In contrast, the College of Agriculture and Life Sciences (page 181) has an approach based on the productivity of natural resources and the regulation of environmental wastes. The science content of the two colleges therefore differs. The choice of which college to enroll in should be made after conferring with representatives from each and reading the available advising materials.

Other Undergraduate Degree Granting Programs

Bioenvironmental Science (page 215), **Biological and Agricultural Engineering** (see page 217 or 367), **Environmental Design** (page 283), **Environmental Geoscience** (page 417), **Plant and Environmental Soil Science** (page 253), **Rangeland Ecology and Management** (page 257), and **Renewable Natural Resources** (page 264).



TEXAS A&M
UNIVERSITY

A black and white photograph of a bronze statue of a man with a beard and mustache, wearing a suit and tie. The statue is in the foreground, and in the background, there is a large, domed building, likely the Texas State Capitol, partially obscured by trees.

**COLLEGE OF
AGRICULTURE AND
LIFE SCIENCES**

★ 2008–2009 UNDERGRADUATE CATALOG ★

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College of Agriculture and Life Sciences

Administrative Officers

Interim Vice Chancellor and Dean	Mark A. Hussey, B.S., M.S., Ph.D.
Interim Deputy Vice Chancellor and Associate Dean	Bill Dugas, B.S., M.S., Ph.D.
Executive Associate Dean	A. Gene Nelson, B.S., M.S., Ph.D.
Associate Dean for Academic Operations	Ann L. Kenimer, B.S., M.S., Ph.D.
Associate Dean for Student Development	Joe D. Townsend, B.S., M.S., Ph.D.
Assistant Dean	Danielle A. Harris, B.S., M.S., Ph.D.
Assistant Dean	Edward R. Romero, B.S., M.S.

General Statement

Ensuring an adequate and safe food supply for a rapidly expanding world population, succeeding in a global economy, and maintaining our planet's natural resources and biodiversity are some of the challenges that are being met by graduates from the College of Agriculture and Life Sciences (COALS). Our students are educated to apply their knowledge to solve problems as scientists, business leaders, engineers, educators, and other professionals. Majors focus on the food systems and agricultural industry, life sciences, the environment and natural resources, and leadership development. Enthusiastic and competitive students, a distinguished faculty, innovative teaching methods, outstanding advisors, and abundant experiential learning opportunities, including undergraduate research, result in COALS being considered one of the top colleges of agriculture in the country.

The College offers exceptional academic programs that have their foundation in basic and applied biological science, social science, technology and business. A total of 32 majors and 15 minors in 14 academic departments offer a wide range of opportunities from which students can select to prepare for a future that fits their interests and abilities. Students with career plans that include the agricultural industry can choose animal and plant sciences; agronomy; engineering; business; and education. While almost all disciplines include life sciences, majors that focus on this area include biochemistry, genetics, nutritional sciences and entomology. Studies in natural resources include bioenvironmental sciences, wildlife science, forestry, rangeland ecology, recreation and tourism, and environmental studies. Leadership education has a home in agricultural leadership and development but is located in majors and other experiences across the college.

All degree programs are designed to allow students to obtain technical expertise within the major and to be educated broadly so that they can meet the challenge of a rapidly changing world. Abilities of thinking creatively and critically, solving problems, making decisions and communicating effectively are developed, along with learning how to work with people from a variety of backgrounds. Relating well with others, leadership and followership are vital to success in the "real world." Faculty members who teach undergraduate classes include many who are recognized nationally and internationally for research and other accomplishments in their disciplines. This means that students may gain new knowledge from those who played a role in its discovery. Interested undergraduates also have a chance to be a part of research projects themselves.

Student organizations that are sponsored by departments or the college include the Agricultural and Life Sciences Student Council and more than 30 others. They promote interaction among students who share interests in the field, such as conservation and the environment, turfgrass management, master gardening, agrimarketing, food science and horsemanship, while developing leadership skills.

The College of Agriculture and Life Sciences and its departments offer a variety of scholarships to students on a competitive basis. Many are reserved for incoming freshmen or transfer students. Additional information and application forms for college-level scholarships for current students can be obtained from the COALS Academic Office, 109 Kleberg Center. Information about departmental scholarships can be obtained from the departments directly.

College of Agriculture and Life Sciences Baccalaureate Degree Programs

Each major can be planned to prepare students for graduate study or admission to professional schools in medicine, dentistry, veterinary medicine, other health professions and law. Students in programs, such as biochemistry, genetics and nutritional sciences, are highly recruited for medicine and other health professions. Animal science and wildlife and fisheries sciences are among several excellent choices for students interested in veterinary medicine. Students with a background in natural resources, the agricultural industry, or life sciences can use that knowledge well if they choose to enter law school. An environmental lawyer with a degree in a natural resource area understands the science and the law.

Knowledge of other cultures is valuable in understanding our own. Therefore, students are encouraged to consider spending a summer term or semester studying outside of the United States. Study abroad courses, offered through several departments in the College, allow students to travel to another country with other students and a COALS faculty member. Recent programs that focused on ecology and tropical biology on the island of Dominica in the Caribbean, ecotourism in South Africa, agriculture in Australia and New Zealand, and water management in Belgium allow students to gain a new perspective of the world and the place of the United States in it. International experience is invaluable when graduates enter the job market.

The College of Agriculture and Life Sciences participates in the University Honors Program, and honors courses offered are in most majors. Because of the opportunities to participate in basic and applied research, many students in the College are selected for the University Undergraduate Research Fellows program. Research conducted by faculty members in COALS focuses on sustainability of ecosystems and natural resources; competitiveness of agricultural products from genomics and biotechnology to the marketplace; health promotion through nutrition, food safety, and prevention of transmission of human disease by insect/pest vectors; and countermeasures against agricultural bioterrorism.

Advising is provided for each student in the college through offices in the individual academic departments. Departmental faculty and professional advisors provide assistance on course selection and other academic issues and serve as mentors for career planning and admission to graduate or professional school. Advisors serve as professional consultants for students in the College with the objective of avoiding problems if possible and solving problems if needed.

College of Agriculture and Life Sciences

Interdisciplinary Programs

- Agribusiness—offered in conjunction with the Mays Business School
- Environmental Studies—University-level program
- Renewable Natural Resources
- Spatial Sciences—jointly administered with the College of Geosciences

Department of Agricultural Economics

- Agricultural Economics
 - Finance and Real Estate Option
 - Food and Marketing Systems Option
 - Policy and Economic Analysis Option
 - Rural Entrepreneurship Option

Department of Agricultural Leadership, Education, and Communications

- Agricultural Communications and Journalism
- Agricultural Leadership and Development
- Agricultural Science—offered in conjunction with the College of Education and Human Development

Department of Animal Science

- Animal Science
 - Production/Industry Option
 - Science Option
- Dairy Science
 - Dairy Manufacturing Option
 - Dairy Production Option

Department of Biochemistry and Biophysics

- Biochemistry
- Genetics

Department of Biological and Agricultural Engineering

- Agricultural Systems Management
- Biological and Agricultural Engineering—offered in conjunction with the Dwight Look College of Engineering

Department of Ecosystem Science and Management

- Ecological Restoration
- Forestry
 - Forest Resource Management Option
 - Urban Forestry Option
- Rangeland Ecology and Management
 - Ranch Management Option
 - Rangeland Resources Option
- Spatial Sciences

Department of Entomology

- Entomology
- Forensic and Investigative Sciences

Department of Horticultural Sciences

Floriculture

Horticulture

Department of Nutrition and Food Science

Food Science and Technology

Food Science Option

Industry Option

Nutritional Sciences

Didactic Program in Dietetics

Department of Plant Pathology and Microbiology

Bioenvironmental Sciences

Department of Poultry Science

Poultry Science

Department of Recreation, Park and Tourism Sciences

Community Development

Recreation, Park and Tourism Sciences

Park and Natural Resources Management Option

Recreation and Park Administration Option

Tourism Resources Management Option

Department of Soil and Crop Sciences

Agronomy

Agro-Industry Option

Soil and Crop Management Option

Turfgrass Management Option

Plant and Environmental Soil Science

Department of Wildlife and Fisheries Sciences

Fisheries Science

Wildlife and Fisheries Sciences

Aquatic Ecology and Conservation

Wildlife Ecology and Conservation

Vertebrate Zoology

Wildlife Science

Wildlife Science (Joint Program with Texas A&M University–Kingsville)

Minors in the College of Agriculture and Life Sciences

Minors consist of a group of specified courses totaling between 15 and 18 credit hours. Students who are eligible to enroll in a minor should contact an advisor in the department offering the minor. Minors available in the college are listed below.

Department of Agricultural Economics

Agricultural Economics and Agribusiness

Department of Agricultural Leadership, Education, and Communications

Agricultural Communications and Journalism

Department of Animal Science

Animal Science

Department of Biochemistry and Biophysics

Biochemistry

Genetics

Department of Ecosystem Science and Management

Forestry

Rangeland Ecology and Management

Department of Entomology

Entomology

Department of Horticultural Sciences

Horticulture

Department of Plant Pathology and Microbiology

Bioenvironmental Sciences

Department of Poultry Science

Poultry Science

Department of Recreation, Park and Tourism Science

Park and Natural Resources

Tourism Resource Management

Department of Soil and Crop Sciences

Agronomy

Environmental Soil Science

Department of Wildlife and Fisheries Sciences

Wildlife and Fisheries Sciences

Certificate Programs

Certificate programs document expertise in an area beyond a major or minor. Currently, certificates can be earned in International Trade and Agriculture (Department of Agricultural Economics) and Watershed (Department of Rangeland Ecology and Management). Information on requirements for certificate programs is available from the advisor of the department offering the certificate.

Internships and Cooperative Education

Internships provide real-world experience in industries related to agriculture, life sciences or natural resources. Students return to campus with an interest in course work from the perspective of knowledge and skills needed to succeed. The experiences are so valuable that many students complete more than one internship. Most departments in the College offer academic credit for the satisfactory completion of an internship course. In fact, an internship is required for graduation in some degree programs.

The Agriculture and Natural Resources Congressional Internship Program places students from the College of Agriculture and Life Sciences in Washington, D.C., or Austin in the office of a legislator or government agency for a semester or summer. Selection for the program is based upon academic performance, leadership and other factors.

Cooperative education is a program of work and study that allows students to gain practical experience in their chosen field while pursuing a degree. Students interested in information should write the Texas A&M University Office of Cooperative Education.



Graduate Study

All departments in the College of Agriculture and Life Sciences offer graduate degrees at the master's and doctoral levels. The Master of Science usually includes a research component while original research is required for the Doctor of Philosophy degree. Professional studies in the College of Agriculture and Life Sciences lead to the Master of Agriculture in several areas, the Master of Education in agricultural education, and the Master of Agribusiness in that major. The Master of Agriculture degree generally requires an internship experience in an industry or agency. Students receiving one of these degrees may continue study for the doctor of philosophy degree.

Students are encouraged to contact the department in which they wish to major to obtain information about graduate study. Information on admission, programs available, etc., can be found in the *Texas A&M University Graduate Catalog*.

Environmental Sciences

Professional development in the environmental sciences should consist of education and training in a diverse array of interdisciplinary subjects. These may include environmental planning; environmental education and communications; management of land, water, and air, as well as fisheries and wildlife management; solid and hazardous waste management; parks and outdoor recreation; and forestry. The College of Agriculture and Life Sciences sponsors curricula that address the scientific and engineering components of each of these subjects. Programs and emphases, such as Bioenvironmental Sciences, Environmental Studies, and Environmental and Natural Resources Engineering, have evolved. In addition, traditional environmental fields, including Wildlife and Fisheries Sciences; Rangeland Ecology and Management; Forestry; and Recreation, Park and Tourism Sciences, provide environmental policy, technology and management. For a listing of these programs and career emphases, refer to the index of this catalog, obtain further information from the Office of the Associate Dean for Academic Affairs, College of Agriculture and Life Sciences, or visit the Web site coals.tamu.edu.

Teacher Certification

Texas teacher certification in agricultural science is available through the Department of Agricultural Leadership, Education, and Communications. Certification is granted through the State Board of Educator Certification (SBEC) upon a student's completion of the course of study administered by the department. The undergraduate major in agricultural science includes all course work required for our recommending a student to SBEC for teacher certification. The requirements can be completed with any major in the College of Agriculture and Life Sciences. See an advisor in Agricultural Science, Department of Agricultural Leadership, Education, and Communications, for more information.

International and Cultural Diversity Requirement

Texas A&M University requires its students to meet an International and Cultural Diversity requirement as part of the University's Core Curriculum. Meeting this requirement will require the careful selection of courses. The student is directed to page 20 of this catalog for detailed information regarding this requirement and also is encouraged to seek the advice of the student's academic advisor.

Curriculum in Agribusiness

In conjunction with Mays Business School, the College of Agriculture and Life Sciences and the Department of Agricultural Economics offer a Bachelor of Science in Agribusiness.

Requirements for Graduation

Requirements for graduation are listed in the Texas A&M University Student Rules and this catalog. With the exception of physical activity and general elective requirements, courses taken to satisfy degree requirements must be taken for letter grades.

In addition, students pursuing the agribusiness degree must have a GPR of 2.0 in the courses included in the Common Body of Knowledge.

Curriculum in Bachelor of Science Agribusiness (B.S.)

The Bachelor of Science degree is offered in Agribusiness. The B.S. degree in Agribusiness prepares students for careers in the nation's growing agribusiness sector which provides the products and services for the production, processing and distribution of food and fiber. With the potential for expanded export opportunities, the need for graduates for agribusiness positions is increasing. The agribusiness program combines the common body of knowledge requirements of a degree in business with course work emphasizing the understanding of the unique institutional and managerial challenges facing agribusiness firms. Students integrate business management principles with technical knowledge to develop practical decision-making skills.

B.S.—Agribusiness Common Body of Knowledge

Required Courses	Cr
ACCT 229 Introductory Accounting	3
ACCT 230 Introductory Accounting	3
AGEC 217 Fundamentals of Agricultural Economics Analysis	3
AGEC 440 Agribusiness Strategic Analysis	3
AGEC 481 Ethics in Agribusiness and Agricultural Economics	1
ECON 202 Principles of Economics	3
ECON 203 Principles of Economics	3
FINC 341 Business Finance	3
INFO 303 Statistical Methods	3
INFO 364 Operations Management	3
MGMT 211 Legal and Social Environment of Business	3
MGMT 363 The Management Process	3
MKTG 321 Marketing	3
	37

B.S.—Agribusiness Major Field

Courses	Cr
AGEC 105 Introduction to Agricultural Economics.....	3
AGEC 317 Economic Analysis for Agribusiness Management	3
AGEC 340 Agribusiness Management.....	3
AGEC 414 Agribusiness and Food Market Analysis.....	3
AGEC 429 Agricultural Policy.....	3
AGEC 430 Macroeconomics of Agriculture	
or FINC 460 Money and Capital Markets.....	3
AGEC 431 Cases in Agribusiness Finance	3
ECON 322 Applied Microeconomic Theory	
or ECON 323 Microeconomic Theory.....	3
	24

Upper-Level Entry into Agribusiness

The requirements and procedures for consideration for upper level are as follows:

1. In order to be considered for upper level and possible admission into the program of study in agribusiness, a student must have:
 - a. Satisfactorily completed at least 60 semester credit hours.
 - b. Satisfactorily completed the following eight courses:
 - ACCT 229, 230
 - AGEC 217
 - ECON 202, 203
 - MGMT 211
 - MATH 141, 142
 - c. Students should complete the freshman and sophomore sequence of courses as listed under Curriculum in Agribusiness. Following this sequence will allow the timely application for consideration for upper level.
 - d. Admission, if granted, will be effective upon successful completion of the in-process courses; however, if all requirements are not met prior to the start of the next semester, admission will be revoked.
2. Transfer students:

Transfer students admitted to the Agribusiness degree will be classified as AGBL (lower-level Agribusiness) students until they complete all requirements listed previously in item 1.
3. Change of curriculum students:

Texas A&M students who change curriculum into the Agribusiness degree from another college or department at the University will be classified as AGBL (lower-level Agribusiness) students until they complete all requirements listed previously in item 1.

Curriculum in Agribusiness (B.S.)

FRESHMAN YEAR**

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
AGEC 105 Intro. to Ag. Econ.	(3-0)	3	MATH 142 Business Math. II	(3-0)	3
ENGL 104 Composition and Rhetoric	(3-0)	3	American history ^{1,2}		3
MATH 141 Business Math. I.....	(3-0)	3	Directed elective–behavioral sciences ³		3
American history ^{1,2}		3	Natural sciences elective ⁴		4
Natural sciences elective ¹		<u>4</u>	* KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>
		16			14

SOPHOMORE YEAR**

ACCT 229 Introductory Accounting	(3-0)	3	ACCT 230 Introductory Accounting	(3-0)	3
ECON 202 Principles of Economics.....	(3-0)	3	AGEC 217 Fund. of Ag. Econ. Analysis ⁸	(1-4)	3
MGMT 211 Legal and Social Env. of Business	(3-0)	3	ECON 203 Principles of Economics.....	(3-0)	3
POLS 206 American Natl. Govt. ²	(3-0)	3	POLS 207 State and Local Govt. ²	(3-0)	3
Technical agriculture elective ⁴		<u>3</u>	Communications elective ⁵		3
		15	* KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>
					16

JUNIOR YEAR

AGEC 340 Agribus. and Food Management..	(3-0)	3	AGEC 317 Econ. Analysis for Agribusiness Management	(3-0)	3
ECON 322/323 Microeconomic Theory.....	(3-0)	3	AGEC 429 Agricultural Policy ⁸	(3-0)	3
FINC 341 Business Finance	(3-0)	3	INFO 364 Operations Management	(3-0)	3
INFO 303 Statistical Methods.....	(3-0)	3	Directed elective–international ⁶		3
MGMT 363 The Management Process	(3-0)	3	Humanities elective ¹		<u>3</u>
MKTG 321 Marketing	(3-0)	<u>3</u>			15
		18			

SENIOR YEAR

AGEC 431 Cases in Agribusiness Finc. ⁸	(3-0)	3	AGEC 414 Agribusiness and Food Market Analysis	(3-0)	3
AGEC 481 Ethics in Agribusiness and Agricultural Economics.....	(1-0)	1	AGEC 430 Macroeconomics of Ag. or		
Directed elective–international ⁶		3	FINC 460 Money and Capital Markets.....	(3-0)	3
Visual and performing arts elective ¹		3	AGEC 440 Agribusiness Strategic Analysis ...	(3-0)	3
General electives ⁷		<u>4</u>	General elective ⁷		<u>3</u>
		14			12

- NOTES: 1. To be selected from the University Core Curriculum.
 2. For those students under ROTC contract, see section on "Requirement in Political Science (Government) and History" in this catalog.
 3. To be selected from a list of courses in anthropology, psychology, sociology and women's studies.
 4. Three hours of technical agriculture electives to be selected from any course offered by the College of Agriculture and Life Sciences except 285s, 484s, 485s and agricultural economics courses.
 5. To be selected from AGCJ 404, ENGL 203, 235, 236, 241, 301, COMM 205 or 243.
 6. Six hours required. Three hours of international course work may be taken outside of the Mays Business School. A complete list of approved international electives is available in the college Undergraduate Program Office, Room 331 Blocker Building, or can be found online at agecon.tamu.edu/undergraduate/.
 7. Any Texas A&M or transfer course (except KINE 198 and 199; STLC 001-003) not used to meet other requirements.
 8. All undergraduate students must take at least two (2) specific courses in their major designated as writing intensive (W). This course is an approved W course.

* See page 21.

**See Upper-Level Entry Requirements into Agribusiness.

Curricular Options for Agribusiness Students Only

International Certificate Programs

To meet the challenges of increased business globalization Mays Business School has created a variety of international certificate programs. Each program offers B.S.—Agribusiness degree students the opportunity to study international business, develop understanding of other cultures and language knowledge to meet global business challenges.

Students who pursue any of the international certificate programs must complete all requirements for the specific program prior to graduation. Specific certificate requirements are available in the Undergraduate Program Office, Room 238 Wehner, of Mays Business School or in the Undergraduate Programs Office, Room 331 Blocker, of the Department of Agricultural Economics.

Certificate in International Business

Requirements include 18 hours of course work and completion of an approved international work or study abroad experience.

Certificate in European Union Business

Requirements include 21 hours of course work, completion of an approved European Union work or study abroad experience, and demonstration of proficiency in a European Union Language.

Certificate in Latin American Business

Requirements include 21 hours of course work, completion of an approved Latin American work or study abroad experience and demonstration of proficiency in a dominant Latin American language—Spanish or Portuguese.

The Certificate in International Trade and Agriculture

Open to All Majors

The Certificate in International Trade and Agriculture (CITA), offered by the Department of Agricultural Economics, is designed to provide students with a complete knowledge and understanding of the global forces shaping change in agriculture. The CITA is available to all students provided that all prerequisites are met. The program requires a minimum of 15 credit hours in designated courses. Also, students must earn a grade of “C” or better in each course used to meet CITA requirements. Students who pursue the CITA must complete all requirements prior to graduation. Specific certificate requirements are available in the Undergraduate Programs Office, Room 331 Blocker, of the Department of Agricultural Economics or at agecon.tamu.edu/undergraduate.

International and Cultural Diversity Requirement

Texas A&M University requires its students to meet an International and Cultural Diversity requirement as part of the University’s Core Curriculum. Meeting this requirement will require the careful selection of courses. The student is directed to page 20 of this catalog for detailed information regarding this requirement and also is encouraged to seek the advice of the student’s academic advisor.

Curriculum in Agricultural Communications and Journalism

Curriculum in Agricultural Communications and Journalism is administered by the Department of Agricultural Leadership, Education, and Communications. The program prepares students for careers in agricultural communications. Graduates are employed by agricultural businesses, industries and associations; by agriculture-related organizations; by government agencies at all levels; and by all types of communication media: magazines, the Internet, television and radio stations, and newspapers.

Students who wish to develop specific career plans may do so in consultation with their Agricultural Communications and Journalism advisor. With approval of the advisor and the dean's office, substitutions may be made in the required scientific and technical agriculture courses to help meet the student's goals.

Students are expected to be proficient in the use of computer keyboards for writing.

Required Course	(Th-Pr)	Cr
AGCJ 105 Introduction to Agricultural Communications	(2-0)	2
AGCJ 203 Agricultural Media Writing I	(2-3)	3
AGCJ 303 Agricultural Media Writing II	(2-3)	3
AGCJ 304 Editing for Agricultural Audiences	(2-3)	3
AGCJ 481 Senior Seminar	(1-0)	1
AGLS 101 Modern Agricultural Systems and Renewable Natural Resources	(1-0)	1
ENGL 104 Composition and Rhetoric	(3-0)	3
POLS 206 American National Government	(3-0)	3
POLS 207 State and Local Government	(3-0)	3
Agricultural Business Directed elective ⁶		3
Agricultural Communications and Journalism Core electives ¹		6
Agricultural Communications and Journalism Professional Skills ²		9
Agricultural Communications and Journalism Optional electives.....		0-6
Agricultural Systems Management Directed elective ⁶		3
Animal Science Directed elective ³		3
Plant Science Directed elective ⁴		3
Human Performance Directed elective ⁷		3
Agricultural electives ¹⁰		15
Communications elective ⁸		3
Humanities and Visual and Performing Arts electives ⁸		6
Mathematics electives		6
Science electives ⁸		8
Statistics elective ⁹		3
U.S. history electives ⁸		6
General electives ¹⁰		13-19
* KINE 198 Health and Fitness Activity	(0-2)	1
* KINE 199 Required Physical Activity	(0-2)	1
	total hours	120

- NOTES: 1. Select two from: AGCJ 305, 306, 307.
 2. Select three from: AGCJ 404, 405, 406, 407.
 3. Select one from: ANSC 107; DASC 202; ENTO 201, 208; POSC 201; WFSC 301, 304.
 4. Select one from: AGRO 105; HORT 301; PLPA 301, 302; RLEM 301, 302, 314; FRSC 203.
 5. Select one from: AGECE 105, 314, 315, 340.
 6. Select one from: AGSM 201, 360, POSC 427.
 7. Select one from: ALED 340, 440; NUTR 202, 430, FSTC 201.
 8. Selected from the University Core Curriculum.
 9. Select one from: STAT 201-225 or 301-415.
 10. All agricultural electives will be used to develop a cohesive career emphasis and are to be selected in consultation with an advisor.

The University Core Curriculum includes a requirement for 6 hours of international and cultural diversity courses. Refer to the International and Cultural Diversity table on page 20 for a list of acceptable courses. A course satisfying another Core category, a college/department requirement, or as a free elective can be used to satisfy these requirements.

Minor in Agricultural Communications and Journalism

Students seeking a minor in Agricultural Communications and Journalism should begin the process by discussing the option with their academic advisor in their major. Students should then make an appointment with an advisor in Agricultural Communications and Journalism to discuss their interests and to arrange a time to take the program's entrance examination. The examination takes 45 minutes to complete and is a prerequisite for establishing a minor in Agricultural Communications and Journalism. To make an appointment call (979) 862-3001.

Required Course	(Th-Pr)	Cr
AGCJ 105 Introduction to Agricultural Communications	(2-0)	2
AGCJ 203 Agricultural Media Writing I.....	(2-3)	3
AGCJ 303 Agricultural Media Writing II	(2-3)	3
AGCJ 304 Editing for Agricultural Audiences	(2-3)	3
Select one:		
AGCJ 305 Agricultural Publishing		
AGCJ 306 Agricultural Public Relations		
AGCJ 307 Electronic Media Production in Agricultural Communications		3
Select one:		
AGCJ 405 Agricultural Publication Production		
AGCJ 406 Agricultural Public Relations Methods		
AGCJ 407 Web Authoring in Agricultural Communications		3
		17

Agricultural Communications and Journalism is highly focused on written communication. Interested students should consider their interest in writing before beginning the minor.



Curricula in Agricultural Economics

The Department of Agricultural Economics offers a Bachelor of Science degree in Agricultural Economics. The B.S. degree in Agricultural Economics offers students four options: Finance and Real Estate, Food Marketing Systems, Policy and Economic Analysis, and Rural Entrepreneurship. In addition, in conjunction with the Mays Business School, the department also offers a B.S. in Agribusiness.

Requirements for Graduation

Requirements for graduation are listed in the Texas A&M University Student Rules and this catalog. With the exception of physical activity and general elective requirements, courses taken to satisfy degree requirements must be taken for letter grades.

Curricula in Agricultural Economics Bachelor of Science

The curricula in Agricultural Economics are designed to train graduates for a wide variety of jobs in agriculturally-oriented business firms and agencies. Flexibility is included in the curricula so that a student, in consultation with an academic advisor, can develop a degree program which best fits personal career objectives.

While not required on the degree plan, students are strongly encouraged to participate in internships (AGEC 484) to broaden their knowledge base and gain real-world experience to greater enhance employability after graduation. Students also have an opportunity to work one-on-one with a faculty member in a directed studies project. Directed studies projects (AGEC 485) enable students to receive additional instruction in areas of their career choice. To receive credit for AGEC 484 and/or AGEC 485 course work, which can be used as part of the student's free electives, the student must meet the following requirements: (1) must have completed between 30 and 59 hours total (a minimum of 12 of those hours at Texas A&M); (2) have completed AGEC 105, either ECON 202 or ECON 203, MATH 141, MATH 142, AGEC 217 and ACCT 209 or 229 (or their equivalents); (3) have a minimum GPR of 2.75 (overall, in major, and in CBK classes if applicable); and (4) obtain approval of the department head and supervising professor. For students who have completed 60 or more hours, you must (1) have completed a minimum of 12 hours at Texas A&M; (2) have completed AGEC 105, either ECON 202 or ECON 203, MATH 141, MATH 142, AGEC 217 and ACCT 209 or 229 (or their equivalents); (3) have a minimum GPR of 2.5 (overall, in major, and in CBK classes if applicable); and (4) obtain approval of the department head and supervising professor.

Students also have the opportunity to participate in the Agricultural and Natural Resources Policy Internship program. This internship allows students to work a semester in Washington, D.C. with a member of the Texas delegation. To receive credit for this

experience, the student must meet the following requirements: (1) have completed AGEC 105 or 3 hours of economics; (2) have a minimum GPR of 2.25 (overall, in major, and in CBK classes, if applicable); (3) be classified as a junior or senior; and (4) obtain approval from the department head and supervising professor.

Options available in agricultural economics are Finance and Real Estate, Food Marketing Systems, Policy and Economic Analysis, and Rural Entrepreneurship. The course requirements are the same during the freshman and sophomore years for all options. Students may select an option at any time, but must do so prior to registering for their junior year.

All sophomore (200) through senior (400) level agricultural economics courses have prerequisites which are strictly enforced. Prerequisites are shown in the agricultural economics course description portion of this catalog. You may also find a list of agricultural economic course prerequisites on our Web site at agecon.tamu.edu/undergraduate/. **Prerequisites are subject to change and students should review the prerequisite list on our Web site before registering each semester.**

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
AGEC 105 Intro. to Ag. Economics	(3-0)	3	MATH 142 Business Math. II	(3-0)	3
AGLS 101 Modern Ag. Systems and Renewable Natural Resources.....	(1-0)	1	American history elective ^{1,2}		3
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	Humanities elective ^{1,4}	(3-0)	3
MATH 141 Business Math. I.....	(3-0)	3	Natural sciences elective ¹		4
American history elective ^{1,2}		3	* KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>
Technical agriculture elective ³		<u>3</u>			14
		16			

SOPHOMORE YEAR

ACCT 209 Survey of Accounting Prin.	(3-0)	3	ACCT 210 Survey of Mgrl. and Cost Accounting Prin.	(3-0)	3
AGEC 217 Fund. of Ag. Econ. Anlys. ⁵	(1-4)	3	ECON 203 Prin. of Economics	(3-0)	3
ECON 202 Prin. of Economics	(3-0)	3	POLS 207 State and Local Govt. ²	(3-0)	3
POLS 206 American Natl. Govt. ²	(3-0)	3	Communications elective ⁶		3
Natural science elective ¹		<u>4</u>	Visual and performing arts elective ^{1,4}		3
		16	* KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>
					16

NOTES: 1. To be selected from the University Core Curriculum.

2. For those students under ROTC contract, see section on "Requirement in Political Science (Government) and History" in this catalog.

3. Any course offered by the College of Agriculture and Life Sciences, except 285s, 484s, 485s and agricultural economics courses.

4. The 6 hours of international and cultural diversity courses, as required for graduation, may be met in the curriculum. Students may select humanities and visual and performing arts electives that also meet the international and cultural diversity requirement.

5. All undergraduate students must take at least two (2) specific courses in their major designated as writing intensive (W). This course is an approved W course.

6. To be selected from AGCJ 404, ENGL 203, ENGL 235, ENGL 241, ENGL 301, COMM 205, or COMM 243.

* See page 21.

Finance and Real Estate Option

The Finance and Real Estate option is designed to provide a well-founded basis in principles, concepts and methods for students interested in finance and/or real estate professional careers in the agricultural industry and/or related professions.

(See Freshman and Sophomore Years)

JUNIOR YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
AGEC 314 Marketing Ag. and Food Prod.	(3-0)	3	AGEC 317 Econ. Anlys. for Agbu. Mgmt.	(3-0)	3
AGEC 330 Fin. Management in Ag.	(3-0)	3	AGEC 429 Agricultural Policy ⁴	(3-0)	3
AGEC 422 Land Economics	(3-0)	3	AGEC 481 Ethics in Agribusiness		
ECON 323 Microeconomics	(3-0)	3	and Agricultural Economics	(1-0)	1
STAT 303 Statistical Methods	(3-0)	3	Directed non-agricultural econ. electives ¹		3
Directed non-agricultural econ. elective ¹		<u>3</u>	Directed agricultural economics elective ³		3
		18	General elective ²		<u>3</u>
					16

SENIOR YEAR

AGEC 340 Agribusiness Management	(3-0)	3	AGEC 430 Macroeconomics of Ag.	(3-0)	3
AGEC 424 Rural Entrepreneurship I	(2-2)	3	AGEC 432 Rural Real Est. and Fin. Anlys.	(3-0)	3
Directed agricultural economics elective ³		3	Directed agricultural economics elective ³		3
General elective ²		<u>3</u>	General elective ²		<u>3</u>
		12			12

- NOTES: 1. Six hours to be selected in one or more departments outside of the Department of Agricultural Economics. A minimum of 3 of these hours must be at the 300- or 400-level.
2. Any Texas A&M or transfer course (except KINE 198 and 199; STLC 001-003) not used to meet other requirements.
3. Select 3 courses from AGEC 315, 344, 350, 425, 447, 448 and {452 or 453}.
4. All undergraduate students must take at least two (2) specific courses in their major designated as writing intensive (W). This course is an approved W course.

Food Marketing Systems Option

The Food Marketing Systems Option is designed to provide a well-founded basis in principles, concepts and methods for students interested in management, marketing, sales and related professional careers in the agricultural industry and/or related professions.

(See Freshman and Sophomore Years)

JUNIOR YEAR

AGEC 314 Mkt Ag. and Food Products	(3-0)	3	AGEC 317 Econ. Anlys. for Agbu. Mgmt.	(3-0)	3
AGEC 315 Food and Ag. Sales	(3-0)	3	AGEC 330 Fin. Management in Ag.	(3-0)	3
ECON 323 Microeconomic Theory	(3-0)	3	AGEC 340 Agribusiness Management	(3-0)	3
STAT 303 Statistical Methods	(3-0)	3	AGEC 481 Ethics in Agribusiness		
Directed non-agricultural econ. elective ¹		<u>3</u>	and Agricultural Economics	(1-0)	1
		15	Directed agricultural economics elective ²		3
			General elective ³		<u>3</u>
					16

SENIOR YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
AGEC 429 Agricultural Policy ⁴	(3-0)	3	AGEC 430 Macroeconomics of Ag.		
AGEC 452 International Trade and Ag.			or		
or			ECON 311 Money and Banking	(3-0)	3
AGEC 453 Int. Agbu. Marketing.....	(3-0)	3	AGEC 447 Food Ag. Price Analysis		
Directed agricultural economics electives ²	(3-0)	6	or		
General elective ³		<u>3</u>	AGEC 448 Ag. Commodity Futures ⁵	(3-0)	3
		15	Directed non-agricultural econ. elective ¹		3
			General elective ³		<u>3</u>
					12

- NOTES: 1. Six hours to be selected in one or more departments outside of the Department of Agricultural Economics. A minimum of 3 of these hours must be at the 300- or 400-level.
2. Select 3 courses from AGEC 344, 413, 422, 424, 425, 432, 448, and [452 or 453].
3. Any Texas A&M or transfer course (except KINE 198 and 199; STLC 001-003) not used to meet other requirements.
4. All undergraduate students must take at least two (2) specific courses in their major designated as writing intensive (W). This course is an approved W course.
5. AGEC 447 is a fall only class. AGEC 448 is a spring only class.

Policy and Economic Analysis Option

The Policy and Economic Analysis Option is designed to provide a well-founded basis in principles, concepts and methods for students interested in pursuing graduate study and/or law school following their graduation with a B.S. degree.

(See Freshman and Sophomore Years)

JUNIOR YEAR

AGEC 314 Mkt Ag. and Food Products.....	(3-0)	3	AGEC 317 Econ. Anlys for Agbu. Mgmt.....	(3-0)	3
AGEC 340 Agribusiness Management.....	(3-0)	3	AGEC 330 Fin Management in Ag.	(3-0)	3
ECON 323 Microeconomic Theory.....	(3-0)	3	AGEC 429 Agricultural Policy ⁴	(3-0)	3
STAT 303 Statistical Methods.....	(3-0)	3	AGEC 481 Ethics in Agribusiness		
Directed non-agricultural econ. elective ¹		<u>3</u>	and Agricultural Economics	(1-0)	1
		15	Directed agricultural economics elective ²		3
			General elective ³		<u>3</u>
					16

SENIOR YEAR

AGEC 344 Food and Ag. Law			AGEC 350 Environ. and Nat. Res. Econ.	(3-0)	3
or			AGEC 430 Macroeconomics of Agriculture		
AGEC 452 International Trade in Ag.....	(3-0)	3	or		
AGEC 447 Food and Ag. Price Anlys.	(3-0)	3	ECON 311 Money and Banking	(3-0)	3
Directed agricultural econ. elective ²		3	Directed agricultural economics elective ²		3
Directed non-agricultural econ. elective ¹		3	General electives ³		<u>3</u>
General elective ³		<u>3</u>			12
		15			

- NOTES: 1. Six hours to be selected in one or more departments outside of the Department of Agricultural Economics. A minimum of 3 of these hours must be at the 300- or 400-level.
2. Select 3 courses from AGEC 413, 422, 424, 425, 432, 448, and [452 or 453].
3. Any Texas A&M or transfer course (except KINE 198 and 199; STLC 001-003) not used to meet other requirements.
4. All undergraduate students must take at least two (2) specific courses in their major designated as writing intensive (W). This course is an approved W course.

Rural Entrepreneurship Option

The Rural Entrepreneurship Option is designed to provide a well-founded basis in principles, concepts and methods for students interested in owning and/or managing or otherwise being engaged in working with a rural business.

(See Freshman and Sophomore Years)

JUNIOR YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
AGEC 314 Mkt Ag. and Food Products	(3-0)	3	AGEC 317 Econ. Anlys. for Agbu. Mgmt.....	(3-0)	3
AGEC 340 Agribusiness Management.....	(3-0)	3	AGEC 330 Fin. Management in Ag.	(3-0)	3
ECON 323 Microeconomic Theory.....	(3-0)	3	AGEC 429 Agricultural Policy ⁴	(3-0)	3
STAT 303 Statistical Methods	(3-0)	3	AGEC 481 Ethics in Agribusiness		
Directed non-agricultural econ. elective ¹		3	and Agricultural Economics	(1-0)	1
General elective ³		<u>3</u>	Directed non-agricultural econ. elective ¹		3
		18	Directed agricultural economics elective ²		<u>3</u>
					16

SENIOR YEAR

AGEC 344 Food and Ag. Law.....	(3-0)	3	AGEC 425 Rural Entrepreneurship II.....	(2-2)	3
AGEC 424 Rural Entrepreneurship I.....	(2-2)	3	AGEC 430 Macroeconomics of Ag.		
Directed agricultural economics elective ²		3	or		
General elective ³		<u>3</u>	ECON 311 Money and Banking	(3-0)	3
		12	Directed agricultural economics elective ²		3
			General elective ³		<u>3</u>
					12

- NOTES: 1. Six hours to be selected in one or more departments outside of the Department of Agricultural Economics. A minimum of 3 of these hours must be at the 300- or 400-level.
2. Select 3 courses from AGECE 315, 413, 422, 432, 447, 448 and [452 or 453].
3. Any Texas A&M or transfer course (except KINE 198 and 199; STLC 001-003) not used to meet other requirements.
4. All undergraduate students must take at least two (2) specific courses in their major designated as writing intensive (W). This course is an approved W course.

The Certificate in International Trade and Agriculture

Open to All Majors

The Certificate in International Trade and Agriculture (CITA), offered by the Department of Agricultural Economics, is designed to provide students with a complete knowledge and understanding of the global forces shaping change in agriculture. The CITA is available to all students provided that all prerequisites are met. The program requires a minimum of 15 credit hours in designated courses. Also, students must earn a grade of “C” or better in each course used to meet CITA requirements. Students who pursue the CITA must complete all requirements prior to graduation. Specific certificate requirements are available in the Undergraduate Programs Office, Room 331 Blocker, of the Department of Agricultural Economics or at agecon.tamu.edu/undergraduate.

International and Cultural Diversity Requirement

Texas A&M University requires its students to meet an International and Cultural Diversity requirement as part of the University’s Core Curriculum. Meeting this requirement will require the careful selection of courses. The student is directed to page 20 of this catalog for detailed information regarding this requirement and also is encouraged to seek the advice of the student’s academic advisor.



Curriculum in Agricultural Leadership and Development

Agricultural Leadership and Development is administered by the Department of Agricultural Leadership, Education, and Communications. It prepares students to work with people involved in agriculture and life sciences. The curriculum emphasizes the development of leadership capabilities, communication skills and broad preparation in life sciences. The curriculum in agricultural leadership and development is multidisciplinary, designed to develop students for leadership positions in local, state, regional and national groups, organizations and agencies that are involved with agriculture and life sciences. These include extension and community support services, legislative staffs, agricultural organizations, marketing groups, and state and federal agencies. Other career paths may include banking, public relations, farm and ranch management, and international agricultural development. Students, working with their faculty advisors, plan their course work to match their career goals.

Required Course	(Th-Pr)	Cr
AGEC 105 Introduction to Agricultural Economics.....	(3-0)	3
AGLS 101 Modern Agricultural Systems	(1-0)	1
AGRO 105 or HORT 201	(2-2)	3
ALED 102 Critical Issues in Agricultural Leadership.....	(1-0)	1
ALED 301 Topics in Agricultural Leadership	(3-0)	3
ALED 340 Professional Leadership Development	(3-0)	3
ALED 440 Principles of Technological Change.....	(3-0)	3
ALED 481 Seminar.....	(1-0)	1
ANSC 107, 108, DASC 202, or POSC 201, 202 ^{1,2}	(3-0)	3
ENGL 104 Composition and Rhetoric.....	(3-0)	3
POLS 206 and 207 American National and State and Local Government	(3-0)	6
Agricultural leadership and development electives ^{1,2}		9
Agriculture and life sciences electives ^{1,2,4}		15
Application of business elective ^{1,2}		3
Communication elective ³		3
History electives ³		6
Humanities elective ³		3
Management/marketing elective ^{1,2}		3
Mathematics electives ³		6
Natural resource management elective ^{1,2}		3
Natural sciences electives ³		8
Nutrition elective ^{1,2}		3
Social and behavioral sciences electives ³		3
Speech (COMM) elective ^{1,2}		3
Visual and performing arts elective ³		3
Electives (emphasis area) ^{1,2,4}		12
Electives ⁴		5
KINE 198 Health and Fitness Activity ³	(0-2)	1
KINE 199 Required Physical Activity ³	(0-2)	1
	total hours	120⁴

- NOTES: 1. Before registering as a junior, each student must develop a degree program in consultation with the departmental advisor.
 2. All electives must be recommended by the departmental advisor.
 3. To be selected from the University Core Curriculum.
 4. A total of 120 semester hours will be required for a B.S. degree. At least 36 credits must be 300- and 400-level courses.

The University Core Curriculum includes a requirement for 6 hours of international and cultural diversity courses. Refer to the International and Cultural Diversity table on page 20 for a list of acceptable courses. A course satisfying another Core category, a college/department requirement, or as a free elective can be used to satisfy these requirements.



Curriculum in Agricultural Science

Teaching

The Agricultural Science curriculum is designed to offer the student a combination of courses in scientific agriculture and in professional education that will meet requirements for employment and advanced study in different careers in which the emphasis is on formal and informal programs of education. Such careers may include teaching agricultural science in high schools, area career and technology schools and community colleges; working as an agricultural extension agent; working as an agricultural representative for a marketing agency, an agricultural supply company or other industries related to agriculture; and serving as an agricultural technician in an international program.

A student majoring in agricultural science will be counseled by an advisor in the Department of Agricultural Leadership, Education, and Communications to ensure that the program developed with the student will satisfy his or her unique interests, needs and professional aspirations. A combination of courses in scientific agriculture, education and general studies provides students with a knowledge of scientific agriculture and the ability to work with and influence people. Flexibility in course selection allows a student to place emphasis on a particular field of agriculture or to prepare broadly in agricultural studies. This flexibility might prepare a student to teach in a particular school setting, focusing upon a certain curriculum (e.g., horticulture, animal science and agricultural business).

Many aspects of the practice of agriculture are learned through experience. Enrollment in high school agricultural science and participation in FFA and/or 4-H are encouraged and recommended.

A student following this curriculum may be eligible to enter public schools as a teacher of agricultural science under the Texas Education Agency. Off-campus student teaching is required.

Required Course	(Th-Pr)	Cr
AGEC 105 Introduction to Agricultural Economics.....	(3-0)	3
AGEC 314, 315 or 325	(3-0)	3
AGLS 101 Modern Agricultural Systems	(1-0)	1
AGRO 105 or HORT 201	(2-2)	3
AGSC 301 Intro to AGSC Teaching.....	(3-0)	3
* AGSC 325 Instructional Design in Agricultural Science	(1-2)	2
* AGSC 327 Program Planning in Teaching AGSC.....	(1-2)	2
* AGSC 384 Clinical Professional Experience in AGSC.....	(2-3)	3
* AGSC 425 Learned Centered Instruction in Agricultural Science	(3-0)	3
* AGSC 436 Professional Teaching Internship in AGSC.....	(2-12)	6
* AGSC 481 Seminar	(1-0)	1
* AGSC 484 Field Experience.....		4
ANSC 107, 108, DASC 202, or POSC 201, 202 ²	(3-0)	3-4
ANSC 320 Animal Nutrition and Feeding	(3-0)	3
ANSC 433 Reproduction in Farm Animals	(2-2)	3
ANSC 484 Livestock Practicum	(0-2)	1
ENGL 104 Composition and Rhetoric	(3-0)	3
* INST 301 Educational Psychology.....	(3-0)	3
* INST 310 Understanding Special Populations	(3-0)	3
POLS 206 and 207 American National and State and Local Government	(3-0)	6
Biological and agricultural engineering/Agricultural systems management electives ²		9
English writing elective ^{2,3}		3
History (American) electives ³		6
Humanities (literature) elective ³		3
Mathematics electives ³		6
Natural science electives ³		8
Plant science electives.....		6
Scientific agriculture electives ^{2,4}		6-7
Social and behavioral sciences elective ³		3
Visual and performing arts elective ³		3
Electives ^{2,4}		5
KINE 198 Health and Fitness Activity.....	(0-2)	1
KINE 199 Required Physical Activity.....	(0-2)	1
	total hours	120

NOTES: 1. A total of 120 semester hours will be required for a B.S. degree.

2. Before registering as a junior, each student must develop a degree program in consultation with the departmental advisor and with approval of the department head.

3. To be selected from the University Core Curriculum.

4. Restricted electives in scientific agriculture are required for teacher certification by the Texas Education Agency. A minimum of 24 semester hours of scientific agriculture must be at the 300- and 400-level.

* Professional development courses required for certification as a teacher of agricultural science.

The University Core Curriculum includes a requirement for 6 hours of international and cultural diversity courses. Refer to the International and Cultural Diversity table on page 20 for a list of acceptable courses. A course satisfying another Core category, a college/department requirement, or as a free elective can be used to satisfy these requirements.

Curriculum in Agricultural Systems Management

Graduates of the Agricultural Systems Management program manage people, money and machines in the food and agricultural industries. They are typically employed as production or processing operations managers, equipment managers, or in technical sales and services. Employers include farm and industrial equipment companies, food processing plants, cotton gins, grain and seed companies, livestock feeding operations, irrigation companies, construction companies, manufacturers, and a variety of other employers who need technical managers.

The technological courses are applications-oriented and focus on practical experience in food processing systems, water management, machinery and power systems, electrical systems and electronics. Business courses include accounting, economics, marketing, management, law and finance. A student may obtain a minor in business by taking one course in addition to the AGSM requirements. Management and systems science techniques such as linear programming, simulation, optimization, queuing theory, inventory models, PERT/CPM and expert systems are taught along with applications for solving realistic problems faced by agribusiness managers. Supporting courses provide a foundation of mathematics, chemistry, computer and communications skills. Technical electives are available to develop a degree program that meets personal career objectives.

The curriculum is administered by the Department of Biological and Agricultural Engineering and leads to the Bachelor of Science degree in Agricultural Systems Management.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
AGLS 101 Modern Ag. Sys.....	(1-0)	1	AGSM 125 Intro. to Ag. Syst. Mgmt.	(0-2)	1
AGSM 201 Power and Energy Systems	(2-2)	3	CHEM 107 Fund. of Chemistry.....	(3-3)	4
ENDG 105 Eng. Graphics.....	(0-6)	2	MATH 142 Business Math. II	(3-0)	3
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	POLS 207 State and Local Govt.....	(3-0)	3
MATH 141 Business Math. I.....	(3-0)	3	Computer elective ³		3
POLS 206 American Natl. Govt.	(3-0)	3	Humanities elective ¹		3
* KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>			<u>17</u>
		16			

SOPHOMORE YEAR

ACCT 209 Survey of Accounting Prin. ²	(3-0)	3	ACCT 210 Survey of Managerial and Cost Accounting Prin.	(3-0)	3
AGSM 301 Systems Analysis Ag.....	(3-0)	3	AGEC 344 Food and Agricultural Law		
ECON 202 Principles of Economics.....	(3-0)	3	or		
ENGL 210 Technical Writing.....	(3-0)	3	MGMT 209 Business, Govt. and Society ²		
PHYS 201 College Physics	(3-3)	<u>4</u>	or		
		16	MGMT 212 Business Law.....	(3-0)	3
			COMM 203 Public Speaking.....	(3-0)	3
			ECON 203 Principles of Economics.....	(3-0)	3
			Visual and performing arts elective ¹		3
			* KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>
					<u>16</u>

JUNIOR YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
AGEC 330 Financial Mgmt. in Agriculture...	(3-0)	3	AGSM 310 Agricultural Machinery Mgmt. ...	(2-2)	3
AGSM 335 Water and Soil Mgmt.	(2-3)	3	AGSM 315 Food Process Engr. Tech.	(2-2)	3
MGMT 309 Survey of Management ²			AGSM 325 Agri-Ind. Appl. of Elect.....	(2-2)	3
or			AGSM 360 Occupational Safety Mgmt.....	(3-0)	3
AGEC 340 Agribusiness Management.....	(3-0)	3	**Technical Elective.....		<u>3</u>
STAT 303 Statistical Methods					15
or					
STAT 302 Statistical Methods	(3-0)	3			
American History Elective ¹		<u>3</u>			
		15			

SENIOR YEAR

AGEC 315 Food and Ag. Sales			AGSM 410 Spatial Tech. for Precision Ag.		
or			or		
Technical elective		3	AGSM 461 Geo. Info. Sys. for Rec. Mgmt.		
AGSM 337 Tech. for Environ. and			or		
Natural Resource Engineering	(2-2)	3	AGSM 475 App. Info. Tech. for Ag. Sys.....	(2-2)	3
AGSM 403 Proc. and Storage Ag. Prod.....	(2-2)	3	AGSM 440 Management of Ag. Systems	(1-5)	3
AGSM 439 Mgmt. of Ag. Systems I.....	(0-2)	1	MKTG 409 Intro. to Marketing ²		
AGSM 470 Ag. Elect. and Cont.	(2-2)	3	or		
AGSM 481 Seminar.....	(1-0)	1	AGEC 314 Marketing Ag. and Food Prod.....	(3-0)	3
American History Elective ¹		<u>3</u>	** Technical Electives		<u>6</u>
		17			15

- NOTE: Grade Requirement: A grade of C or better is required for all Common Body of Knowledge (CBK) courses; ACCT 209, AGSM 301, CHEM 107, ECON 202, MATH 141, MATH 142 and PHYS 201, or equivalents.
- To be selected from the University Core Curriculum. The University Core Curriculum also requires 6 hours of international and cultural diversity courses. Refer to page 20 for a list of acceptable courses. A course satisfying this requirement may also satisfy another requirement in the curriculum.
 - A minor in business may be obtained by completing the noted courses plus FINC 309 (which can be used as a technical elective).
 - Computer elective is to be selected from departmental approved list.

*See page 21.

**Technical electives must be selected in consultation with the student's advisor and from the current list of approved electives published by the department.

Curricula in Agronomy

The Department of Soil and Crop Sciences is multidisciplinary in character, including field crops; soil and water; forage and turf; weed science; and food science and technology. The department offers curricula in agronomy, and plant and environmental soil science.

Agronomy is a combination of crop science and soil science, dealing with the inventory, analysis, manipulation and management of soils, and the many phases of breeding and producing crops for food, feed, fiber and recreation. Proper use and conservation of soils and efficient production of crops are of paramount importance to the health and quality of life enjoyed by society.

Agronomy encompasses two main areas of interest: (1) crops—the study of the principles involved in production, management (including weed control), marketing and use of fiber, forage, grain, oil, and turf crops; also food science and technology as related to cereals and oil crops; and (2) soils—the study of their nature, properties, management, conservation and use. The well-trained agronomist may choose a career in: education—consulting, extension or public relations activities; production agriculture—seed production, farming and farm management; soil and water resource management—soil surveying, land appraisal, land use planning, conservation and pollution abatement; agro-business—fertilizers, herbicides, weed control, seeds and turf; agronomic research with crops, soils; or the fields of environmental protection and pollution control as affected by soil-plant-water interactions. The required courses provide an essential foundation in several disciplines, while the elective courses can be selected to meet the interests, needs and objectives of individual students.

Maximum flexibility in curricula is provided in the junior and senior years so that each student, in consultation with the academic advisor, can design a degree program that best serves each individual's career objectives in relation to projected employment opportunities at the time of graduation.

Agro-Industry Option. Agronomists often choose careers in sales, promotions, public relations and management with agro-business industries. These industries market fertilizers, herbicides, seeds, turf and crop products. Courses in other agricultural sciences, accounting, marketing, management, finance and humanities should be taken as electives.

Soil and Crop Management Option. Agronomists use inputs of fertilizer, seed, herbicides, irrigation water, tillage and conservation practices to maximize production while maintaining the integrity of soil, plant and water resources. This option is appropriate for students with career interests in production agriculture, soil and water conservation, consulting, extension, public relations, land reclamation, or soil and water resource management. By electing courses in other agricultural sciences and business to complement the required courses in agronomy, students develop programs to meet particular career goals.

Turfgrass Management Option. This option prepares students for careers in management of golf course, athletic fields, sod farms, parks, public institutions and businesses such as landscape contractors and lawn care specialists. Courses dealing with ornamental horticulture, management, plant protection, business, landscape architecture and equipment are desirable electives in the training of turf managers.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
AGRO 101 Intro. to Soil and Crop Sciences ...	(1-0)	1	ENGL 104 Composition and Rhetoric	(3-0)	3
AGRO 105 World Food and Fiber Crops ¹	(2-2)	3	CHEM 101 Fund. of Chemistry I.....	(3-0)	3
BIOL 101 Botany.....	(3-2)	4	CHEM 111 Fund. of Chemistry Lab. I.....	(0-3)	1
HIST 105 History of U.S. ²	(3-0)	3	POLS 206 American Natl. Govt.....	(3-0)	3
MATH 141 Business Math. I			Humanities elective ³		3
or			* KINE 199 Required Physical Activity.....	(0-2)	1
MATH 166 Finite Math.....	(3-0)	3			14
* KINE 198 Health and Fitness Activity.....	(0-2)	1			
		<u>15</u>			

SOPHOMORE YEAR

ENTO 201 General Entomology	(2-2)	3	AGRO 301 Soil Science	(3-2)	4
Any calculus or PHIL 240, 341 or 342		3-4	HIST 106 History of U.S. ³	(3-0)	3
Social and behavioral sciences elective ³		3	Organic chemistry.....		3
Visual and performing arts elective ³		3	Physics elective.....		3
Elective		2-3	Elective		3
		<u>15</u>			<u>16</u>

JUNIOR AND SENIOR YEARS^{5,6}

AGRO 481 Agronomy Seminar	1
BIOL 301 Taxonomy of Flowering Plants.....	4
POLS 207 State and Local Govt.....	3
Genetics	3
Microbiology or bacteriology	3
Plant pathology	4
Plant physiology	3
Speech and technical writing	6
Electives ^{4,7}	33
	<u>60</u>

- NOTES:**
1. Students in the turf management option may select HORT 201.
 2. Any course in American history approved by the Department of History.
 3. To be selected from the University Core Curriculum. The University Core Curriculum includes a requirement for 6 hours of international and cultural diversity courses. Refer to University Core Curriculum, Item 4, for a list of acceptable courses. A course satisfying another Core category, a college/department requirement, or as a free elective can be used to satisfy these requirements. See academic advisor.
 4. CHEM 102 strongly recommended.
 5. A total of 120 hours will be required for a B.S. degree.
 6. Before registering as a junior, each student must develop, in consultation with the faculty advisor, a degree program consistent with career objectives.
 7. A minimum of 15 hours and a maximum of 25 hours of these electives will be taken in agronomy; the remaining electives may be chosen in any field consistent with career objectives.

* See University Core Curriculum, Item 7.

Agro-Industry Option

(See Freshman and Sophomore Years)

JUNIOR YEAR^{1,2}					
First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
AGRO 303 Crop Ecology	(3-2)	4	MEPS 313 Plant Physiology.....	(3-0)	3
BIOL 301 Taxonomy of Flowering Plants.....	(3-3)	4	POLS 207 State and Local Govt.....	(3-0)	3
GENE 315 Genetics of Plants			Marketing elective.....		3
or			Microbiology elective.....		3
AGRO 304 Plant Breeding.....		3	Elective ³		<u>3</u>
PLPA 301 Plant Pathology	(3-0)	3			15
PLPA 303 Plant Pathology Lab.....	(0-2)	<u>1</u>			
		15			

SENIOR YEAR					
AGRO 422 Soil Fertility and Fertilizers	(3-0)	3	AGRO 450 Chemical Weed Control.....	(3-0)	3
AGRO 432 Soil Chem. and Fertility Lab	(0-3)	1	AGRO 452 Chemical Weed Control Lab.....	(0-2)	1
COMM 203 Public Speaking.....	(3-0)	3	AGRO 481 Seminar	(1-0)	1
Agronomy elective ³		3	ENGL 301 Technical Writing	(3-0)	3
Marketing elective ⁴		3	ENTO 402 Economic Entomology	(2-3)	3
Elective ⁵		<u>3</u>	Elective ³		<u>3</u>
		16			14

- NOTES: 1. A total of 120 credit hours will be required for a B.S. degree.
2. Before registering as a junior, each student must develop, in consultation with the academic advisor, a degree program consistent with degree objectives.
3. These electives may be taken in any field consistent with career objectives.
4. To be selected in consultation with academic advisor.

Soil and Crop Management Option

This option prepares students for careers in production agriculture, soil and water conservation, consulting, extension services, public relations, land reclamation, or resource management. Courses in basic and applied science, mathematics, language arts, and history are required for the option to enable graduates to actively participate in rapid technological developments essential to the productivity of modern agriculture while conserving soil, water, energy, and natural resources. Elective courses from other agricultural sciences and business complement the required courses for the option and enable students to tailor educational degree plans to achieve specific career goals.

(See Freshman and Sophomore Years)

JUNIOR YEAR^{1,2}					
AGRO 303 Crop Ecology	(3-2)	4	GENE 315 Genetics of Plants		
BIOL 301 Taxonomy of Flowering Plants.....	(3-3)	4	or		
Agronomy elective.....		3	AGRO 304 Plant Breeding.....		3
Elective		<u>4</u>	MEPS 313 Plant Physiology.....	(3-0)	3
		15	POLS 207 State and Local Govt.....	(3-0)	3
			Agronomy elective.....		3
			Microbiology elective ⁴		<u>3</u>
					15

SENIOR YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
COMM 203 Public Speaking.....	(3-0)	3	AGRO 422 Soil Fertility and Fertilizers	(3-0)	3
PLPA 301 Plant Pathology	(3-0)	3	AGRO 432 Soil Chem. and Fertility Lab	(0-3)	1
PLPA 303 Plant Pathology Lab.....	(0-2)	1	AGRO 450 Chemical Weed Control	(3-0)	3
Agronomy elective.....		3	AGRO 452 Chemical Weed Control Lab.....	(0-2)	1
Electives ³		<u>5</u>	AGRO 481 Seminar	(1-0)	1
		15	ENGL 301 Technical Writing	(3-0)	3
			Electives ⁵		<u>3</u>
					15

- NOTES: 1. A total of 120 credit hours will be required for a degree.
 2. Before registering as a junior, each student must develop, in consultation with the faculty advisor, a degree program consistent with degree objectives.
 3. These electives may be taken in any field consistent with career objectives.
 4. AGRO 405 recommended.

Turfgrass Management Option

This option prepares students for careers in management of golf courses, athletic fields, sod farms, parks, cemeteries, public institution grounds, and business such as landscape contractors and lawn care specialists. Courses dealing with ornamental horticulture, management, plant protection, business, landscape architecture, and equivalent are desirable electives for the training of turfgrass managers.

(See Freshman and Sophomore Years)

JUNIOR YEAR^{1, 2}

AGRO 428 Adv. Turf Ecol. and Physiology ...	(3-0)	3	AGRO 430 Turfgrass Maintenance.....	(3-2)	4
BIOL 301 Taxonomy of Flowering Plants.....	(3-3)	4	GENE 315 Genetics of Plants		
HORT 306 Woody Ornamental Plants.....	(2-2)	3	or		
Microbiology elective ³		3	AGRO 304 Plant Breeding.....		3
Elective		<u>2</u>	MEPS 313 Plant Physiology.....	(3-0)	3
		15	POLS 207 State and Local Govt.....	(3-0)	3
			Elective ⁴		<u>2</u>
					15

SENIOR YEAR

AGRO 422 Soil Fertility and Fertilizers	(3-0)	3	AGRO 429 Turf Management Systems	(3-2)	4
AGRO 432 Soil Chem. and Fertility Lab.	(0-3)	1	AGRO 450 Chemical Weed Control ¹	(3-0)	3
ENGL 301 Technical Writing	(3-0)	3	AGRO 452 Chemical Weed Control Lab.....	(0-2)	1
PLPA 301 Plant Pathology	(3-0)	3	AGRO 481 Seminar	(1-0)	1
PLPA 303 Plant Pathology Lab.....	(0-2)	1	COMM 203 Public Speaking.....	(3-0)	3
Management elective.....		3	Electives ⁴		<u>3</u>
Elective ⁴		<u>1</u>			15
		15			

- NOTES: 1. A total of 120 credit hours will be required for a degree.
 2. Before registering as a junior, each student must develop, in consultation with the faculty advisor, a degree program consistent with degree objective.
 3. AGRO 405 recommended.
 4. These electives may be taken in any field consistent with career objectives.
 5. To be selected in consultation with academic advisor.

Curricula in Animal Science

The curricula in Animal Science are designed to prepare students for rewarding careers in animal-oriented agribusiness. The millions of domestic animals that provide food, fiber and recreation for humans and the increasing populations of exotic, pet and companion animals offer an unlimited variety of career opportunities for animal science graduates.

Students completing the Bachelor of Science degree in Animal Science are in demand by both the private and public sectors. Career paths include livestock production and the extensive infrastructure that provides the products and services required for management, marketing and processing of livestock and livestock products. Students receive training in nutrition, breeding, reproductive physiology, meat science, dairy products, wool and mohair, and the production and management of livestock. Extensive laboratory facilities and livestock operations located on or near campus in the new Animal Science Teaching, Research and Extension Complex facilitate practical application of the scientific principles.

Leadership skills are developed through participation in a wide array of extra-curricular activities, including departmental clubs, judging teams and continuing education/youth programs. A substantial number of students gain experience in a variety of disciplines and are able to pay for part of their college expenses through part-time employment in the department or as recipients of departmental scholarships.

Science Option

This curriculum is designed to provide scientific expertise in chemistry, biological and physical sciences and mathematics and is recommended for students considering **graduate study or professional schools, such as veterinary medicine, human medicine and dentistry**. This option provides a strong background for graduate study in a wide variety of disciplines. Animal scientists graduating with a Bachelor of Science degree in this option who do not enter graduate or professional school find ready employment in rewarding careers in the pharmaceutical, clinical and food-related industries. Students may concentrate on an **emphasis area** within this option, including the following.

Pre-veterinary medicine. Students planning to pursue a career in veterinary medicine can complete all course requirements for admission to the professional curriculum in this emphasis. Students gain experience working with animals through direct contact in laboratory courses and directed field study. Students acquire knowledge of animal systems and animal behavior principles through course work and interaction with livestock industry leaders. Students are also prepared to seek admission to the professional curricula in medicine, dentistry, pharmacy, optometry and physical therapy.

Pre-graduate training. This emphasis prepares students to pursue a Master of Science, Master of Agriculture or Doctor of Philosophy degree. Possible graduate programs include animal behavior, animal breeding, biochemistry, cellular and molecular biology, meats, dairy science, food science and technology, genetics, growth biology, nutrition and reproductive physiology. Experience gained through honors courses, internships, special problems courses and research laboratories helps the student identify specific disciplines of interest for graduate study. Students with advanced degrees are employed as university professors, research scientists or technicians, extension livestock specialists and technical representatives for industry.

Production/Industry Option

This curriculum prepares students for careers in animal-oriented agribusinesses. Other courses, in addition to basic animal science courses, include agronomy, genetics, veterinary science, economics, management, accounting, marketing and personnel management. A wide array of internships giving students invaluable experience in all phases of livestock production and related industries is available. Career opportunities include sales, management, public relations, marketing, quality control and education. Students may concentrate on an **emphasis area** within this option, including the following.

Beef cattle. Students receive training that enables them to pursue careers in ranch management, feedlot management, pharmaceutical sales and other service-oriented livestock industries. Students are trained in all aspects of production, marketing and merchandising techniques for employment in the beef industry. The University Beef Cattle Center gives students hands-on experience.

Dairy. The focus of this emphasis area is to develop a well-rounded, knowledgeable student. Students have the opportunity to apply scientific principles, problem-solving methods, state-of-the-art techniques and information transfer to complex dairy production systems.

Equine. Designed for students with professional or vocational interests in horses and the horse industry. Course work emphasizes equine nutrition, breeding, reproduction, health, management, training and judging. Lectures are reinforced with laboratories in which students work with horses. Graduates are well prepared for careers with horse production farms, stallion stations, performance and race training stables, breed associations, performance horse organizations, feed and pharmaceutical companies, county extension positions, and other industries and agencies related to the horse industry. Some graduates become professional horse show judges and trainers.

Meat. Students prepare for a career in the meats industry by taking meat science and processing and evaluation courses. Students also can conduct research through special problems courses and can gain valuable work experience on campus in the Meat Science Section or the Rosenthal Meat Science and Technology Center or off campus through internships or summer jobs. Job opportunities are available in packing, processing, retailing, purveying, food service, promotion, public relations and government regulatory agencies.

Sheep. Designed to prepare students for careers in the sheep and goat industries and in the associated wool and mohair industries, this emphasis gives students first-hand experience in sheep production and management practices, as well as procedures for processing and evaluating fleeces. Job opportunities are diverse and include flock management, marketing of lamb and fiber products, feed and pharmaceutical sales and county extension agent positions.

Swine. This emphasis area is designated for students planning to pursue a career in swine production or closely allied industries. Students are taught the principles of breeding and genetics, nutrition and feeding, animal health, environmental control and waste management as they relate to profitable swine production systems. These principles are reinforced by hands-on experience with the department's swine herd. Career paths include management of swine production units and technical service or sales for feed, pharmaceutical and breeding stock companies.

University Core Curriculum

Required Course	(Th-Pr)	Cr
ENGL 104 Composition and Rhetoric	(3-0)	3
GENE 301 Genetics	(3-0)	4
POLS 206 American National Government	(3-0)	3
POLS 207 State and Local Government	(3-0)	3
Foreign language requirement ¹		
History electives ²		6
Humanities electives ³		3
Mathematics electives ^{4,5}		6
Technical communication elective ⁶		3
Visual and performing arts elective ³		3
* KINE 198 Health and Fitness Activity	(0-2)	1
* KINE 199 Required Physical Activity	(0-2)	1
		36

- NOTES: 1. Students must have completed the foreign language requirement to graduate by completing either (1) two years of a foreign language in high school or (2) two semester sequence at the college level to be selected from: CLAS 101, 102; CLAS 121, 122; FREN 101, 102; GERM 101, 102; ITAL 101, 102; JAPN 101, 102; RUSS 101, 102; SPAN 101, 102.
2. HIST 105 and 106 or other courses in American and Texas history, except those courses pertaining solely to Texas history may not comprise more than 3 hours.
3. To be selected from the University Core Curriculum. The University Core Curriculum includes a requirement for 6 hours of international and cultural diversity courses. Refer to page 20 for a list of acceptable courses. A course satisfying another Core category, a college/department requirement, or used as a free elective can be used to satisfy these requirements.
4. Science option: PHIL 240 or MATH 141 or 166 taken in addition to MATH 131, 142, 151 or 171.
5. Production/Industry option: PHIL 240 or MATH 131, 142, 151 or 171 taken in addition to MATH 141 or 166.
6. ENGL 210 or 301.

* See page 21.

Animal Science Core Curriculum

Required Course	(Th-Pr)	Cr
AGLS 101 Modern Agricultural Systems and Renewable Natural Resources	(1-0)	1
ANSC 107 General Animal Science	(3-0)	3
ANSC 108 General Animal Science Lab	(0-2)	1
ANSC 303 Principles of Animal Nutrition	(3-0)	3
ANSC 305 Animal Breeding	(2-2)	3
ANSC 307 Meats	(2-3)	3
ANSC 318 Feeds and Feeding	(2-3)	3
ANSC 433 Reproduction in Farm Animals	(2-2)	3
ANSC 481 Seminar	(1-0)	1
CHEM 101 Fundamentals of Chemistry I	(3-0)	3
CHEM 111 Fundamentals of Chemistry Lab. I	(0-3)	1
STAT 301 Introduction to Biometry	(3-0)	3
		28

Science Option Curriculum

Required course	(Th-Pr)	Cr
BICH 410 Comprehensive Biochemistry I.....	(3-0)	3
BICH 411 Comprehensive Biochemistry II.....	(3-0)	3
BIOL 111 Introductory Biology I.....	(3-3)	4
BIOL 112 Introductory Biology II.....	(3-3)	4
CHEM 102 Fundamentals of Chemistry II.....	(3-0)	3
CHEM 112 Fundamentals of Chemistry Lab. II.....	(0-3)	1
CHEM 227 Organic Chemistry I.....	(3-0)	3
CHEM 237 Organic Chemistry Lab.....	(0-3)	1
CHEM 228 Organic Chemistry II.....	(3-0)	3
CHEM 238 Organic Chemistry Lab.....	(0-3)	1
PHYS 201 College Physics.....	(3-3)	4
PHYS 202 College Physics.....	(3-3)	4
VTPP 423 Biomedical Physiology.....	(3-2)	4
Microbiology elective ¹		4
Social and behavioral sciences elective ²		3
General electives ³		11
		<hr style="width: 100%; border: 0.5px solid black;"/> 56

NOTES: 1. BIOL 351 or VTPB 405.

2. To be selected from the University Core Curriculum.

3. Students may choose a concentration in pre-veterinary medicine and other pre-professional curricula in the health sciences or in pre-graduate training by selecting electives in these areas.

Production/Industry Option Curriculum

Required course	(Th-Pr)	Cr
AGEC 330 Financial Management in Agriculture.....	(3-0)	3
ANSC 437 Marketing and Grading of Livestock and Meats.....	(3-0)	3
CHEM 222 Elements of Organic and Biological Chemistry.....	(0-3)	3
CHEM 242 Elementary Organic Chemistry Lab.....		1
MGMT 309 Survey of Management or AGECE 340 Agribusiness Management.....	(3-0)	3
VTPP 323 Physiology of Domestic Animals.....	(3-0)	3
BIOL 107 Zoology.....	(3-3)	4
Accounting elective ¹		3
Economics elective ²		3
Entomology elective ³		3
Microbiology elective ⁴		3
Production electives ⁵		8
General electives ⁶		16
		<hr style="width: 100%; border: 0.5px solid black;"/> 56

NOTES: 1. ACCT 209.

2. AGECE 105, ECON 202, 203.

3. ENTO 201, 208.

4. DASC 326, BIOL 206.

5. Students should select production electives from ANSC 406, 412, 414 or 420.

6. Students may choose a concentration in beef, dairy, horses, swine, sheep and goats or meat science by selecting electives in these areas.

Curriculum in Biochemistry

Curriculum in Biochemistry is administered by the Department of Biochemistry and Biophysics. Biochemists study living systems of all kinds, ranging from the simplest viruses and bacteria to higher plants and animals. These studies are conducted at all levels, ranging from physical chemical studies of proteins to functional studies of the human brain. The goal of the biochemist is to understand living systems at the molecular level. Our knowledge about living systems has increased dramatically in the past 20 years, allowing biochemists to pursue even more interesting problems. Biochemical research using genetic and molecular engineering for manipulating genes has greatly enhanced our approach to solving problems in the life sciences. The new disciplines of bioinformatics and genomics have revolutionized our understanding of how genes respond to different environments. This research has spawned new biotechnology industries based on genetic engineering that have great potential for solving some of the most difficult problems facing the world. Biochemists also have made significant progress in understanding the molecular basis of diseases such as sickle-cell anemia, diabetes, cancer and heart disease. Biochemistry is a dynamic and diverse scientific field which has become the basic discipline for the life sciences.

The undergraduate Biochemistry curriculum is designed to provide a sound scientific education with expertise in chemistry and the physical sciences, as well as a good background in the biological sciences. Consequently, biochemistry is an especially versatile major giving undergraduates many options when they complete their B.S. degree. The majority of our majors either go on to graduate school or to one of the professional schools such as medicine, veterinary medicine or dentistry. For any of these professional opportunities, biochemistry is an excellent major. A biochemistry major provides a strong background for entering graduate school in a variety of fields. Biochemistry majors excel during their first year in biomedical professional schools because they have a good background in the basic science courses such as biochemistry, chemistry, and microbiology. A wide variety of job opportunities is open to biochemistry majors with a B.S. degree. Many find rewarding careers working in laboratories as research scientists, forensic scientists and technicians. Biochemists are employed by many different industries: chemical, pharmaceutical, agricultural, food and scientific equipment. Positions also are available in clinical, governmental and university laboratories.

University Core Curriculum

Required Courses	(Th-Pr)	Cr
ENGL 104 Composition and Rhetoric	(3-0)	3
*HIST American history electives		6
POLS 206 American National Government	(3-0)	3
POLS 207 State and Local Government	(3-0)	3
Humanities elective ¹		3
International and cultural diversity electives ⁴		6
Social and behavioral sciences elective ¹		3
Visual and performing arts elective ¹		3
**KINE 198 Health and Fitness Activity	(0-2)	1
**KINE 199 Required Physical Activity	(0-2)	1

Departmental Curriculum

Required Courses	(Th-Pr)	Cr
BICH 107 Horizons in Biological Chemistry	(2-0)	2
BICH 285 and BICH 491 (Research) ³		4
BICH 407 Horizons in Biological Chemistry II	(1-0)	2
BICH 414 Biochemical Techniques or BICH 432 Lab. in Molecular Genetics	(0-6)	2
BICH 431 Molecular Genetics	(3-0)	3
BICH 440 and 441 Biochemistry I and II	(3-0)	6
BIOL 111 and 112 Introductory Biology I and II	(3-3)	8
BIOL 351 Fundamentals of Microbiology or BIOL 413 Cell Biology and BIOL 423 Cell Biology Lab.		4
CHEM 101 and 111 Fundamentals of Chemistry I and Lab.		4
CHEM 102 and 112 Fundamentals of Chemistry II and Lab.		4
CHEM 227 and 228 Organic Chemistry I and II	(3-0)	6
CHEM 237 and 238 Organic Chemistry Lab. I and II	(0-3)	2
CHEM 316, 317, 318, and 320 Quantitative Analysis I and II and Lab.		7
CHEM 327, 328, and 325 Physical Chemistry I and II and Lab. I		7
ENGL 210 Scientific and Technical Writing or ENGL 301 Technical Writing	(3-0)	3
GENE 302 Principles of Genetics	(3-3)	4
MATH 151 and 152 Engineering Mathematics I and II ⁵		8
MATH 251 Engineering Mathematics III ⁵	(3-0)	3
PHYS 201 and 202 or PHYS 218 and 219 College Physics I and II	(3-3)	8
Free electives ²		13
		100

- NOTES: 1. To be selected from the University Core Curriculum. One of the courses must be a literature course.
 2. Often used for a minor degree in chemistry, mathematics, modern languages, or philosophy, or for a double major in genetics. See advisor.
 3. Only 2 hours of BICH 285 may apply towards the total of 4.
 4. Must have 6 hours selected from the approved list (see page 20). Courses may also be used to fulfill other University Core Curriculum requirements. See advisor.
 5. Select from MATH 151 or 171, MATH 152 or 172 and MATH 221 or 251 or 253.

It is recommended that students attempt to receive credit by examination for certain courses. Contact Measurement and Research Services for details as early as possible.

* See page 27.

** See page 21.

Minor in Biochemistry: 18 credit hours required

Course	Cr
BICH 410 Comprehensive Biochemistry I or BICH 440 Biochemistry I	3
BICH 411 Comprehensive Biochemistry II or BICH 441 Biochemistry II	3
BICH 431 Molecular Genetics	3
BICH 491 Research	3
BICH 414 Biochemical Techniques I or BICH 432 Molecular Genetics Lab	2
CHEM 322 Physical Chemistry for Engineers	3



Curriculum in Bioenvironmental Sciences

Major breakthroughs are taking place locally, regionally and globally concerning environmental awareness. Environmental hazards take many forms, including microbial threats, toxic wastes and the indirect impact of man's activities on a fragile ecosystem. As a result, there is a growing recognition that the solutions to environmental problems require innovative multi-disciplinary perspectives and technologically-intensive approaches. The Bioenvironmental Sciences curriculum (BESC) was designed in consultation with numerous industry representatives in order to comply with the most current thinking on the talents needed for tomorrow's environmental fields. Students will be prepared for a breadth of career choices in the environmental sciences. These choices include such areas as research and development, environmental consulting, remediation of wastes, site assessment and environmental sampling, and environmental law. Graduates from BESC find employment in federal, state and municipal environmental agencies; in industries concerned with the generation and clean-up of hazardous wastes; with environmental advocacy and educational groups. In addition, the strong science base in BESC prepares students for professional and graduate schools in a variety of disciplines.

The curriculum described combines a foundation of required courses of technical and free electives to allow the student the maximum flexibility to design a personalized course of study. Students are advised to focus on an area of emphasis with those electives that come from such categories as conservation/ecology, policy/ethics/regulations, the physical environment, engineering, plant studies, genetics/biotechnology and general environmental. The Department of Plant Pathology and Microbiology also supports the extracurricular activities needed to support a successful environmental professional.

Required Course ¹	(Th-Pr)	Cr
AGEC 105 Introduction to Agricultural Economics.....	(3-0)	3
AGLS 101 Modern Agricultural Systems	(1-0)	1
AGRO 301 Soil Science	(3-2)	4
BESC 201 Introduction to Bioenvironmental Science.....	(3-0)	3
BESC 484 Field Experience		3
BIOL 101 Botany and BIOL 107 Zoology or BIOL 111 and 112 Introductory Biology.....		8
CHEM 101 Fundamentals of Chemistry I and Lab.....		4
CHEM 102 Fundamentals of Chemistry II and Lab		4
CHEM 227 and 237 Organic Chemistry and Lab.....		4
COMM 203 Public Speaking.....	(3-0)	3
ENGL 104 Composition and Rhetoric	(3-0)	3
GENE 310 Principles of Heredity or GENE 315 Genetics of Plants	(3-0)	3
HIST 105 and 106 or American history elective ²	(3-0)	6
MATH 131 Mathematical Concepts—Calculus.....	(3-0)	3
PHIL 240 Introduction to Logic or MATH 166 Topics in Contemporary Mathematics II or MATH 141 Business Mathematics I.....	(3-0)	3
POLS 206 and 207 American National and State and Local Government ²	(3-0)	6
RENR 205 and 215 Fundamentals of Ecology and Lab.....		4
STAT 302 Statistical Methods	(3-0)	3
* KINE 198 Health and Fitness Activity.....	(0-2)	1
* KINE 199 Required Physical Activity	(0-2)	1
BIO Group electives ³		10
ENV Group electives ³		12
Humanities elective ⁵		3
Technical electives ^{2,4}		14
Visual and performing arts electives ⁵		3
Free electives		8
	total hours	120

NOTES: 1. A minimum of 120 semester hours will be required for a B.S. degree.

2. During the sophomore year, a degree plan will be developed in consultation with the departmental advisor.

3. **BIO Group** selections consist of: BESC 401 Bioenvironmental Microbiology; AGRO 405 Soil Microbiology; PLPA 301/303 Introductory Plant Pathology and Lab; and other course selections as approved by advisor. **ENV Group** selections consist of BESC 402 Microbial Processes in Bioremediation; BESC 314 Pathogens, the Environment, and Society; and other course selections as approved by advisor. Exact numbers of hours from these groups will vary, to achieve a minimum of 120 hours.

4. Courses may be selected from categories designed to reflect the professional aspirations of the student. Exact number of technical electives will depend on choice selections from other categories to achieve a minimum 120 hours.

5. To be selected from the University Core Curriculum. The University Core Curriculum includes a requirement for 6 hours of international and cultural diversity courses. Refer to page 20 for a list of acceptable courses. A course satisfying another Core category, a college/department requirement, or as a free elective can be used to satisfy these requirements. See academic advisor.

* See page 21.

Curriculum in Biological and Agricultural Engineering

Biological and agricultural engineers apply their knowledge of physical and biological sciences, mathematics, engineering principles and engineering design to the production and processing of food and fiber, to the preservation of environmental quality, to biological systems and processes, and to machine systems that interface with all of these. Because of their broad general engineering background, biological and agricultural engineering graduates are sought by a wide variety of employers. Recent employers include environmental consulting firms, equipment manufacturers, crop storage and handling industries, the cotton and forest products industries, food and feed processing industries, concentrated animal production industries, biotechnology companies, electric utility companies, chemical companies, and governmental agencies. Biological and agricultural engineers are making significant contributions to meeting many basic needs of society such as maintaining food quality, quantity and safety; improving environmental quality; and enhancing the quantity and quality of our water resources.



The Biological and Agricultural Engineering Department provides quality education, research and outreach in engineering and technology for the world's agricultural, biological, environmental and food systems. Our undergraduate programs provide a high quality education for engineering and systems management students to fulfill the needs of industries we serve and advance our reputation as a world leader in engineering and systems management education.

The biological and agricultural engineering program develops graduates who can pursue engineering careers in industry, academia, consulting or government. The curriculum is designed:

- to produce graduates to serve the engineering needs of clientele in environmental and natural resources, machine systems, food processing, bioprocessing, and agricultural production and processing;
- to produce graduates who are successfully employed in engineering jobs in industry, government or academia;
- to maintain our national and international reputation for program excellence; and
- to produce graduates who continue to be engaged in professional development.

Students learn to apply fundamental knowledge of biological and physical sciences, mathematics, and engineering principles to formulate and solve engineering problems. Engineering design is integrated throughout the curriculum, along with opportunities to develop communication, learning, and teamwork skills, culminating in a capstone design experience. Electives in the curriculum allow the student to develop an emphasis in one of the following areas:

- **Environmental and Natural Resources Engineering**—design and management of systems affecting soil, water, and air resources.
- **Food and Bioprocess Engineering**—design and development of systems for processing and handling of food and agricultural products and processes involving cells, enzymes, or other biological components.
- **Machine Systems Engineering**—design and development of machines and machine systems for food, feed and fiber production and processing.

Students select courses with the assistance of faculty advisors in an individualized advising system. Faculty members also assist with professional development and job placement for students.

The biological and agricultural engineering program is jointly administered by the College of Agriculture and Life Sciences and the Dwight Look College of Engineering, and the curriculum is fully accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology. The department is one of the largest in North America and is consistently ranked as one of the top two in the nation.

All biological and agricultural engineering majors are required to earn a grade of C or better in each of the Common Body of Knowledge (CBK) courses (CHEM 107, ENGL 104, ENGR 111 and 112, MATH 151 and 152, and PHYS 218 and 208) and in each additional engineering and math course taken to satisfy degree requirements.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
AGLS 101 Modern Ag. Systems	(1-0)	1	BIOL 113 Introductory Biology I	(3-3)	3
BAEN 150 Intro. to Biol. and Ag. Engineering Design	(0-2)	1	CHEM 107 Chemistry for Engineers	(3-3)	4
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	ENGR 112 Foundations of Engr. II	(1-3)	2
ENGR 111 Foundations of Engr. I.....	(1-3)	2	MATH 152 Engineering Math. II.....	(3-2)	4
MATH 151 Engineering Math. I ¹	(3-2)	4	University Core Curriculum elective ²		3
PHYS 218 Mechanics	(3-3)	4	* KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>
* KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>			17
		16			

SOPHOMORE YEAR

ENGL 210 Scientific and Tech. Writing.....	(3-0)	3	BAEN 265 Inv. Tech. for Biol. and Ag. Engr.....	(1-6)	3
MATH 251 Engineering Math. III	(3-0)	3	BAEN 320 Eng. Thermodynamics.....	(2-2)	3
MEEN 221 Statics and Particles Dynamics ...	(2-2)	3	CVEN 305 Mechanics of Materials.....	(3-0)	3
MEEN 222 Materials Science	(3-0)	3	MATH 308 Differential Equations.....	(3-0)	3
PHYS 208 Electricity and Optics.....	(3-3)	<u>4</u>	Science elective ³		<u>4</u>
		16			16

JUNIOR YEAR

BAEN 340 Fluid Mechanics.....	(3-0)	3	BAEN 365 Unit Ops. for Biol. and Ag. Engr.....	(2-3)	3
BAEN 354 Engr. Properties of Biological Materials.....	(2-2)	3	BAEN 366 Transport Processes in Biological Systems	(3-0)	3
BAEN 375 Des. of Ag. Mach. and Struc.	(3-0)	3	BAEN 370 Meas. and Control of Bio. Sys. and Ag. Processes	(2-2)	3
CHEM 222 Elements of Org. Biol. Chem.	(3-0)	3	Mathematics elective ³		3
ECEN 215 Prin. of Electrical Engr.....	(2-2)	<u>3</u>	University Core Curriculum elective ²		<u>3</u>
		15			15

SENIOR YEAR

BAEN 479 Biol. and Ag. Engr. Design I.....	(1-2)	2	BAEN 480 Biol. and Ag. Engr. Design II.....	(1-5)	3
BAEN 481 Seminar.....	(1-0)	1	Engineering elective ⁴		3
ENGR 482 Ethics and Engineering	(2-2)	3	Technical elective ³		3
Engineering electives ⁴		6	University Core Curriculum electives ²		<u>6</u>
University Core Curriculum electives ²		<u>6</u>			15
		18			

- NOTES: 1. Entering students will normally be given a placement test in mathematics. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.
2. To be selected from the University Core Curriculum. Of the 18 hours shown as University Core Curriculum electives, 3 must be from visual and performing arts, 3 from social and behavioral sciences, 6 from U.S. history, and 6 from POLS 206 and 207. The required 6 hours from international and cultural diversity may be met by courses satisfying the visual and performing arts, social and behavioral sciences, and the political science and history requirements if they are also on the approved list of international and cultural diversity courses (see page 20).
3. Science, mathematics and technical electives are to be selected from a departmental approved list in consultation with an academic advisor to enhance the chosen career emphasis.
4. Engineering electives must include at least 6 hours of departmental engineering courses and are to be selected from an approved list in consultation with the academic advisor to enhance the chosen career emphasis.

The Systems Safety Engineering specialty is available for students pursuing this degree. See page 364 for detailed information.

* See page 21.

Curriculum in Community Development

The Department of Recreation, Park and Tourism Sciences offers courses leading to a Bachelor of Science degree in Community Development. The major is designed to prepare students to address important social and economic issues in metropolitan centers, urban fringe areas, and rural communities. Each of these types of communities has unique conditions, including different economies and diverse populations that can affect development efforts. For example, natural resource dependent communities often have small resident populations and seasonal economies. They must carefully weigh impacts of development against protection and conservation of environmental qualities that attract new residents, recreationalists, and tourists.



The Community Development major is an interdisciplinary program. The curriculum provides students with theoretical, statistical, decision-making and communication skills that they can effectively apply in federal and state governmental agencies, community planning firms, municipal departments, marketing firms, and other professional settings. The program will enhance students' abilities to: collect and analyze different kinds of data; work with community leaders, groups and publics; identify and mobilize necessary resources for development processes; and assess outcomes and impacts of community development on residents and newcomers. Graduates with a Community Development major will be able to apply their skills to such issues as: institutional development; human capacity building; economic development; youth development; poverty; welfare-to-work; water quality; land use planning; and other issues involving the mobilization of and collaboration with diverse community groups. Students who select this major will participate in a common set of core courses in the Department of Recreation, Park and Tourism Sciences. These courses emphasize the importance of parks, recreation, tourism, and youth-oriented programs to community development processes and strategies.

University Core Curriculum

Courses	(Th-Pr)	Cr
Communication (6 hours)		
COMM 203 Public Speaking.....	(3-0)	3
ENGL 104 Composition and Rhetoric.....	(3-0)	3
Mathematics (6 hours)¹		
Select two courses from the following:		
MATH 131 Mathematical Concepts—Calculus.....	(3-0)	3
MATH 141 Business Mathematics I.....	(3-0)	3
MATH 142 Business Mathematics II.....	(3-0)	3
MATH 166 Topics in Contemporary Mathematics II.....	(3-0)	3
MATH 171 Analytical Geometry and Calculus.....	(4-0)	4
MATH 172 Calculus.....	(4-0)	4
PHIL 240 Introduction to Logic.....	(3-0)	3
PHIL 341 Symbolic Logic.....	(3-0)	3
PHIL 342 Symbolic Logic II.....	(3-0)	3
Natural Sciences (8 hours)		
Select two University Core Curriculum courses. Each course must include a corresponding lab.....		8
Humanities (3 hours)		
Select one University Core Curriculum course.		3
Visual and Performing Arts (3 hours)		
Select one University Core Curriculum course.		3
Social and Behavioral Sciences (3 hours)		
PSYC 105 Introduction to Psychology		
or		
SOCI 205 Introduction to Sociology.....	(3-0)	3
U.S. History and Political Science (12 hours)		
HIST 105 History of the United States.....	(3-0)	3
HIST 106 History of the United States.....	(3-0)	3
POLS 206 American National Government.....	(3-0)	3
POLS 207 State and Local Government.....	(3-0)	3
Kinesiology (2 hours)		
* KINE 198 Health and Fitness Activity.....	(0-2)	1
* KINE 199 Required Physical Activity.....	(0-2)	1

Community Development

Courses	(Th-Pr)	Cr
RPTS 201 Foundations of Recreation and Parks	(3-0)	3
RPTS 202 Foundations of Tourism	(3-0)	3
RPTS 308 Principles of Community Assessment	(3-0)	3
RPTS 311 Recreation and Tourism Programs	(3-0)	3
RPTS 336 Recreation Research and Analysis.....	(3-0)	3
RPTS 340 Recreation, Parks and Diverse Populations	(3-0)	3
RPTS 402 Park Planning and Design.....	(3-2)	4
RPTS 403 Funding and Allocating Recreation, Park and Tourism Resources ¹ (W course).....	(3-2)	4
RPTS 408 Community Development and the Landgrant System	(3-0)	3
RPTS 481 Seminar.....	(1-0)	1
RPTS 484 Internship.....		6
Community and Urban Life (9 hours)		
Select three courses from the following:		
AGEC 344 Food and Agricultural Law	(3-0)	3
ALED 441 Agricultural Extension Organization and Methods	(3-0)	3
FRSC 421 Urban Forestry.....	(3-0)	3
PLAN 360 Introduction to the Urban Planning Function	(3-0)	3
PLAN 365 Introduction to Planning	(3-0)	3
PLAN 414 Sustainable Communities.....	(3-0)	3
PLAN 415 Urban Issues	(3-0)	3
RPTS 470 Youth Development Organizations and Services	(3-0)	3
SOCI 321 Urban Society.....	(3-0)	3
SOCI 404 Sociology of the Community.....	(3-0)	3
Leadership Development (3 hours)		
Select one course from the following:		
ALED 340 Professional Leadership Development	(3-0)	3
ALED 343 Human Resource Management in Agricultural Life Sciences	(3-0)	3
ALED 344 Leadership of Volunteers.....	(3-0)	3
ALED 440 Principles of Technological Change.....	(3-0)	3
MGMT 309 Survey of Management	(3-0)	3
POLS 341 Urban Administration	(3-0)	3
Social and Behavioral Sciences (3 hours)		
SOCI 312 Population and Society		
or		
SOCI 407 Rural Sociology.....	(3-0)	3

Courses	(Th-Pr)	Cr
Required Technical Support (24 hours)		
Select two courses from the following:		
ACCT 209 Survey of Accounting Principles	(3-0)	3
ACCT 210 Survey of Managerial and Cost Accounting Principles.....	(3-0)	3
AGEC 330 Financial Management in Agriculture	(3-0)	3
AGEC 340 Agribusiness Management.....	(3-0)	3
ALED 425 Principles of Program Evaluation in Agriculture and the Life Sciences	(3-0)	3
Select two courses from the following:		
AGEC 105 Introduction to Agricultural Economics.....	(3-0)	3
AGEC 422 Land Economics.....	(3-0)	3
ECON 202 Principles in Economics	(3-0)	3
ECON 203 Principles in Economics	(3-0)	3
Select one course from the following:		
AGJR 404 Communicating Agricultural Information to the Public	(2-2)	3
ENGL 210 Scientific and Technical Writing	(3-0)	3
ENGL 301 Technical Writing	(3-0)	3
Select one course from the following:		
CPSC 110 Programming	(3-2)	4
CPSC 203 Introduction to Computing	(3-0)	3
CPSC 206 Structured Programming in C.....	(3-2)	4
RENR 201 Computer Applications in Agriculture	(2-2)	3
Select one course from the following:		
FRSC 461 Geographical Information Systems for Resource Management	(2-2)	3
GEOG 390 Principles of Geographical Information Systems	(2-2)	3
LAND 461 GIS Application in Resource Management	(2-4)	3
RENR 405 GIS for Environmental Problem Solving	(2-2)	3
STAT 201 Elementary Statistical Inference	(3-0)	3
Free Electives (courses not taken elsewhere)		12
	total hours	130

The University Core Curriculum includes a requirement for 6 hours of international and cultural diversity courses. Refer to page 20 for a list of acceptable courses. A course satisfying another Core category, a college/department requirement or used as a free elective can be used to satisfy these requirements.

NOTES: 1. Designated writing-intensive course.

* See page 21.

Curricula in Dairy Science

Curricula in Dairy Science is administered by the Department of Animal Science. Trained personnel are much in demand to service, manage and direct the production, manufacture and distribution of milk and dairy foods.

Dairy Manufacturing Option

This major is designed to prepare students for careers in dairy plant operation and management; plant field work and dairy product quality control; teaching and research work in milk and dairy food processing; and merchandising and sales. Fundamental technical and business courses offer a well-rounded program of training in these areas.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
AGLS 101 Modern Ag. Systems	(1-0)	1	BIOL 112 Introductory Biology II	(3-3)	4
BIOL 111 Introductory Biology I.....	(3-3)	4	CHEM 102 Fund. of Chemistry II.....	(3-0)	3
CHEM 101 Fund. of Chemistry I.....	(3-0)	3	CHEM 112 Fund. of Chem. I Lab.....	(0-3)	1
CHEM 111 Fund. of Chem. I Lab.....	(0-3)	1	DASC 202 Dairying	(2-2)	3
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	Social and behavioral sciences elective ¹		3
MATH 166 Topics in Contemp. Math.	(3-0)	3	Visual and performing arts elective ¹		3
** KINE 198 Health and Fitness Activity.....	(0-2)	1	** KINE 199 Required Physical Activity.....	(0-2)	1
		<u>16</u>			<u>18</u>

SOPHOMORE YEAR

CHEM 222 Elements of Organic and Biological Chemistry.....	(3-0)	3	* POLS 206 American Natl. Govt.....	(3-0)	3
CHEM 242 Elem. Organic Chemistry Lab....	(0-3)	1	* American history elective ¹		3
MGMT 211 Legal and Social Environ. of Business	(3-0)	3	Computer appl. elective		3
* POLS 207 State and Local Govt.....	(3-0)	3	Economics elective.....		3
* American history elective ¹		3	Entomology elective		<u>3</u>
Physics elective.....		<u>3</u>			15
		16			

JUNIOR YEAR

ACCT 209 Survey of Accounting Prin.....	(3-0)	3	DASC 314 Food Analysis.....	(1-4)	3
DASC 312 Food Chemistry.....	(2-0)	2	DASC 331 Dairy and Food Tech.....	(3-3)	4
DASC 326 Food Bacteriology	(3-0)	3	FSTC 213 Food Plant Engineering.....	(2-3)	3
DASC 327 Food Bacteriology	(0-3)	1	Accounting or finance elective		3
DASC 330 Dairy and Food Tech.....	(3-3)	4	Elective		<u>1</u>
Agricultural economics or economics elective		<u>3</u>			14
		16			

SENIOR YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ENGL 301 Technical Writing	(3-0)	3	ANSC 481 Seminar.....	(1-0)	1
PHIL 240 Intro. to Logic.....	(3-0)	3	COMM 203 Public Speaking.....	(3-0)	3
Humanities elective ¹		3	Management elective		3
Electives		<u>2</u>	Electives		<u>7</u>
		11			14

NOTE: 1. To be selected from the University Core Curriculum. The University Core Curriculum includes a requirement for 6 hours of international and cultural diversity courses. Refer to page 20 for a list of acceptable courses. A course satisfying another Core category, a college/department requirement, or as a free elective can be used to satisfy these requirements.

* See page 27.

** See page 21.

Dairy Production Option

This major is designed for students interested in careers as dairy farm operators or managers; as dairy herd owners and breeders of dairy cattle; as teachers and research workers in dairy nutrition, breeding or management; as extension dairy specialists and organization leaders; and as workers in allied fields.

With the approval of the student's advisor, changes in this curriculum can be made to meet the specific needs of the student who wishes to enter Graduate Studies, the College of Veterinary Medicine and Biomedical Sciences or other special fields of work.

Freshman and Sophomore Years

See advisor for course requirements.

JUNIOR YEAR

ANSC 307 Meats.....	(2-3)	3	AGRO 301 Soil Science	(3-2)	4
DASC 204 Modern Dairy Cattle Appraisal....	(0-2)	1	ANSC 318 Feeds and Feeding.....	(2-3)	3
GENE 301 Genetics	(3-2)	4	ANSC 433 Repro. in Farm Animals.....	(2-2)	3
STAT 301 Intro. to Biometry.....	(3-0)	3	VTPP 323 Physiology of Domestic Animals..	(2-2)	3
Microbiology elective ¹		<u>3</u>	Computer appl. elective ²		<u>3</u>
		14			16

SENIOR YEAR

ENGL 301 Technical Writing	(3-0)	3	ANSC 481 Seminar.....	(1-0)	1
Agronomy elective ³		3	DASC 400 Animal Science Ind. Studies	(1-0)	1
Humanities elective ⁴		3	DASC 418 Feeding and Management of		
Elective		<u>3</u>	Dairy Cattle	(3-2)	4
		12	Social and behavioral sciences elective ⁴		3
			Electives		<u>4</u>
					13

NOTES: 1. DASC 326 or BIOL 206.

2. AGEC 321, AGRI 201, CPSC 203 or INFO 209.

3. AGRO 308 or 417.

4. See advisor for courses to be selected from the University Core Curriculum.

Curriculum in Ecological Restoration

Ecological restoration is the process of repairing dysfunctional ecosystems to provide essential ecosystem goods and services important to society. The Ecological Restoration degree prepares students for a career that requires an understanding of the causes of land degradation and strategies for recovery of ecosystems damaged, degraded, or destroyed by natural or human causes.

The curriculum focuses on restoration of damaged ecosystems and landscapes, particularly terrestrial, wetland, and riparian systems in diverse settings that span the rural-urban spectrum. The discipline of ecological restoration requires a strong conceptual/theoretical foundation as well as a practical application component. This degree combines basic sciences, modern technologies, and contemporary ecological knowledge. Students will develop practical capabilities and gain critical understanding of the interaction of biophysical, socio-economic and political drivers that affect land degradation and restoration through a program that incorporates integrated coursework and an internship with ecological restoration practitioners.

Completion of this degree will prepare students to assess the causes of ecosystem degradation and to develop strategies for ecological restoration at multiple spatial scales. Graduates will be equipped for professional careers with environmental consulting companies, governmental and non-governmental land management organizations, and regulatory agencies. This degree program also provides a foundation for students planning to pursue advanced degrees in restoration ecology, disturbed land reclamation, natural resources conservation and management, or related fields. The total number of credit hours required for graduation is 120 hours.

University Core Curriculum

Required Courses	(Th-Pr)	Cr
AGEC 105 Introduction to Agricultural Economics.....	(3-0)	3
CHEM 101 and 111 Fundamentals of Chemistry I and Lab.....		4
CHEM 102 and 112 Fundamentals of Chemistry II and Lab.....		4
ENGL 104 Composition and Rhetoric.....	(3-0)	3
MATH 141 Business Mathematics I.....	(3-0)	3
MATH 142 Business Mathematics II.....	(3-0)	3
POLS 206 American National Government ²	(3-0)	3
POLS 207 State and Local Government ²	(3-0)	3
Communication elective ¹		3
History electives ³		6
Humanities elective ³		3
Visual and performing arts elective ³		3
*KINE 198 Health and Fitness Activity.....	(0-2)	1
*KINE 199 Required Physical Activity.....	(0-2)	1
		43

Ecological Restoration Core Courses

Required Courses

AGRO 301 Soil Science	(3-2)	4
AGRO 310 Soil Morphology and Interpretations	(1-3)	2
AGRO 405 Soil Microbiology.....	(3-2)	4
BIOL 101 Botany.....	(3-3)	4
FRSC 305 Silviculture.....	(3-3)	4
RENr 205 Fundamentals of Ecology	(3-0)	3
RENr 215 Fundamentals of Ecology Laboratory.....	(0-3)	1
RLEM 103 Introduction to Ecological Restoration.....	(1-0)	1
RLEM 316 Rangeland Communities and Ecosystems or FRSC 304 Forest Ecology.....		3
RLEM 317 Rangeland Vegetation Manipulation.....	(2-0)	2
RLEM 320 Landscape Restoration.....	(2-0)	2
RLEM 321 Field Studies in Ecological Restoration	(0-1)	1
RLEM 420 Eco. Rest. of Wetland and Riparian Sys.....	(2-2)	3
RLEM 430 Adv. Restoration Ecology	(3-0)	3
RLEM 440 Wetland Delineation.....	(2-3)	3
RLEM 484 Internship.....		3
WFSC 419 Wildlife Restoration.....	(2-3)	3
WFSC 428 Wetland Ecosystem Management.....	(3-3)	4
Environmental policy elective ⁴		3
Field sampling methods elective ⁵		3-4
GIS elective ⁶		3
Plant taxonomy elective ⁸		7
Remote sensing elective ⁷		3
Statistics elective ⁹		3
Watershed elective ¹⁰		3
Free electives		1-2
Total hours		120

- NOTES: 1. Communication elective choose from ENGL 210, 301 or AGJR 404.
 2. Credit by examination may be used to substitute 3 hours of POLS 206 or 207.
 3. To be selected from the University Core Curriculum. The University Core Curriculum includes a requirement for 6 hours of international and cultural diversity courses. Refer to page 20 for a list of acceptable courses. A course satisfying another Core category, a college/department requirement or used as a free elective can be used to satisfy these requirements. See academic advisor.
 4. Environmental Policy elective choose from RENr 470, 420; FRSC 406; PHIL 314; WFSC 305 or AGECE 350.
 5. Field Sampling Methods elective choose from RLEM 315 or FRSC 404.
 6. Geographic Information System (GIS) elective choose from RENr 405, FRSC 461, GEOG 390 or LAND 461.
 7. Remote Sensing elective choose from FRSC 398/GEOG 398, RENr 444 or GEOG 361.
 8. Plant Taxonomy elective choose one from RLEM 303; FRSC 203; HORT 306, 308; or RLEM 302 and choose one course from RLEM 304 or BIOL 301.
 9. Statistics elective choose from STAT 211 or 302.
 10. Watershed elective choose one RLEM 301, 305 or AGSM 335.

* See page 21.

Curricula in Entomology

Entomology is a basic and applied science of insects and their relatives such as ticks and mites. Insects are the most numerous and diverse forms of life on earth; they are essential constituents of virtually every terrestrial and aquatic ecosystem. While society benefits from the many diverse roles played by the vast majority of insects, some species may become limiting factors in the production, processing and storage of our food and fiber crops, and to the health and well being of humans and animals. The knowledge and skills possessed by entomologists are essential components of modern integrated pest management strategies designed to safely and efficiently produce adequate food supplies for a continuously expanding world population, and to impede the transmission of insect-borne diseases, while at the same time protecting our endangered species and fragile ecosystems.

The Bachelor of Science degree in Entomology leads to a wide array of career paths with strong employment demands among corporate and private agribusiness; urban pest management companies; scientific and technical organizations; public health agencies; local, state and federal governments; and international organizations. In addition, employment opportunities exist in areas such as forensic entomology, conservation biology, environmental quality, food quality, regulatory inspection, public health and many more. Our curriculum is sufficiently flexible such that a student, in consultation with the academic advisor, may tailor the degree to meet their individual academic goals, including requirements for graduate school, professional schools in the health career areas (medical, veterinary, dental) as well as providing the analytical skills needed for law school. Our department also participates in the Texas A&M accelerate online program for teaching certification, which is an innovative approach to training Texas secondary science teachers to gain the background education needed to prepare for certification to teach science grades 8–12.

In addition, students have the option to choose the forensic science track in entomology, which offers the versatility to provide the education and training over a broad area of the sciences, as well as provide the interaction with professionals in the area. Forensic science is a growing area of interest for students seeking to gain entry into a career that delves into



the collection, preservation, and use of evidence to solve civil and criminal cases. There are internships, employment, and post-graduate studies available to students with an education specialty in forensic studies.

Students majoring in related areas such as agronomy, animal science, horticulture, biology, genetics and biomedical sciences may wish to consider augmenting their knowledge base and broaden their career opportunities by electing to either double major or to minor in entomology. Interested students should contact the departmental Undergraduate Advisor for additional information on these options.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
AGLS 101 Modern Ag. Systems	(1-0)	1	CHEM 102 Fund. of Chemistry II	(3-0)	3
CHEM 101 Fund. of Chemistry I.....	(3-0)	3	CHEM 112 Fund. of Chemistry II Lab.....	(0-3)	1
CHEM 111 Fund. of Chemistry I Lab.....	(0-3)	1	Biological sciences elective ¹		4
ENGL 104 Composition and Rhetoric	(3-0)	3	Math. or philosophy elective ²		3
MATH 141 Business Math. I.....	(3-0)	3	Technical elective ³		4
Biological sciences elective ¹		4			15
		<u>15</u>			

SOPHOMORE YEAR

ENTO 482 Occupational and Prof. Dev.	(2-0)	2	ENGL 210 Scientific and Tech. Writing.....	(3-0)	3
POLS 206 American Natl. Govt.....	(3-0)	3	POLS 207 State and Local Govt.....	(3-0)	3
American history elective ²		3	American history elective ²		3
Organic chemistry elective ⁴		3	Humanities elective ²		3
Social and behavioral sciences elective ²		3	Elective		3
* KINE 198 Health and Fitness Activity.....	(0-2)	1			15
		<u>15</u>			

JUNIOR YEAR

ENTO 305 Evol. of Insect Structure.....	(2-1)	3	ENTO 301 Biodiversity and Biology of Insects	(3-3)	4
ENTO 306 Insect Physiology	(2-1)	3	ENTO 424 Insect Ecology.....	(2-3)	3
International and cultural diversity elective ² ..		3	GENE 301 Genetics.....	(3-3)	4
Technical elective ³		3	Visual and performing arts elective ²		3
Elective		3	* KINE 199 Required Physical Activity.....	(0-2)	1
		<u>15</u>			15

SENIOR YEAR

ENTO 428 Insect Biotechnology.....	(3-0)	3	ENTO 435 Case Studies in Problem Solving..	(3-0)	3
International and cultural diversity elective ² ..		3	ENTO 481 Seminar	(1-0)	1
Technical electives ³		6	ENTO 484 Professional Internship or		
Elective		3	ENTO 491 Research		2
		<u>15</u>	Technical electives ³		6
			Elective		3
					<u>15</u>

NOTES: 1. BIOL 111 and 112 or BIOL 101 and BIOL 107.

2. To be selected from the University Core Curriculum and in consultation with student's academic advisor in the department. Six hours of international and cultural diversity electives are also required; these courses may fulfill other degree requirements as well. See the list of approved courses on page 20.

3. Technical electives must be selected in consultation with the student's advisor or from the current list of approved electives published by the department.

4. CHEM 222 or 227.

* See page 21.

Forensic Science Track

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
AGLS 101 Modern Ag. Systems	(1-0)	1	CHEM 102 Fund. of Chemistry II	(3-0)	3
CHEM 101 Fund. of Chemistry I.....	(3-0)	3	CHEM 112 Fund. of Chemistry II Lab.....	(0-3)	1
CHEM 111 Fund. of Chemistry I Lab.....	(0-3)	1	Biological sciences elective ¹		4
ENGL 104 Composition and Rhetoric.....	(3-0)	3	Math. or philosophy elective ²		3
MATH 141 Business Math. I.....	(3-0)	3	Elective		3
Biological sciences elective ¹		<u>4</u>	* KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>
		15			15

SOPHOMORE YEAR

ENTO 482 Occupational and Prof. Dev.	(2-0)	2	ENGL 210 Scientific and Tech. Writing.....	(3-0)	3
POLS 206 American Natl. Govt.....	(3-0)	3	POLS 207 State and Local Govt.....	(3-0)	3
American history elective ²		3	American history elective ²		3
Organic chemistry elective ⁴		3	Humanities elective ²		3
Social and behavioral sciences elective ²		3	Elective		<u>3</u>
* KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>			15
		15			

JUNIOR YEAR

GENE 301 Genetics.....	(3-3)	4	ENTO 301 Biodiversity and Biology of Insects.....	(3-3)	4
International and cultural diversity elective ² ..		3	ENTO 424 Insect Ecology.....	(2-3)	3
Technical electives ³		5	Technical electives ³		5
Elective		<u>3</u>	Visual and performing arts elective ²		<u>3</u>
		15			15

SENIOR YEAR

ENTO 428 Insect Biotechnology.....	(3-0)	3	ENTO 403 Urban Entomology.....	(2-3)	3
ENTO 429 Insect Biotechnology Lab.....	(0-3)	1	ENTO 431 The Science of Forensic Entomology	(3-0)	3
International and cultural diversity elective ² ..		3	ENTO 432 Applied Forensic Entomology.....	(0-3)	1
Technical electives ³		5	ENTO 481 Seminar	(1-0)	1
Elective		<u>3</u>	ENTO 484 Professional Internship		
		15	or		
			ENTO 491 Research		2
			Technical electives ³		<u>5</u>
					15

NOTES: 1. BIOL 111 and 112 or BIOL 101 and BIOL 107.

2. To be selected from the University Core Curriculum and in consultation with the student's academic advisor in the department. Six hours of international and cultural diversity electives are also required; these courses may fulfill other degree requirements as well. See the approved list of courses on page 20.

3. Technical electives must be selected in consultation with the student's advisor or from the current list of approved forensic science technical electives published by the department.

4. CHEM 222 or 227.

* See page 21.

Curriculum in Environmental Studies

The B.S. degree in Environmental Studies in the College of Agriculture and Life Sciences (COALS) provides students with the opportunity to learn about the major societal forces that influence environmental issues. These include political agreement supporting legal and regulatory requirements, economics and the marketplace, environmental values, and technology. Students gain technical background blended with a solid foundation in economics, political issues, environmental law, ethics, and communications. Technology and the environment are well supported in existing curricula in COALS and contribute to the multidisciplinary nature of the Environmental Studies degree. Technical courses focus on biological sciences, natural resources, and assessment of the environment and come from the Agricultural Economics; Bioenvironmental Sciences; Entomology; Forest Science; Rangeland Ecology and Management; Recreation; Park and Tourism Sciences; Soil and Crop Sciences; and Wildlife and Fisheries Sciences. It is the fusion of these courses with those from the Liberal Arts that make this a truly unique curriculum.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
BESC 201 Intro. to Bioenviron. Sciences	(3-0)	3	CHEM 101 Fundamentals of Chemistry I.....	(3-0)	3
BIOL 101 Botany			CHEM 111 Fundamentals of Chem. I Lab	(0-3)	1
or			ENGL 104 Composition and Rhetoric	(3-0)	3
BIOL 111 Introductory Biology I.....	(3-3)	4	GEOG 201 Intro. to Human Geography	(3-0)	3
MATH 141 Business Math I.....	(3-0)	3	RENR 205 Fundamentals of Ecology	(3-0)	3
POLS 206 American Natl. Govt.....	(3-0)	3	*KINE 199 Required Physical Activity.....	(0-2)	1
*KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>			<u>14</u>
		14			

SOPHOMORE YEAR

FRSC 304 Forest Ecology	(3-0)	3	AGEC 105 Introduction to Agricultural Economics	(3-0)	3
GEOG 204 Economic Geography.....	(3-0)	3	GEOG 203 Planet Earth: Systems Science	(3-3)	4
MATH 142 Business Math II	(3-0)	3	POLS 207 State and Local Govt.....	(3-0)	3
Free elective.....		4	Communication elective ²		3
Visual and performing arts elective ¹		<u>3</u>	Free elective.....		<u>3</u>
		16			<u>16</u>

JUNIOR YEAR

RENR 375 Conservation of Natural Resources	(3-0)	3	AGRO 301 Soil Science	(3-2)	4
RPTS 420 Natural Resource Law	(3-0)	3	PHIL 205 Tech. and Human Value or		
STAT 303 Statistical Methods	(3-0)	3	PHIL 314 Environmental Ethics	(3-0)	3
Environmental policy electives ³		6	Environmental policy elective ³		3
History elective ⁴		<u>3</u>	History elective ⁴		3
		18	Natural resources elective ⁵		<u>3</u>
					<u>16</u>

SENIOR YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
WFSC 301 Wildlife and the Changing Environment	(3-0)	3	RENr 470 Environmental Impact Assess.	(2-2)	
Environmental policy electives ³		6	or		
Natural resources electives ⁵		6	FRSC 461 GIS for Resources Mgmt.	(3-0)	
Professional experience elective ⁶		3	or		
		<u>3</u>	RENr 405 GIS for Envrn. Problem Solv.	(2-2)	3
		18	Environmental policy electives ³		6
			Free electives		<u>7</u>
					16

- NOTES: 1. Visual and performing arts elective to be selected from the University Core Curriculum. The University Core Curriculum also requires 6 hours of international and cultural diversity courses. This requirement may be met by courses satisfying another requirement in the curriculum if they also are on the approved list on international and cultural diversity courses (see page 20).
2. Communication electives to be selected from the University Core Curriculum.
3. To be selected in consultation with faculty academic advisor from AGEC 344, 350, 429; ECON 202, 203, 323, 412,435; FRSC 406; GEOG 401, 406; PHIL 314, 483; PLAN 365, 414; POLS 306, 329, 331, 340, 342, 347, 440, 461; SOCI 312, 328; WFSC 303.
4. Select from HIST 359, 360, 363, 364.
5. Select Life Sciences electives from AGRO, AGSM, BESC, ENTO, POSC, RENr, RLEM, RPTS, or WFSC in consultation with an advisor.
6. To be selected in consultation with an academic advisor.

* See page 21.

Curricula in Food Science and Technology

It is important that people have the knowledge to make the right food choices when eating at home and away from home. Graduates from the Department of Nutrition and Food Science enter careers where they: 1) help develop, distribute, and market foods that people want to eat; 2) find out how foods (and nutrients) work in our bodies to promote health; and 3) teach people to choose foods (and lifestyles) to help them be healthy. The curriculum in Food Science and Technology provides students with an exciting opportunity to study food chemistry, food analysis, food product development, food processing, food bacteriology, microbiology, nutrition, and management. Other courses offered include meats, poultry, Hazard Analysis and Critical Control Points, and fruits and vegetables.

Graduates in the field of food science qualify for management, technical, sales, food processing, quality assurance, engineering, product development, pharmaceuticals, marketing, and sensory evaluation careers. Beyond career opportunities, there are also immense opportunities for internships, scholarships, and study abroad. The Bachelor Science in Food Science and Technology offers two options that allow students to take courses in their area of interest, science or industry.

University Core Curriculum¹

Courses	(Th-Pr)	Cr
CHEM 101 and 111 Fundamentals of Chemistry I and Lab.....		4
CHEM 102 and 112 Fundamentals of Chemistry II and Lab.....		4
ENGL 104 Composition	(3-0)	3
MATH 141 or PHIL 240.....	(3-0)	3
MATH 142 or MATH 131	(3-0)	3
POLS 206 American Natl Govt.....	(3-0)	3
POLS 207 State and Local Govt.....	(3-0)	3
History Elective.....		6
Humanities Elective ²		3
Visual and performing arts elective ³		3
International and cultural diversity electives ^{2,3}		(6)
KINE 198 Health and Fitness	(0-2)	1
KINE 199 (Must be taken S/U).....	(0-2)	1
	Total Core Curriculum	37

Departmental Core Curriculum

Courses	(Th-Pr)	Cr
ACCT 209 Survey of Accounting Principles or ACCT 229 Introductory Accounting	(3-0)	3
AGEC 105, ECON 202 or 203.....		3
AGLS 101 Modern Ag. Sys.....	(1-0)	1
ENGL 210 or 301 or COMM 203.....		3
FSTC 201 Food Science	(3-0)	3
FSTC 311 Food Processing.....	(2-3)	3
FSTC 312 Food Chemistry.....	(2-0)	3
FSTC 313 Food Chemistry Lab.....	(0-3)	1
FSTC 314 Food Analysis.....	(1-4)	3
FSTC 315 Food Process Engineering.....	(2-3)	3
FSTC 326 Food Bacteriology	(3-0)	3
FSTC 327 Food Bacteriology Lab.....	(0-3)	1
FSTC 401 Food Prod. Develop.....	(2-3)	3
FSTC 481 Seminar	(1-0)	1
MGMT 309 Survey of Management or MGMT 363 The Management Process	(3-0)	3
NUTR 202 Fundamentals of Human Nutrition	(3-0)	3
PHYS 201 College Physics	(3-3)	4
STAT 302 Statistics	(3-0)	3
	Total Department Curriculum	47

Food Science Option

The science option utilizes biology, chemistry, engineering, microbiology, biochemistry, toxicology and physics to study the nature of foods, the causes of their deterioration, and the principles of food processing. Students in this option are prepared to enter graduate and professional schools. Career opportunities include research, food product development, and quality assurance.

Food Science Option Emphasis Curriculum

Courses	(Th-Pr)	Cr
BIOL 111 Intro. Biology	(3-3)	4
CHEM 227 Organic Chemistry I.....	(3-0)	3
CHEM 237 Organic Chemistry I Lab	(0-3)	1
CHEM 228 Organic Chemistry II	(3-0)	3
CHEM 238 Organic Chemistry II Lab.....	(0-3)	1
CHEM 316 Quantitative Analysis	(2-0)	2
CHEM 318 Quantitative Analysis Lab.....	(0-3)	1
BICH elective (any 100-489).....		3
Food science electives ⁴		6
General electives.....		12
Total Hours For Food Science Option		120

Industry Option

The Industry Option emphasizes management and food processing. Students in this option are prepared for production management, sales, public relations, quality assurance, and leadership positions in the food industry. Food Science uses the core sciences of biology, chemistry, nutrition, and physics to keep American food supply safe, nutritious, and tasty.

Industry Option Emphasis Curriculum

Courses	(Th-Pr)	Cr
AGEC 314 Marketing Ag. Productions	(3-0)	3
BICH 303 or 410.....	(3-0)	3
CHEM 222 Elements of Organic Chemistry	(3-0)	3
CHEM 242 Elements of Org. Chem. Lab.....	(0-3)	1
MGMT 212, 372, or 373.....	(3-0)	3
VIBS 404 Food Toxicology.....	(3-0)	3
Biology elective		4
Finance elective	(3-0)	3
Food science electives ⁴		6
General electives.....		7
Total Hours For Industry Option		120

- NOTES: 1. All students are required to take two writing intensive W courses within their major. Please see Academic Advisor for approved courses.
2. To be selected from the University Core Curriculum. See page15. Please see Academic Advisor for assistance.
3. The University Core Curriculum includes a requirement for 6 hours of international and cultural diversity courses. Refer to University Core Curriculum, item 6 for a list of acceptable courses. A course satisfying another Core category, a college/department requirement, or as a free elective can be used to satisfy these requirements. These 6 hours are not included in the 120 hours required to receive a Bachelor of Science in Food Science and Technology.
4. To be selected from Upper Level Food Science and Technology courses. Please see Academic Advisor for approved course.

Curricula in Forensic and Investigative Sciences

Bachelor of Science

Forensic science is a growing area of interest for students seeking to gain entry into careers that deal with the collection, preservation, processing and use of evidentiary information to solve problems. A life sciences-based education, which develops skills in problem solving and critical thinking, is essential for career opportunities in this field. Forensic and investigative scientists rely upon state-of-the-art scientific discoveries and technologies as tools to seek answers to critical questions in a variety of settings. Molecular, organismal, environmental, and ecological sources of information are often analyzed and interpreted in industrial, regulatory, legal, medical and associated professions. Graduates will be competitive for employment opportunities in quality assurance laboratories, homeland security and investigative services at local, state and national levels. Graduates will also be well prepared for opportunities to enter post-graduate studies or professional schools including medicine, law, and veterinary medicine.

Interactions with and among plants, animals and microbes occur regularly. These interactions impact public and environmental health and require life science-based forensic and investigative science to improve the quality of life. Homeland security, criminal investigation, environmental quality, agricultural and public health offer careers for students with forensic and investigative skills. Students can also pursue avenues to forensic careers through degree programs in specialty areas such as chemistry, anthropology, physics, computer science and business.

Forensic and investigative sciences also operate at the crossroads of science and the legal profession, and provide opportunities for students to consider pre-law preparation. There are growing demands for attorneys with knowledge and understanding of science and research to address legal issues and cases where the interpretation of science and/or scientific data and analyses are pivotal. Law schools often seek candidates with diverse backgrounds and interests, and they look closely at curricula that stress analytical and problem-solving skills, critical reading abilities, writing skills, oral communication and listening abilities, general research skills, and task organization and management skills. The Forensic and Investigative Sciences program provides students with opportunities to build these essential skills and knowledge areas through a combination of required and elective courses.

University Core Curriculum Requirements (35 hrs)

Courses	(Th-Pr)	Cr
ENGL 104 Composition & Rhetoric	(3-0)	3
Communication*		3
Humanities*		3
International and Cultural Diversity*		6
Social and Behavioral Sciences*		3
U.S. History & Political Science (6 hrs HIST & 6 hrs POLS)*		12
Visual and Performing Arts*		3
KINE 198 Health and Fitness	(0-2)	1
KINE 199 Physical Activity (S/U).....	(0-2)	1

*To be selected from University Core Curriculum in the Undergraduate Catalog.

Forensic and Investigative Sciences Core Requirements (21 hrs)

Courses	(Th-Pr)	Cr
FIVS 205 Introduction to Forensic & Investigative Sciences	(3-0)	3
FIVS 316 Biotechnology & Forensics.....	(3-0)	3
FIVS 415 Practice & Principles of Science & Law	(3-0)	3
FIVS 431 The Science of Forensic Entomology.....	(3-0)	3
FIVS 432 Applied Forensic Entomology.....	(3-0)	1
FIVS 435 Case Studies in Problem Solving	(3-0)	3
FIVS 481 Seminar	(1-0)	1
FIVS 482 Occupational & Professional Development	(2-0)	2
FIVS 484 Internship or FIVS 491 Research		2

Students will choose one of two emphasis areas: Science or Pre-Law

Science Emphasis Area Requirements:**Natural Science Core Requirements – Science Emphasis Area (44–46 hrs)**

Courses	(Th-Pr)	Cr
BIOL 111/112 Introductory Biology I & II		8
CHEM 101/111 Fundamentals of Chemistry I		4
CHEM 102/112 Fundamentals of Chemistry II.....		4
CHEM 227 and 237 Organic Chemistry I		4
CHEM 228 and 238 Organic Chemistry II.....		4
CHEM 315 Quantitative Analysis		3
MATH 141 Business Mathematics I or MATH 171 Analytic Geometry & Calculus		3-4
MATH 142 Business Mathematics II or MATH 131 Mathematical Concepts – Calculus or MATH 172 Calculus		3-4
PHYS 201 and 202 College Physics.....		8
STAT 302 Statistical Methods	(3-0)	3

Life Science Core Requirements – Science Emphasis Area (12 hrs)

Courses	(Th-Pr)	Cr
AGLS 101 Modern Ag. Systems	(1-0)	1
BICH 410/411 Comprehensive Biochemistry I and II		6
BICH 412 Biochemistry Laboratory I	(0-3)	1
GENE 301 Comprehensive Genetics.....	(3-3)	4

Directed Electives – Science Emphasis Area
(Select 6-8 hrs from the following courses)

Courses	(Th-Pr)	Cr
AGRO 301 Soil Science	(3-2)	4
ANTH 225/BIOL 225 Physical Anthropology.....		4
ANTH 425 Human Osteology.....	(2-3)	3
ANTH 427 Human Variation	(3-0)	3
BIOL 213 Molecular Cell Biology.....	(3-0)	3
BIOL 301 Taxonomy of Flowering Plants.....	(3-3)	4
BIOL 319 Integrated Human Anatomy and Physiology I.....	(3-3)	4
BIOL 320 Integrated Human Anatomy and Physiology II	(3-3)	4
BIOL 351 Fundamentals of Microbiology.....	(3-4)	4
BIOL 413 Cell Biology	(3-0)	3
BIOL 430 Biological Imaging.....	(3-3)	4
BIOL 454 Immunology	(3-0)	3
BIOL 460 Microbial Biotechnology	(3-0)	3
CHEM 318 Quantitative Analysis Laboratory.....	(0-3)	1
CHEM 320 Instrumental Analysis Laboratory.....	(0-6)	2
ENTO 423 Medical Entomology	(2-3)	3
ENTO 428 Insect Biotechnology.....	(3-0)	3
ENTO 429 Insect Biotechnology Laboratory	(0-3)	1
FSTC/DASC 326 Food Bacteriology	(3-0)	3
GENE 412 Population and Ecological Genetics.....	(3-0)	3
GENE 420 Bioethics	(3-0)	3
GENE 450 Recombinant DNA & Biotechnology.....	(3-0)	3
PHYS 221 Optics and Thermal Physics.....	(3-0)	3
SOCI 304 Criminology	(3-0)	3
VIBS 305 Biomedical Anatomy	(2-4)	4
VTPB 405 Biomedical Microbiology	(3-5)	5
VTPP 425 Pharmacology	(3-0)	3
VTPP 429 Introduction to Toxicology.....	(3-0)	3
VTPP 430 Laboratory in Toxicology.....	(0-3)	1

Pre-Law Emphasis Area Requirements:**Natural Science Core Requirements – Pre-Law Emphasis Area (36 hrs)**

Courses	(Th-Pr)	Cr
BIOL 111/112 Introductory Biology I & II		8
CHEM 101/111 Fundamentals of Chemistry I		4
CHEM 102/112 Fundamentals of Chemistry II.....		4
CHEM 222 Elements of Organic & Biological Chem	(3-0)	3
MATH 141 Business Mathematics I.....	(3-0)	3
MATH 142 Business Mathematics II or PHIL 240 Introduction to Logic or MATH 131 Mathematical Concepts – Calculus, or MATH 166 Topics in Contemporary Mathematics II		3
PHYS 201/202 College Physics.....		8
STAT 303 Statistical Methods	(3-0)	3

Life Science Core Requirements – Pre-Law Emphasis Area (7 hrs)

Courses	(Th-Pr)	Cr
AGLS 101 Modern Ag. Systems	(1-0)	1
BICH 303 Elements of Biological Chemistry	(3-0)	3
GENE 310 Principles of Heredity.....	(3-0)	3



Directed Electives – Pre-Law Emphasis Area (21 hrs)

Choose one course (minimum 3 hours) from each category below. The remaining 11 hrs of directed electives may come from any category.

Category 1 (Select minimum of 3 hrs from):

Courses	(Th-Pr)	Cr
AGEC 105 Introduction to Agricultural Economics.....	(3-0)	3
AGEC 315 Food and Agricultural Sales.....	(3-0)	3
AGEC 344 Food and Agricultural Law.....	(3-0)	3
AGEC 350 Environ. & Natural Resource Economics.....	(3-0)	3
AGEC 429 Agricultural Policy.....	(3-0)	3
ECON 202 Principles of Economics.....	(3-0)	3
ECON 322 Applied Microeconomic Theory.....	(3-0)	3
ECON 323 Microeconomic Theory.....	(3-0)	3
ECON 420 Law and Economics.....	(3-0)	3
FRSC 406 Forest Policy.....	(3-0)	3
MGMT 209 Business, Government and Society.....	(3-0)	3
MGMT 212 Business Law.....	(3-0)	3
POLS 351 Law and Legislation.....	(3-0)	3
POLS 356 Law, Politics, and Policy ³	(3-0)	3
RPTS 420 Natural Resource Law.....	(3-0)	3
WFSC 303 Fish and Wildlife Laws and Administration.....	(3-0)	3

Category 2 (Select minimum of 3 hrs from):

ALED 340 Professional Leadership Development.....	(3-0)	3
COMM 203 Public Speaking.....	(3-0)	3
COMM 243 Argumentation and Debate.....	(3-0)	3
COMM 305 Theories of Communication.....	(3-0)	3
COMM 325 Persuasion.....	(3-0)	3
COMM 443 Communication and Conflict.....	(3-0)	3
SOCI 304 Criminology.....	(3-0)	3

Category 3 (Select minimum of 3 hours from):

ALED 440 Principles of Technological Change.....	(3-0)	3
GENE 420 Bioethics.....	(3-0)	3
HIST 447 Constitutional History of the U.S. to 1901.....	(3-0)	3
PHIL 111 Contemporary Moral Issues.....	(3-0)	3
PHIL 314 Environmental Ethics.....	(3-0)	3
PHIL 480 Medical Ethics.....	(3-0)	3
PHIL 483 Professional Ethics.....	(3-0)	3
POLS 310 Legal Research.....	(2-0)	2
RENH 470 Environmental Impact Assessment.....	(3-0)	3
SOCI 445 Sociology of Law.....	(3-0)	3

Curricula in Forestry

The Department of Ecosystem Science and Management provides one of the most advanced educational opportunities available for developing leaders in the management, conservation and restoration of the world's diverse forests. Students seeking to study forestry in this department are interested in solving problems related to protecting forest biodiversity, providing wood, water, recreation and wildlife for a growing society, and contributing to the advancement of knowledge about forests. Resolving today's forest management issues requires a broad education in the biological, physical and social sciences, a solid understanding of the methods used to integrate information from many fields and to solve problems, and an in-depth knowledge of the sophisticated tools and techniques that are an essential part of modern forestry. Curricula in the Department of Ecosystem Science and Management incorporate these ideas so that motivated and capable students can become competent forest and resource management professionals and scientists.

Forests cover one-third of the land area of the United States. The products and services derived from forests, and the scenic beauty they provide, have contributed to the well-being of the American people since the founding of this country. These benefits range from lumber and paper to recreation and biological diversity. Forests also are renewable. Under proper stewardship, they can yield products and biodiversity indefinitely. Proper management of forests, which is the responsibility of the professional forester, results in healthy, productive forests that are capable of serving human needs and providing a quality environment in rural or urban settings.

The primary objective of the Department of Ecosystem Science and Management is to educate students in the scientific management of forest resources. Students select a course of study best suited to their educational and career goals. Students also receive help from faculty advisors in their areas of interest. The total number of credit hours required for a degree in each option is 131. The Department offers two options:

Urban Forestry. For students interested in the management of trees and forests in an urban environment. The curriculum provides an understanding of urban landscape ecosystems and issues related to the boundary between cities and wildlands. In addition to forestry and other sciences, the curriculum includes arboriculture, human ecology and landscape design.

Forest Resource Management. For students interested in the management of forest resources. The curriculum uses principles of scientific stewardship to prepare leaders in forest management and forest research. In addition, undergraduate students may choose the Individually Designed Program (IDP) emphasis to tailor their curriculum within this option to focus on a specific area of forestry. Such areas include spatial sciences, international forestry, forest industries, forest products, forest ecology, and the restoration and protection of native forests. Many other areas of specialization are possible. Students have great flexibility in tailoring their curricula to meet the challenges facing today's professional forester.

Core Courses

Required Courses	(Th-Pr)	Cr
AGEC 105 Introduction to Agricultural Economics		
or ECON 202 Principles of Economics.....	(3-0)	3
AGLS 201 Computer Applications in Agriculture.....	(2-2)	3
BIOL 111 Introductory Biology	(3-3)	4
BIOL 112 Introductory Biology	(3-3)	4
CHEM 101 and 111 Fundamentals of Chemistry I and Lab.....		4
CHEM 102 and 112 Fundamentals of Chemistry II and Lab.		4
or PHYS 201 College Physics		4
COMM 203 Public Speaking		
or COMM 243 Argumentation and Debate		
or COMM 325 Persuasion.....	(3-0)	3
ENGL 104 Composition and Rhetoric	(3-0)	3
ENGL 210 Scientific and Technical Writing		
or ENGL 301 Technical Writing	(3-0)	3
MATH 141 Business Mathematics I.....	(3-0)	3
MATH 142 Business Mathematics II.....	(3-0)	3
POLS 206 American National Government.....	(3-0)	3
POLS 207 State and Local Government	(3-0)	3
RENR 205 Fundamentals of Ecology	(3-0)	3
RENR 215 Fundamentals of Ecology Lab.	(0-3)	1
STAT 302 Statistical Methods	(3-0)	3
American history electives ¹		6
Humanities elective ¹		3
Visual and performing arts elective ¹		3
* KINE 198 Health and Fitness Activity.....	(0-2)	1
* KINE 199 Required Physical Activity.....	(0-2)	1
		64

Basic Forest Resource Courses

Required Courses	(Th-Pr)	Cr
AGRO 301 Soil Science	(3-2)	4
FRSC 203 Dendrology	(2-2)	3
FRSC 304 Forest Ecology	(3-0)	3
FRSC 305 Silviculture.....	(3-3)	4
FRSC 311 Wood Properties and Utilization.....	(2-2)	3
FRSC 398 Interpretation of Aerial Photographs		
or FRSC 461 Geographic Information Systems for Resource Management		3
FRSC 406 Forest Policy.....	(3-0)	3
Business elective ²		3
		26

Forest Resource Management Option

Required Courses ¹	(Th-Pr)	Cr
FRSC 300 Forest Practices.....	(5-0)	5
FRSC 306 Forest Measurements	(3-3)	4
FRSC 307 Forest Protection.....	(3-3)	4
FRSC 308 Tree Structure and Function	(0-3)	1
FRSC 314 Forest Economics and Valuation	(4-0)	4
FRSC 404 Forest Management	(3-0)	3
FRSC 405 Integrated Forest Resource Analysis and Planning.....	(3-3)	4
FRSC 409 Manufacturing and Applications of Wood Products.....	(3-0)	3
FRSC 414 Modeling Forest Resources.....	(3-0)	3
Multiple use elective ⁴		3
Free electives		7
		41

NOTE: 1. Students approved for individually designed program emphasis may substitute for the courses required for the Forest Resource Management Option.

Urban Forestry Option

Required Courses	(Th-Pr)	Cr
AGRO 302 Recreational Turf.....	(3-0)	3
FRSC 307 Forest Protection.....	(3-3)	4
FRSC 420 Arboriculture	(2-2)	3
HORT 206 Woody Ornamental Plants.....	(2-2)	3
HORT 308 Landscape Plant Materials.....	(2-2)	3
HORT 425 Landscape Maintenance and Construction.....	(2-3)	3
MEPS 313 Introduction to Plant Physiology	(3-0)	3
RENH 444 Remote Sensing in Renewable Natural Resources.....	(2-3)	3
Directed technical electives ³		7
Free electives		9
		41

NOTES: 1. To be selected from the University Core Curriculum. The University Core Curriculum includes a requirement for 6 hours of international and cultural diversity courses. Refer to page 20 for a list of acceptable courses. A course satisfying another Core category, a college/department requirement or used as a free elective can be used to satisfy these requirements. See academic advisor.

2. To be selected from an approved list in consultation with the student's advisor.

3. Directed technical electives are to be used to develop an area of specialization and must be chosen from an approved list in consultation with the student's advisor.

4. Multiple use electives must be chosen from an approved list in consultation with the student's advisor.

* See page 21.

Curriculum in Genetics

Curriculum in Genetics is administered by the Department of Biochemistry and Biophysics. Genetics is one of the most exciting, rapidly expanding areas in the life sciences. More than an independent discipline, it has become the basis for understanding many aspects of medical and agricultural systems, animal and plant diseases, and even animal behavior. Recent developments in molecular genetics have provided biotechnologies that will dramatically affect our lives from the improved diagnosis of human disease, to the production of viral-resistant crops, to environmental clean-up.

The undergraduate genetics curriculum allows the study of several different aspects of genetics, including population genetics, human genetics and genetic engineering. The genetics major is designed to develop the knowledge and skills necessary for advanced studies in all disciplines related to life sciences from medicine/veterinary medicine to genetic engineering. This basic science curriculum also has enough flexibility to allow a student to prepare for such diverse careers as forensics, medicine, business or law.

University Core Curriculum

Required Courses	(Th-Pr)	Cr
ENGL 104 Composition and Rhetoric	(3-0)	3
POLS 206 American National Government	(3-0)	3
POLS 207 State and Local Government	(3-0)	3
*HIST American history electives		6
Humanities elective ¹		3
International and cultural diversity electives ⁴		6
**KINE 198 Health and Fitness Activity	(0-2)	1
**KINE 199 Required Physical Activity	(0-2)	1
Social and behavioral sciences electives ³		3
Visual and performing arts elective ¹		3
		32

Departmental Curriculum Requirements

Required Courses	(Th-Pr)	Cr
BICH 414 Biochemical Techniques I		
or GENE 432 Lab. in Molecular Genetics.....	(0-6)	2
BICH 440 and 441 Biochemistry I and II.....	(3-0)	6
BIOL 111 and 112 Introductory Biology I and II	(3-3)	8
BIOL 351 Fundamentals of Microbiology		
or BIOL 413 Cell Biology and BIOL 423 Cell Biology Laboratory	(3-3)	4
CHEM 101 and 111 Fundamentals of Chemistry I and Lab.....		4
CHEM 102 and 112 Fundamentals of Chemistry II and Lab.....		4
CHEM 227 and 228 Organic Chemistry I and II.....	(3-0)	6
CHEM 237 and 238 Organic Chemistry Lab. I and II.....	(0-3)	2
CHEM 316, 317, 318 and 320 Quantitative Analysis I and II and Laboratories.....		7
ENGL 210 Scientific and Technical Writing or 301 Technical Writing.....	(3-0)	3
GENE 105 Perspectives in Genetics	(2-0)	2
GENE 285 and 491 (Research) ³		4
GENE 302 Principles of Genetics.....	(3-3)	4
GENE 412 Population and Ecological Genetics.....	(3-0)	3
GENE 431 Molecular Genetics.....	(3-0)	3
GENE 481 Genetics I Seminar.....	(1-0)	1
GENE 482 Genetics II Seminar	(1-0)	1
MATH 151 and 152 Engineering Mathematics I and II ³	(3-2)	8
PHYS 201 and 202 or PHYS 218 and 219 College Physics I and II.....	(3-3)	8
STAT 302 Statistical Methods	(3-0)	3
Genetics electives		6
Free electives ²		11
		100

NOTES: 1. To be selected from the University Core Curriculum.

2. Often used for a minor degree in chemistry, mathematics, modern languages, or philosophy, or for a double major in biochemistry. See advisor.

3. Only two hours of GENE 285 may apply towards the total of four.

4. Must have 6 hours selected from the approved list (see page 20). Courses may also be used to fulfill other University Core Curriculum requirements. See advisor.

5. Select from MATH 151 or 171 and MATH 152 or 172.

It is recommended that students attempt to receive credit by examination for certain courses. Contact Measurement and Research Services for details as early as possible.

* See page 27.

** See page 21.

Minor in Genetics: 15-16 credit hours required

Courses	(Th-Pr)	Cr
GENE 301 Comprehensive Genetics		
or GENE 302 Principles of Genetics		
or GENE 320 Biomedical Genetics.....		3-4
GENE 412 Population and Ecological Genetics.....		3
GENE 431 Molecular Genetics.....		3
GENE electives. (Select from courses below.)		
GENE 404 Plant Breeding		
GENE 405 Mammalian Genetics		
GENE 406 Bacterial Genetics		
GENE 420 Bioethics		
GENE 421 Advanced Human Genetics		
GENE 450 Recombinant DNA and Biotechnology		
GENE 452 Modifying Mammalian Genomes for Biomedical Research.....		6

Curricula in Horticultural Sciences

Horticulture encompasses a unique blend of art, science and technology. Horticultural crops include trees, shrubs, tropical plants, herbs, flowers, fruits, vegetables and nuts which are grown and utilized throughout the world. The Department of Horticultural Sciences offers three undergraduate degrees: a Bachelor of Science in Horticulture, a Bachelor of Science in Floriculture and a Bachelor of Arts in Horticulture. Our flexible degree plans enable students opportunities to develop programs tailored to their unique goals. The horticulture industry is the second largest agricultural industry in the state and offers graduates a multitude of diverse career opportunities.

Curriculum in Horticulture or Floriculture Bachelor of Science

These degrees are designed to provide students with the knowledge and skills needed for production, management and marketing of horticultural and floriculture crops. Each degree also offers students with strong interests in science and/or technology opportunities in research related fields including graduate studies. Career prospects range from producing specialty herb crops for upscale restaurants, to managing landscape businesses for growing communities, to marketing fruits and vegetables for healthier lifestyles. Many former students are self-employed, owning their own greenhouse, nursery or landscape operation. Others work in upper management of large corporations or travel the world developing future horticultural crops.

University Core Curriculum

Required Courses	(Th-Pr)	Cr
BIOL 101 Botany		
or BIOL 111 Introductory Biology I.....	(3-3)	4
CHEM 101 and 111 Fundamentals of Chemistry I and Lab.....		4
ENGL 104 Composition and Rhetoric.....	(3-0)	3
POLS 206 American National Government.....	(3-0)	3
POLS 207 State and Local Government.....	(3-0)	3
Communication elective ¹		3
History electives ¹		6
Humanities elective ¹		3
Mathematics electives ¹		6
Social and behavioral sciences elective ¹		3
Visual and performing arts elective ¹		3
* KINE 198 Health and Fitness Activity.....	(0-2)	1
* KINE 199 Required Physical Activity.....	(0-2)	1
		43

Horticultural Sciences Core Courses

Required Courses	(Th-Pr)	Cr
HORT 101 Concepts of Horticultural Science	(1-0)	1
HORT 201 General Horticulture	(3-0)	3
HORT 202 General Horticulture Laboratory	(0-3)	1
HORT 326 Plant Propagation	(2-3)	3
HORT 481 Seminar	(1-0)	1
		9

Support Courses

Required Courses	(Th-Pr)	Cr
AGRO 301 Soil Science	(3-2)	4
CHEM 222 Elements of Organic and Biological Chemistry	(3-0)	3
ENTO 201 General Entomology	(2-2)	3
GENE 310 Principles of Heredity or GENE 315 Genetics of Plants or GENE 320 Biomedical Genetics.....	(3-0)	3
MEPS 313 Introduction to Plant Physiology	(3-0)	3
PLPA 301 Plant Pathology	(3-0)	3
PLPA 303 Plant Pathology Laboratory.....	(0-2)	1
Directed horticulture electives		18
Directed electives ²		30
		68

total hours 120

NOTES: 1. To be selected from the University Core Curriculum.

2. Hours to be selected with approval by the student's academic advisor and the associate department head from 100–400-level courses in: ACCT, AGECE, AGRO, AGSM, ALEC, BESE, BICH, BIOL, CHEM, COSC, ECON, ENTO, FINC, FRSC, GENE, HLTH, HORT, INST, JOUR, LAND, MGMT, MKTG, NUTR, PHYS, PLPA, RENR, RLEM, RPTS, SPAN, STAT, WFSC. No more than 15 hours can be used from HORT.

* See page 21.

Curriculum in Horticulture Bachelor of Arts

This degree blends traditional horticulture with the benefits derived from the human association with plants. This degree offers students the option of pairing a horticulture degree with electives in social sciences, business, education, art and design. Creative opportunities range from planning gala events, to designing tranquil gardens, to constructing educational programs for school gardens to pursuing advanced degrees. This degree also branches out to include students interested in careers in horticultural therapy working with clients at major rehabilitation centers, hospitals, and geriatric facilities. Graduates may find themselves working in exciting environments including botanical gardens, international flower markets or upscale resorts.

University Core Curriculum

Required Courses	(Th-Pr)	Cr
BIOL 101 Botany or BIOL 111 Introductory Biology I.....	(3-3)	4
CHEM 101 and 111 Fundamentals of Chemistry I and Lab.....		4
COMM 203 Public Speaking.....	(3-0)	3
ENGL 104 Composition and Rhetoric.....	(3-0)	3
POLS 206 American National Government.....	(3-0)	3
POLS 207 State and Local Government.....	(3-0)	3
History electives ¹		6
Humanities elective ¹		3
Mathematics electives ¹		6
Social and behavioral sciences elective ¹		3
Visual and performing arts elective ¹		3
* KINE 198 Health and Fitness Activity.....	(0-2)	1
* KINE 199 Required Physical Activity.....	(0-2)	1
		43

Horticultural Sciences Core Courses

Required Courses	(Th-Pr)	Cr
HORT 101 Concepts of Horticultural Science.....	(1-0)	1
HORT 201 General Horticulture.....	(3-0)	3
HORT 202 General Horticulture Laboratory.....	(0-3)	1
HORT 326 Plant Propagation.....	(2-3)	3
HORT 481 Seminar.....	(1-0)	1
		9

Support Courses

Required Courses	(Th-Pr)	Cr
ENTO 201 General Entomology	(2-2)	3
ENGL 210 Scientific and Technical Writing or ENGL 301 Technical Writing	(3-0)	3
PLPA 301 Plant Pathology	(3-0)	3
PLPA 303 Plant Pathology Laboratory.....	(0-2)	1
Language.....		6
Directed horticulture electives		18
Directed electives ²		<u>34</u>
		<u>68</u>
total hours		120

NOTES: 1. To be selected from the University Core Curriculum.
 2. Hours to be selected with approval by the student's academic advisor and the associate department head from 100–400-level courses in: ACCT, AGCJ, AGEC, AGLS, AGRO, ALEC, ANTH, ARTS, BESC, COMM, ECON, ENDS, ENTO, EPSY, FINC, FRSC, GENE, GEOG, HLTH, HORT, INFO, INST, KINE, LAND, MEPS, MGMT, MKTG, NUTR, PSYC, RENR, RLEM, RPTS, SAED, SEFB, SOCI, SPAN, SPED, STAT, WFSC.
 No more than 15 hours can be used from HORT.

* See page 21.



Curriculum in Nutritional Sciences

It is important that people have the knowledge to make the right food choices when eating at home and away from home. Graduates from the Department of Nutrition and Food Science enter careers where they: 1) help develop, distribute, and market foods that people want to eat; 2) find out how foods (and nutrients) work in our bodies to promote health; and 3) teach people to choose foods (and lifestyles) to help them be healthy. The curriculum in Nutritional Sciences provides students with an opportunity to study and understand the manner in which nutrition affects human health, behavior and disease.

Nutritional Sciences includes courses which examine the clinical, psychological, biochemical, physiological, and cultural aspects of human nutrition. The University Core Curriculum and Departmental Core Curriculum provide students with a well rounded foundation in nutritional sciences. All students begin in a General Nutritional Sciences Track. Students who have successfully completed 12 hours of science courses and have at least a 2.5 overall GPA may apply to the Molecular and Experimental Nutrition or Dietetics tracks.

University Core Curriculum

Required Courses	(Th-Pr)	Cr
CHEM 101 and 111 Fundamentals of Chemistry I and Lab.....		4
CHEM 102 and 112 Fundamentals of Chemistry II and Lab.....		4
ENGL 104 Composition and Rhetoric	(3-0)	3
ENGL 210 Scientific and Technical Writing		
or ENGL 301 Technical Writing	(3-0)	3
* KINE 198 Health and Fitness Activity.....	(0-2)	1
* KINE 199 Required Physical Activity (Must be taken S/U)	(0-2)	1
MATH 131 Mathematical Concepts—Calculus		
or MATH 142 Business Mathematics II.....	(3-0)	3
PHIL 240 Introduction to Logic		
or MATH 141 Business Mathematics I	(3-0)	3
POLS 206 American National Government.....	(3-0)	3
POLS 207 State and Local Government	(3-0)	3
American history electives ²		6
International and cultural diversity electives ^{2,3}		(6)
Visual and performing arts elective ²		<u>3</u>
Total University Core Credits (without ICD)		37

* See page 21.

Departmental Core Curriculum¹

Required Courses	(Th-Pr)	Cr
AGLS 101 Modern Agricultural Systems	(1-0)	1
BICH 410 Comprehensive Biochemistry I.....	(3-0)	3
BICH 411 Comprehensive Biochemistry II.....	(3-0)	3
BICH 412 Comprehensive Biochemistry Lab. I.....	(0-3)	1
BIOL 111 Introductory Biology	(3-3)	4
BIOL 112 Introductory Biology	(3-3)	4
BIOL 319 Human Anatomy and Physiology I or VTPP 423 Physiology		4
BIOL 320 Human Anatomy and Physiology II or VIBS 305 Biomedical Anatomy.....		4
CHEM 227 Organic Chemistry I.....	(3-0)	3
CHEM 237 Organic Chemistry Lab. I.....	(0-3)	1
CHEM 228 Organic Chemistry II	(3-0)	3
GENE 301 Genetics	(3-3)	4
NUTR 203 Scientific Principles of Human Nutrition.....	(3-0)	3
NUTR 444 Nutrition Through Life.....	(3-0)	3
NUTR 470 Nutrition and Physiological Chemistry	(3-0)	3
NUTR 481 Seminar.....	(1-0)	1
STAT 302 Statistical Methods	(3-0)	3
Total Department Core Credits		47

General Nutrition Track

The General Nutrition Track provides a wide range of approved electives in biochemistry, nutrition, food science, microbiology, immunology, genetics, and psychology in order to customize a degree suited to research interests and career objectives. Through this program, students are prepared to work in community nutrition programs, sports nutrition, education, research, and as technical representatives in the nutrition and health industry. This is also an excellent program for students wanting to go to professional schools such as medicine, dentistry, physical therapy, physician assistant, or pharmacy.

General Nutrition Track Curriculum

Required Courses	(Th-Pr)	Cr
FSTC 326 and 327 or BIOL 351.....		4
Approved technical electives ⁵		9
Humanities elective ²		3
Nutrition electives ⁴		9
Social sciences elective ²		3
General electives.....		8
Total General Nutrition Hours		120



Molecular and Experimental Track

The Molecular and Experimental track provides a strong base in biological sciences, biochemistry, and natural sciences as they relate to human health and nutrition. This track is ideal for those students wishing to pursuing graduate work, teaching or research. Students must apply for this track. Please see an academic advisor for application procedures and GPR requirements.

Molecular and Experimental Nutrition Track Curriculum

Required Courses	(Th-Pr)	Cr
BICH 412 Biochemistry Laboratory I.....	(0-3)	1
CHEM 238 Organic Chemistry Lab II.....	(0-3)	1
FSTC 326 and 327 or BIOL 351.....		4
PHYS 201 College Physics.....	(3-3)	4
Approved technical electives ³ (if not already required).....		3
General electives.....		11
Humanities electives ²		3
Nutrition electives ⁴ (if not already required).....		6
Social sciences elective ²		3
Total Molecular and Experimental Hours		120

Dietetics Track

The Dietetics track has been accredited by the Commission on Accreditation for Dietetic Education (CADE). Graduates of this program will be certified to apply for competitive internships through the American Dietetic Association to become licensed as Registered Dietitians (R.D.). Registered Dietitians hold positions in government, health care, communications, and food industry where they are employed as nutrition educators, food service directors, researchers, and nutritionists. Students must apply for this track. Please see an academic advisor for application procedures and GPR requirements.

Dietetics Track Curriculum

Required Courses	(Th-Pr)	Cr
ANTH 205 Introduction to Anthropology	(3-0)	3
FSTC 326 Food Bacteriology	(3-0)	3
FSTC 327 Food Bacteriology Lab.....	(0-3)	1
MGMT 309 Survey of Management	(0-3)	3
NUTR 211 Scientific Principles of Nutrition	(2-3)	3
NUTR 304 Food Service Management	(3-4)	5
NUTR 404 Nutrition Assessment and Plan.	(2-2)	3
NUTR 405 Nutritional Treatment of Disease	(3-3)	4
NUTR 430 Community Nutrition (W course).....	(3-3)	3
PSYC 107 Introduction to Psychology	(3-0)	3
General Electives.....		5
Total Dietetics Hours		120

- NOTES: 1. All students are required to take two writing intensive (W) courses within their major. Please see Academic Advisor for approved courses.
2. To be selected from the University Core Curriculum. See page 15 in catalog. Please see Academic Advisor for assistance.
3. The University Core Curriculum includes a requirement for 6 hours of international and cultural diversity courses. Refer to University Core Curriculum, item 6 for a list of acceptable courses. A course satisfying another Core category, a college/department requirement, or as a free elective can be used to satisfy these requirements. These 6 hours are not included in the 120 hours required to receive a Bachelor of Science in Nutritional Sciences.
4. To be selected from upper division Nutrition courses. Please see Academic Advisor.
5. To be selected from:
- CHEM 238 Organic Chemistry Lab II. (0-3). Credit 1.
 - PHYS 201 College Physics. (3-3). Credit 4.
 - PHYS 202 College Physics. (3-3). Credit 4.
 - CHEM 315. Quantitative Analysis. (3-0). Credit 3.
 - CHEM 318. Quantitative Analysis Lab. (0-3). Credit 1.
 - BIOL 413. Cell Biology. (3-0). Credit 3.
 - BIOL 414 Developmental Biology. (3-0). Credit 3.
 - MICR 352 Diagnostic Bacteriology. (2-3). Credit 4.
 - MICR 360 Microbial Biotechnology. (3-0) Credit 3.
 - VTPP 425. Pharmacology. (3-0). Credit 3.
 - COMM 203 Speech Communications. (3-0). Credit 3.
 - COMM 315. Interpersonal Communication. (3-0). Credit 3.
 - COMM 325. Persuasion. (3-0). Credit 3.
 - PSYC 306. Abnormal Psychology. (3-0). Credit 3.
 - PSYC 307. Developmental Psychology. (3-0). Credit 3
 - BICH 431. Molecular Genetics. (3-0). Credit 3.

Curriculum in Plant and Environmental Soil Science

Curriculum in Plant and Environmental Soil Science is administered by the Department of Soil and Crop Sciences. Students following this curriculum develop and utilize basic knowledge of biology, chemistry, mathematics and physics to understand the Earth's most fundamental resources—plants, soils, water and air—and their interaction in different environmental settings.

Based on vocational objectives, students may select a career emphasis in either plant sciences or environmental soil science. Through selection of electives they can complement and strengthen knowledge and skills in areas of interest. The curriculum prepares students for graduate studies in specialized subject areas or to seek employment as plant scientists, environmental soil scientists and environmental scientists. Credit hours required: 132.

University Core Curriculum Requirements

Required Courses	(Th-Pr)	Cr
CHEM 101 and 111 Fundamentals of Chemistry I and Lab.....		4
COMM 203 Public Speaking.....	(3-0)	3
ENGL 104 Composition and Rhetoric.....	(3-0)	3
HIST 105 and 106 or American history elective ¹	(3-0)	6
MATH 151 Engineering Mathematics I.....	(3-2)	4
MATH 152 Engineering Mathematics II.....	(3-2)	4
POLS 206 American National Government.....	(3-0)	3
POLS 207 State and Local Government.....	(3-0)	3
Biology or botany ¹		4
Humanities elective ¹		3
Social and behavioral sciences electives ¹		3
Visual and performing arts elective ¹		3
* KINE 198 Health and Fitness Activity.....	(0-2)	1
* KINE 199 Required Physical Activity.....	(0-2)	1
		45

Departmental Requirements

Required Courses	(Th-Pr)	Cr
AGLS 101 Modern Agricultural Systems	(1-0)	1
AGRO 101 Introduction to Soil and Crop Science.....	(1-0)	1
AGRO 105 World Food and Fiber Crops	(2-2)	3
AGRO 301 Soil Science	(3-2)	4
BIOL 301 Taxonomy of Flowering Plants or BIOL 304 Comparative Biology of Plants	(3-3)	4
CHEM 102 and 112 Fundamentals of Chemistry II and Lab.		4
CHEM 227 Organic Chemistry	(3-0)	3
CHEM 237 Organic Chemistry Lab.....	(0-3)	1
CHEM 316 Quantitative Analysis	(2-0)	2
CHEM 318 Quantitative Analysis Lab.....	(0-3)	1
ENGL 301 Technical Writing	(3-0)	3
ENTO 201 General Entomology	(2-2)	3
GENE 301 Genetics	(3-3)	4
MEPS 313 Introduction to Plant Physiology	(3-0)	3
PHYS 201 College Physics or PHYS 218 Mechanics	(3-3)	4
PLPA 301 Plant Pathology	(3-0)	3
PLPA 303 Plant Pathology Lab.....	(0-2)	1
STAT 302 Statistical Methods	(3-0)	3
Electives ²		21
		69

Plant Science Career Emphasis

The Plant Science Emphasis is oriented toward basic sciences and is especially directed toward preparation for graduate studies in agronomy, plant breeding, plant genetics, crop physiology, environmental agronomy and plant pathology. Graduates also may choose careers as plant scientists, crop care specialists or consultants.

Required Courses	(Th-Pr)	Cr
BICH 410 Comp. Biochemistry	(3-0)	3
BICH 412 Comp. Biochemistry Lab.	(0-3)	1
Microbiology elective.....		3
Plant science electives ³		11
		18

Environmental Soil Science Emphasis

The Environmental Soil Science Emphasis is designed for students who plan to enter graduate study in environmental sciences, soil science or environmental agronomy. It also is appropriate for students who wish to be certified as professional soil scientists. Graduates may choose careers as environmental soil scientists, soil surveyors or land reclamation specialists.

Required Courses	(Th-Pr)	Cr
AGRO 310 Soil Morphology.....	(1-3)	2
AGRO 405 Soil Microbiology.....	(3-2)	4
AGRO 422 Soil Fertility and Fertilizers.....	(3-0)	3
AGRO 432 Soil Chemistry and Fertility Lab.....	(0-3)	1
GEOL 104 Physical Geology.....	(3-3)	4
PHYS 202 College Physics		
or PHYS 219 Electricity.....	(3-3)	<u>4</u>
		18

- NOTES: 1. To be selected from the University Core Curriculum. The University Core Curriculum includes a requirement for 6 hours of international and cultural diversity courses. Refer to page 20 for a list of acceptable courses. A course satisfying another Core category, a college/department requirement, or as a free elective can be used to satisfy these requirements. See academic advisor.
2. Suggested electives to be approved by departmental advisor including AGEC 344; AGLS 201; AGRO 308, 417, 422, 432, 445, 450, 452, 455; BECS 401, 402, 403; BICH 411, 413, 431, 432; CHEM 228, 238; CVEN 201, 202; FRSC 398, 461; GEOG 390, 431; GEOL 106, 410; METR 465; RENR 205, 215; RLEM 301; BIOL 107.
3. Plant science courses are to be approved by the departmental advisor. Suggested courses include: AGRO 303, 304, 306, 428; BIOL 453; HORT 404; MEPS 315, 411.

* See page 21.

Curriculum in Poultry Science

Growth of the poultry industry has created the need for scientific, technical and business knowledge in the various fields important to successful poultry production. In few fields of science is an understanding of the basic sciences, nutrition, genetics, physiology, diseases, biotechnology, processing and marketing more rewarding than in the modern, intensive methods of poultry and food production. Students are trained in the necessary background, analytical skills, problem solving and leadership for complex production units, hatcheries, integrated feed mills, processing plants and research laboratories. Rapid industry growth provides many career opportunities for graduates. Students are given two emphasis areas in which to specialize their education toward their selected career goals. The University Core Curriculum courses and the Poultry Science Core courses are required for both emphases. Students then complete a B.S. degree in either emphasis area by completing the respective emphasis area courses. All students are strongly encouraged to get early and frequent academic counseling which is readily available.

Students completing a B.S. degree in the industry emphasis find employment with the poultry and food industries in positions such as corporate management, quality assurance, sales or technical support in live production, processing or marketing. Students in this emphasis also get positions with pharmaceutical and equipment companies, with industry trade publications and in various university and public service positions.

Students completing a B.S. degree in the technical emphasis are prepared for advanced study in biochemistry, nutrition, physiology, molecular genetics, reproduction, processing technology, microbiology or environmental science and for eventual professional employment in research, teaching or public service. This curriculum can be easily tailored to meet the veterinary medicine preprofessional requirements.

University Core Curriculum (Both Emphases)

Required Courses	(Th-Pr)	Cr
AGEC 105 Introduction to Agricultural Economics.....	(3-0)	3
BIOL 111 Introductory Biology I.....	(3-3)	4
CHEM 101 and 111 Fundamentals of Chemistry I and Lab.....		4
COMM 203 Public Speaking		
or ENGL 301 Technical Writing ¹		
or ENGL 210 Scientific and Technical Writing ¹	(3-0)	3
ENGL 104 Composition and Rhetoric.....	(3-0)	3
MATH 141 Business Mathematics I.....	(3-0)	3
MATH 142 Business Mathematics II ¹		
or PHIL 240 Introduction to Logic ¹	(3-0)	3
POLS 206 American National Government.....	(3-0)	3
POLS 207 State and Local Government.....	(3-0)	3
History electives.....		6
Humanities elective.....		3
Social sciences elective.....		3
Visual and performing arts elective.....		3
* KINE 198 Health and Fitness Activity.....	(0-2)	1
* KINE 199 Required Physical Activity.....	(0-2)	1

Poultry Science Core Courses (Both Emphases)

Required Courses	(Th-Pr)	Cr
POSC 201 General Avian Science.....	(3-0)	3
POSC 302 Avian Science Laboratory.....	(0-2)	1
POSC 308 Avian Anatomy and Physiology.....	(2-3)	3
POSC 309 Poultry Meat Production.....	(3-2)	4
POSC 326 Commercial Egg Industry.....	(3-0)	3
POSC 381 Investigation of Professional Development in Poultry Science.....	(2-0)	2
POSC 406 Poultry Processing and Products.....	(3-2)	4
POSC 411 Poultry Nutrition.....	(3-0)	3
POSC 412 Poultry Feed Formulation.....	(1-0)	1
POSC 414 Avian Genetics and Breeding.....	(2-2)	3
POSC 427 Animal Waste Management.....	(3-0)	3
POSC 429 Advanced Food Bacteriology.....	(3-2)	4
POSC 481 Poultry Science Systems.....	(1-2)	2

Support Courses for Industry Emphasis

Required Courses	(Th-Pr)	Cr
ACCT 209 Survey of Accounting Principles		
or AGECE 314 Marketing Agricultural Products.....	(3-0)	3
AGLS 101 Modern Agricultural Systems and Renewable Natural Resources.....	(1-0)	1
CHEM 222 Elements of Organic and Biological Chemistry.....	(3-0)	3
FSTC 326 Food Bacteriology.....	(3-0)	3
GENE 310 Principles of Heredity.....	(3-0)	3
STAT 301 Introduction to Biometry.....	(3-0)	3
VTPB 334 Poultry Diseases.....	(3-2)	4
Business/management elective ³		3
Electives ²		15

Support Courses for Technical Emphasis

Required Courses	(Th-Pr)	Cr
BICH 303 Elements of Biological Chemistry	(3-0)	3
BIOL 351 Fundamentals of Microbiology ¹		
or VTPB 405 Principles and Application of Biomedical Microbiology ¹		4 or 5
CHEM 102 and 112 Fundamentals of Chemistry II and Lab.....		4
CHEM 227 Organic Chemistry I.....	(3-0)	3
CHEM 237 Organic Chemistry Laboratory.....	(0-3)	1
GENE 301 Genetics	(3-3)	4
STAT 301 Introduction to Biometry	(3-0)	3
VTPB 334 Poultry Diseases	(3-2)	4
Electives ²		<u>11 or 12</u>
	total hours	<u>120</u>

- NOTES: 1. Students should choose one of the two classes listed for each category (i.e. MATH 142 or PHIL 240).
2. To be utilized by students to enhance the science and/or business aspects of their undergraduate program. Students may also use elective hours to complete the 6 hour foreign language graduation requirement if they have not completed this in high school. The University Core Curriculum includes a requirement for 6 hours of international and cultural diversity courses. Refer to the University Core Curriculum section for a list of acceptable courses (see page 20). A course satisfying another Core category or a college/department requirement or used as a free elective can be used to satisfy these requirements.
3. To be selected from ACCT 210; AGECE 330, 340, 344, 448; ECON 202, 203; INFO 209; MGMT 105, 209, 211, 212, 309.

* See page 21.

Curricula in Rangeland Ecology and Management

Students majoring in Rangeland Ecology and Management are taught to integrate knowledge and technology in a systems approach to manage land for sustainable utilization of natural resources. Emphasis is placed on conservation and maintenance of biological diversity in wet to arid environments and our sustainable production, conservation and function of land. Rangelands comprise approximately 50% of the land area of the United States and the world. Natural resources on rangelands provide many products and values for society including: livestock grazing, habitat for game and non-game wildlife, water for urban and agricultural uses, recreational opportunities, minerals, oil and gas. The expansiveness and diversity of rangelands require that knowledge and technology be drawn from numerous disciplines. Students majoring in Rangeland Ecology and Management are taught to integrate knowledge and technology in a systems approach to manage land for sustainable utilization of natural resources. Emphasis is placed on conservation and maintenance of biological diversity in wet to arid environments.

Employment opportunities are varied. They include all aspects of natural resource management, including ranch management, environmental consulting, conservation and natural resource planning on private lands and with state and federal agencies. Students also find employment in agribusiness sales, marketing, agricultural finance real estate, consulting and reclamation. Students can also pursue professional careers in teaching agricultural science.

Two options in the Rangeland Ecology and Management curriculum provide the opportunity for specialization in a minor field.

Emphasis Areas

Ranch Management Option. Designed for students preparing for careers in ranch management and agribusiness. This option emphasizes management and utilization of rangeland for livestock and wildlife production. It provides excellent preparation for students desiring to obtain a Master of Agriculture degree in ranch management. Employment opportunities are available on private ranches, businesses, and industries supporting ranches and with state and federal agencies.

Rangeland Resources Option. Designed for students preparing for careers in the private, state and federal sectors in the area of natural resources conservation and management. It also provides good preparation for graduate study leading to positions in extension, teaching, research and consulting. It allows maximum flexibility to orient a degree program towards specific career interests. Students are encouraged to develop an emphasis area by selecting 24 hours of directed elective courses in related disciplines. Several suggested emphasis areas for the Rangeland Resources Option follow.

Ecology. Designed for students to explore and specialize in a diverse array of ecological topics. They study plants and animals and the ecological principles essential for effective conservation, management and restoration of the land and associated natural resources. They are prepared for careers in resource monitoring, management and conservation with state and federal agencies and the private sector.

Environmental Science. Designed for students preparing for professional careers in environmental management. The course work includes a basic foundation of ecological sciences, plant taxonomy and rangeland management with emphasis on plants, water and soils. Job opportunities are available in environmental consulting firms, public utility companies, municipalities and federal environmental agencies. The curriculum provides a good foundation for students planning to pursue graduate studies in watershed management, environmental sciences, pollution control or waste management.

Preveterinary Medicine. Prepares students for admission to the professional program in veterinary medicine. Students planning to work in large animal practice would benefit from studies in rangeland ecology and management. Students not entering the veterinary program could select another emphasis area.

Range/Soil Conservation. Designed to qualify students as range management specialists or soil conservationists with the federal government. The curriculum will provide students with competitive ratings with federal Civil Service for positions with the Natural Resources Conservation Service, Forest Service and Bureau of Land Management. Various electives and work experience may be used to increase the rating score. Job opportunities are also available in private and state organizations.

Teaching. For students majoring in rangeland ecology and management who wish to teach. Directed electives may be chosen so that, following this curriculum, the student is eligible to enter the induction year as a teacher of agricultural science under the Texas Education Agency Plan. Off-campus student teaching is required.

Watershed Resources. For students preparing for a professional career in watershed management. Graduates qualify for employment as range management specialists and soil conservationists or, with proper selection of electives, as hydrologists. Opportunities are also available in environmental consulting firms, public utility companies, land reclamation firms, municipalities, secondary school education and private land management.

University Core Curriculum

Required Course	(Th-Pr)	Cr
AGEC 105 Introduction to Agricultural Economics.....	(3-0)	3
BIOL 101 Botany.....	(3-3)	4
CHEM 101 and 111 Fundamentals of Chemistry I and Lab.....		4
COMM 203 Public Speaking.....	(3-0)	3
ENGL 104 Composition and Rhetoric.....	(3-0)	3
MATH 166 Topics in Contemporary Mathematics II (or MATH 141).....	(3-0)	3
MATH 131 Mathematical Concepts—Calculus (or MATH 142).....	(3-0)	3
POLS 206 and 207 ¹	(3-0)	6
American and Texas history electives ²		6
Humanities elective ²		3
Visual and performing arts elective ²		3
* KINE 198 Health and Fitness Activity.....	(0-2)	1
* KINE 199 Required Physical Activity.....	(0-2)	1
		43

Rangeland Ecology and Management Core Courses

Required Course	(Th-Pr)	Cr
RLEM 102 Introduction to Rangeland Systems.....	(1-0)	1
RLEM 301 Range and Forest Watershed Management.....	(2-2)	3
RLEM 303 Agrostology.....	(1-6)	3
RLEM 304 Rangeland Plant Taxonomy.....	(2-6)	4
RLEM 314 Principles of Rangeland Ecology and Management.....	(3-0)	3
RLEM 315 Vegetation Inventory and Analysis.....	(2-2)	3
RLEM 316 Rangeland Communities and Ecosystems.....	(2-2)	3
RLEM 317 Rangeland Vegetation Manipulation or RLEM 320 Landscape Restoration.....	(2-0)	2
RLEM 324 Application of Rangeland Management Principles.....	(0-2)	1
RLEM 401 Plant-Herbivore Dynamics.....	(2-2)	3
RLEM 415 Range Analysis and Management Planning ³ or RENR 410 Ecosystem Management.....		4
RLEM 481 Seminar.....	(1-0)	1
		31

Required Technical Support

Required Course	(Th-Pr)	Cr
AGRO 301 Soil Science	(3-2)	4
AGRO 310 Soil Morphology and Interpretations	(1-3)	2
MEPS 313 Introduction to Plant Physiology	(3-0)	3
REN205 Fundamentals of Ecology	(3-0)	3
REN215 Fundamentals of Ecology Laboratory	(0-3)	1
Geographic Information Systems Elective		
Choose from: RENR 405, FRSC 461, GEOG 390, LAND 461, or others approved by department head.....		3
		16
total hours		90 [†]

- NOTES: 1. Credit by examination may be used to substitute for 3 hours of POLS 206 or POLS 207.
2. To be selected from the University Core Curriculum. The University Core Curriculum includes a requirement for 6 hours of international and cultural diversity courses. Refer to page 20 for a list of acceptable courses. A course satisfying another Core category, a college/department requirement or used as a free elective can be used to satisfy these requirements. See academic advisor.
3. Students must take RLEM 415 for the Ranch Management Option and the Range/Soil Conservation emphasis in the Rangeland Resources Option.
4. A total of 120 semester hours will be required for a B.S. degree.

* See page 21.

Ranch Management Option¹

Required Course	(Th-Pr)	Cr
AGEC 325 Principles of Farm and Ranch Management	(2-2)	3
ANSC 107 General Animal Science.....	(3-0)	3
ANSC 108 General Animal Science.....	(0-2)	1
ANSC 303 Principles of Animal Nutrition or ANSC 320 Animal Nutrition and Feeding	(3-0)	3
Advanced Livestock Management elective		
Choose from: ANSC 302, 406, 414, or others approved by department head.....		3
Directed technical electives ²		12
Electives		5
		30

- NOTES: 1. A total of 120 semester hours will be required for a B.S. degree.
2. Technical electives are to be chosen in the areas of accounting, animal science, finance, management, marketing, forages, and wildlife.

Rangeland Resources Option¹

Required Course	(Th-Pr)	Cr
Directed technical electives ²		21
Electives		9
		30

- NOTES: 1. A total of 120 semester hours will be required for a B.S. degree.
2. Electives will be chosen in consultation with an academic advisor, and degree plans will be approved by the department head.

Curriculum in Recreation, Park and Tourism Sciences

The undergraduate curriculum leading to a Bachelor of Science degree with a major in Recreation, Park and Tourism Sciences provides students with an education in recreation, park and tourism sciences, with an emphasis on problem-solving skills, development of an international perspective, and the application of scientific principles to managerial problems. The first two years of studies build a foundation that spans a wide range of disciplines and bodies of knowledge in the arts and sciences, and provide the student with an introduction to the history and concepts of recreation, park and tourism sciences. The second two years prepare students with the knowledge and skills for both entry-level positions and for future professional growth in the field.

Through the curriculum, students develop the depth and breadth of knowledge needed to scientifically investigate and select among alternatives as well as the intellectual skills to organize and integrate their knowledge in new and more effective patterns. An education in recreation, park and tourism sciences prepares students to become professionals with the capacity to learn from life and throughout life.

The department maintains links with other resource-management programs within the University as well as exchange programs with other academic entities. Supporting programs at Texas A&M include the resource management programs in the Institute of Renewable Natural Resources (Ecosystem Science and Management, and Wildlife and Fisheries Sciences), the Turfgrass Management Program in Soil and Crop Sciences, and the Sports Management Specialization in the Department of Health and Kinesiology.

Building upon faculty expertise, students may select from the following options.

Park and Natural Resources Management. This option focuses on management of natural and cultural resources associated with park and amenity development. Land managers and related professionals operate within a variety of forums that require the integration of concepts in the environmental sciences, social and behavioral sciences, and policy and administrative decision-making. Necessary skills include computer applications for natural resource management, geographic information systems, impact assessment methodology, and heritage and natural resources planning techniques. Students with an option in this field look forward to careers with both public and private employers in the recreation, park and tourism fields, including state and federal agencies and private enterprises, non-profit organizations, youth camps, and environmental education programs.

Recreation and Park Administration. Management of recreation, park and leisure-service agencies requires expertise in problem-solving, decision-making, assessment of social and environmental impacts, personnel, public relations, volunteer management, financing and fund-raising, marketing of services, and needs assessments. Skills in working with people in the legal and political environment are necessary, as well as the ability to assess and work with other organizations for cooperative developments in recreation and tourism. Utilizing computer based decision-aids, students in this emphasis prepare for managerial careers with public recreation and park agencies, youth agencies, not-for-profit recreation agencies, and commercial recreation enterprises.

Tourism Resources Management. Tourism is one of the world's largest and most diverse industries. To help students prepare for tourism careers, this option area introduces issues pertaining to the management, development, and promotion of places and events as tourism attractions. Courses in tourism are designed to collectively build understanding about the links that exist between local places, host populations, and various public, private and special interest groups. Students also develop competencies in assessing economic, environmental, social and political impacts of tourism, as well as in tourism marketing. Students in this option can pursue careers in private sector enterprises, government agencies, convention and visitor bureaus, and other tourism-related service organizations.

University Core Curriculum

Courses	(Th-Pr)	Cr
U.S. History and Political Science (12 hours)		
HIST 105 History of the United States	(3-0)	3
HIST 106 History of the United States	(3-0)	3
POLS 206 American National Government.....	(3-0)	3
POLS 207 State and Local Government.....	(3-0)	3
Humanities (6 hours)		
Humanities elective ¹		3
Visual and performing arts elective ¹		3
Social and Behavioral Sciences (3 hours)		
Social science elective ¹		3
Kinesiology (2 hours)		
* KINE 198 Health and Fitness Activity.....	(0-2)	1
* KINE 199 Required Physical Activity.....	(0-2)	1
Communication (6 hours)		
COMM 203 Public Speaking.....	(3-0)	3
ENGL 104 Composition and Rhetoric	(3-0)	3
Mathematics (6 hours)¹		6
Natural Sciences (8 hours)		
RENR 205 Fundamentals of Ecology	(3-0)	3
RENR 215 Fundamentals of Ecology Lab	(0-3)	1
Biological elective ¹		4

Recreation, Park and Tourism Sciences

Courses	(Th-Pr)	Cr
RPTS 201 Foundations of Recreation and Parks	(3-0)	3
RPTS 202 Foundations of Tourism.....	(3-0)	3
RPTS 209 Park and Tourism Operations.....	(2-2)	3
RPTS 304 Administration of Recreation Resource Agencies ⁵ (W Course).....	(3-0)	3
RPTS 307 Methods of Environmental Interpretation	(3-0)	3
RPTS 311 Recreation and Tourism Programs	(3-0)	3
RPTS 336 Recreation Research and Analysis.....	(3-0)	3
RPTS 340 Recreation, Parks and Diverse Populations	(3-0)	3
RPTS 402 Park Planning and Design.....	(3-2)	4
RPTS 403 Funding and Allocating Recreation, Park and Tourism Resources ⁵ (W course).....	(3-2)	4
RPTS 481 Seminar	(1-0)	1
RPTS 484 Internship		6
 Required Technical Support Courses (10 hours)²		
AGLS 101 Modern Agricultural Systems		
or RPTS 101 Intro. to Rec. and Parks	(1-0)	1
ENGL 210 Scientific and Technical Writing		
or ENGL 301 Technical Writing	(3-0)	3
RENH 201 Computer Applications in Agriculture	(2-2)	3
RENH 375 Conservation of Natural Resources		
or RPTS 316 Rec. Mgmt. of Wildlands		
or RENH/RPTS 460 Development and Management of Protected Areas ³ (W course).....	(3-0)	3
 Directed electives (12 hours)²		
AGEC 105 or economics elective.....	(3-0)	3
Accounting/economics elective		3
Statistics.....		3
Social science elective ¹		3
 Electives (25 hours)		
Department electives ²		6
Emphasis/Special electives ²		9
Free electives		10
	total hours	129

- NOTES: 1. To be selected from the University Core Curriculum.
 2. Selections for directed, department and special elective courses require approval of the academic advisor.
 3. Designated writing-intensive course in department.

The University Core Curriculum includes a requirement for 6 hours of international and cultural diversity courses. Refer to page 20 for a list of acceptable courses. A course satisfying another Core category, a college/department requirement or used as a free elective can be used to satisfy these requirements.

* See page 21.

Curricula in Renewable Natural Resources

Professional Fields of Study and Department Heads

Ecosystem Science and Management	Steven G. Whisenant, Head
Recreation, Park and Tourism Sciences.....	Gary D. Ellis, Head
Wildlife and Fisheries Sciences.....	Thomas E. Lacher, Jr., Head

General Statement

The curricula in the three departments comprising the Institute of Renewable Natural Resources offer opportunities to obtain professional training in specific areas in management and conservation of natural resources. Students also may select a broader approach to natural resource education by pursuing the multi-department degree in Renewable Natural Resources. This program may be selected in any department in the Institute of Renewable Natural Resources.

Renewable Natural Resources

Renewable Natural Resources (RENR) is for students desiring a rigorous education in the study and management of sustainable ecosystems for a wide variety of resource values. The RENR program of study is comprised of a core of courses and two emphases. The goal of this core/emphasis structure is to provide students with an identity as a renewable natural resources specialist, while, at the same time, affording the flexibility for preparation for a variety for career tracks. One emphasis focuses on management and the other on policy. Technical electives guide the students in chosen educational and career directions. The underlying goal of the RENR degree is to integrate the scientific issues of renewable natural resources. Graduates of this program will be able to articulate these issues verbally and in writing in their chosen career. Therefore, the RENR degree emphasizes verbal presentations and major papers as well as field-oriented activities.

The RENR programs are designed to help students prepare for careers in public and private organizations associated with the planning and use of natural resources and the environment. Possible employment includes areas such as multi-use land management, environmental assessment, resource inventory, natural resource planning, law, policy analysis and land remediation.

An emphasis may be selected in policy or management. The RENR degree consists of 120 credit hours: 43 university core, 44 common to both emphasis areas and 24 designated by the emphasis area and 9 free elective hours.

RENr Management Emphasis

Management—Designed for an education in the scientific management of integrated natural resources. In today's world, it is important to have college graduates prepared to deal with integrated systems, accounting for all of the separate aspects of the system. The management emphasis seeks to prepare the student to integrate concerns related to land, water, air, plants and wildlife into the management process. Students select 24 credit hours of restricted electives from an approved list in consultation with their advisor. The remaining nine credit hours are free electives.

RENr Policy Emphasis

Environmental Policy and Planning—Designed for students desiring an education in natural resources policy. This emphasis incorporates knowledge from all renewable natural resources disciplines, which provides a foundation for decision-making related to the environment. Students will obtain an understanding of the behavior of institutions and organizations associated with natural resource management.

Professionals associated with natural resources need to consider legislative mandates, community interests, resource evaluation and competing uses, and conflict management techniques. This emphasis prepares the student for work in private industry, public and non-profit agencies, and graduate school. Students must select 24 hours of restricted electives from an approved list in consultation with their advisor. The remaining nine hours are free electives.

University Core Curriculum

Required Courses	(Th-Pr)	Cr
AGEC 105 Introduction to Agricultural Economics.....	(3-0)	3
BIOL 101 Botany.....	(3-3)	4
CHEM 101 and 111 Fundamentals of Chemistry I and Lab.....		4
COMM 203 Public Speaking.....	(3-0)	3
ENGL 104 Composition and Rhetoric.....	(3-0)	3
MATH 166 Topics in Contemporary Mathematics.....		
MATH 131 Mathematical Concepts—Calculus.....		
POLS 206 American National Government.....	(3-0)	3
POLS 207 State and Local Government.....	(3-0)	3
History electives.....		6
Humanities elective.....		3
Visual and performing arts elective.....		3
*KINE 198 Health and Fitness.....	(0-2)	1
*KINE 199 Required Physical Activity ¹	(0-2)	1
		43

NOTES: 1. Must be taken Satisfactory/Unsatisfactory (SU).

* See page 21.

Renewable Natural Resources Core

Courses	(Th-Pr)	Cr
AGRO 301 Soil Science	(3-2)	4
ENGL 210 Scientific and Technical Writing	(3-0)	3
RENH 205 Fundamentals of Ecology	(3-0)	3
RENH 215 Fundamentals of Ecology—Laboratory	(0-3)	1
RENH 375 Conservation of Natural Resources	(3-0)	3
RENH 410 Ecosystem Management	(3-3)	4
RLEM 301 Range and Forest Watershed Management	(2-2)	3
WFSC 304 Wildlife and Fisheries Conservation	(3-0)	3
BIOL 107 Zoology	(3-3)	4
 Introduction to Natural Resources		
One of the following:		
FRSC 101 Introduction to Forestry	(1-3)	2
RLEM 102 Introduction to Rangeland Systems	(1-0)	1
RPTS 101 Introduction to Recreation and Parks	(1-0)	1
WFSC 101 Introduction to Wildlife and Fisheries	(1-0)	1
 Plant or Animal Taxonomy		
One of the following:		
FRSC 203 Dendrology	(2-2)	3
RLEM 302 Rangeland Plants of North America	(2-2)	3
RLEM 303 Agrostology	(1-6)	3
RLEM 304 Rangeland Plant Taxonomy	(2-6)	4
WFSC 311 Ichthyology	(2-3)	3
WFSC 315 Herpetology	(2-2)	3
WFSC 335 Natural History of the Invertebrates	(3-3)	4
WFSC 401 General Mammalogy	(2-3)	3
WFSC 402 General Ornithology	(2-3)	3
 Vegetation Sampling		
One of the following:		
FRSC 306 Forest Measurements	(3-3)	4
RLEM 315 Vegetation Inventory and Analysis ¹	(2-2)	3
 Natural Resource Policy		
One of the following:		
AGEC 350 Environmental and Natural Resource Economics	(3-0)	3
FRSC 406 Forest Policy ¹	(3-0)	3
RENH 470 Environmental Impact Assessment	(3-0)	3
RPTS 420 Natural Resource Law	(3-0)	3
WFSC 303 Fish and Wildlife Laws and Administration	(3-0)	3
 Geographic Information Systems		
One of the following:		
FRSC 461 Geographic Information Systems for Resource Management	(2-2)	3
RENH 405 GIS for Environmental Problem Solving	(2-2)	3
AGSM 461 Geographic Information Systems for Resource Management	(2-2)	3
GEOG 390 Principles of Geographic Information Systems	(2-2)	3
LAND 461 Geographic Information System Application in Resource Management	(2-4)	3

Courses	(Th-Pr)	Cr
Work Experience		
One of the following:		
FRSC 484 Internship.....		3
RLEM 484 Internship.....		3
RPTS 484 Internship.....		3
WFSC 484 Internship.....		3
		<hr/> 44

NOTE: 1. Designated writing intensive course in major.

Required Emphasis Area Electives

Directed Technical Electives.....	24
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Free Electives

Free Electives.....	9
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Curriculum in Spatial Sciences

A degree in Spatial Sciences offers students the opportunity to obtain a career in a cutting-edge discipline at the intersection of environmental and spatial sciences. The spatial sciences combine multidisciplinary fields of scientific study with geospatial technologies including Geographic Information Systems (GIS), Global Positioning Systems (GPS), and Remote Sensing. A spatial sciences graduate will possess an advanced knowledge of these technologies, experience in interpretation of aerial photographs and processing of satellite images, as well as a broad understanding of computer applications and database management. Graduates are capable of working as environmental and natural resource managers and possess the necessary skills to map geographical features, patterns, and changes. Furthermore, these individuals will be able to lead and conduct modern environmental management activities.

This degree program is jointly administered by the College of Agriculture and Life Sciences (Department of Ecosystem Science and Management) and the College of Geosciences (Department of Geography). Through core and supporting coursework, students will learn to utilize the full potential of the spatial sciences in real-world problem solving. From real-time wildfire risk assessment to crime analysis, habitat mapping for endangered species, and evaluating environmental damage from natural disasters, the spatial sciences are an integral part of modern resource management.

Students in this degree program receive guidance from faculty advisors in their areas of interest, and meet regularly to discuss courses and career opportunities. The total number of credit hours required for graduation is 131.

Courses	(Th-Pr)	Cr
BIOL 101 Botany.....	(3-3)	4
CHEM 101 and 111 Fundamentals of Chemistry I and Lab.....		4
COMM 203 Public Speaking.....	(3-0)	3
ENGL 104 Composition and Rhetoric.....	(3-0)	3
MATH 141 Business Mathematics I.....	(3-0)	3
MATH 142 Business Mathematics II.....	(3-0)	3
POLS 206 American National Govt.	(3-0)	3
POLS 207 State and Local Govt.....	(3-0)	3
History electives ¹		6
Humanities elective ²		3
Social and behavioral science elective ³		3
Visual and performing arts elective ⁴		3
*KINE 198 Health and Fitness Activity.....	(0-2)	1
*KINE 199 Required Physical Activity.....	(0-2)	1
		43

Spatial Science Core Courses

AGEC 350 Environmental and Natural Resource Economics.....	(3-0)	3
AGSM 337 Technology for Environmental and Natural Resource Engineering.....	(3-0)	3
AGRO 301 Soil Science.....	(3-2)	4
BESC 403 Sampling and Environmental Monitoring.....	(2-3)	3
BIOL 112 Intro. to Biology II or		
GEOG 203 Planet Earth.....		4
CHEM 102 and 112 Fundamentals of Chemistry II and Lab.....		4
CPSC 110 Programming I.....	(3-2)	4
FRSC 398 Interpretation of Aerial Photos.....	(2-3)	3
FRSC 484 Internship ⁶		3
GEOL 352 GPS in the Geosciences.....	(1-3)	2
MGMT 309 Survey of Management.....	(3-0)	3
RENR 205 Fundamentals of Ecology.....	(3-0)	3
RENR 215 Fundamentals of Ecology Lab.....	(0-3)	1
RENR 444 Remote Sensing in RENR.....	(2-3)	3
RENR 470 Env. Impact Assessment.....	(3-0)	3
Communication elective ⁵		3
GIS elective ⁷		3
Natural resource electives ⁸		12
Policy and regulations elective ⁹		3
Spatial science electives ¹⁰		9
Statistics elective ¹¹		3
Free electives.....		9

NOTES: 1. History electives to be selected from the University Core Curriculum.

2. Humanities elective choose from GEOG 202, 301, 305, or 323.

3. Social and Behavioral Sciences elective choose from AGEC 105, ECON 202; GEOG 201, 304, 440.

4. Visual and performing arts elective to be chosen from the University Core Curriculum.

5. Communication elective choose from ENGL 210, 301; AGJR 404.

6. Internship to be approved by an academic advisor.

7. GIS elective choose from FRSC 461, GEOG 390, LAND 461, RENR 405.

8. Natural Resource electives choose from AGRO 310; FRSC 304; RENR 375, 410; RLEM 301; WFSC 428.

9. Policy and Regulations elective choose from FRSC 406, GEOG 330, MGMT 209, PHIL 314, PLAN 365, WFSC 303.

10. Spatial Science elective choose from AGSM 410; CPSC 206, 310; CVEN 201; ENDS 370, 375; FRSC 462; GEOG 361, 475; PLAN 365; RPTS 307; STAT 212.

11. Statistics elective choose from STAT 211 or 302.

Curricula in Wildlife and Fisheries Sciences

The Department of Wildlife and Fisheries Sciences uses the latest in the ecological and management disciplines to provide the most diverse and progressive education available in the conservation of the earth's biodiversity. Students in this department are interested in making contributions to solving problems associated with the extinction of species, wildlife recreational uses, food production from aquaculture, environmental education, and urban wildlife and fisheries recreational activities. The conservation and management of wildlife and fisheries resources require resolution of increasingly complex issues that extend far beyond the bounds of classical biology. Contemporary wildlife and fisheries professionals must be well-versed in the physical and life sciences, mathematics, and the humanities. Today's professionals must have a problem-solving orientation that accommodates animals and their habitats within a larger ecological and socio-economic system. In addition, modern students must be familiar with molecular genetics and the principles of conservation biology. Curricula in wildlife and fisheries sciences are designed to provide both the traditional and contemporary dimensions of academic instruction necessary to transform motivated and intellectually capable students into competent professionals.

Graduates are well equipped for post-baccalaureate study in many life science fields (graduate school programs and human and veterinary medicine) or for direct entry into professions such as wildlife management, fisheries management, environmental impact assessment, aquaculture, natural history museum education, zoological park collection management, public school teaching and urban wildlife management. Employers of recent graduates include state and federal resource agencies, scientific foundations, ranches, hunting and fishing clubs, fish farms, environmental consulting firms, museums and secondary schools.



Wildlife ecology, aquatic ecology, and vertebrate zoology curriculum options lead to the Bachelor of Science degree. At the end of the sophomore year, and after consultation with his or her advisor, each student will choose a course of study from among the options within the department's curricula. The chosen option is enhanced by a common departmental "core" of courses necessary for a sound education in the wildlife and fisheries conservation professions.

Students are encouraged to develop an emphasis area within their degree option. To build this emphasis area, students will choose directed electives, from related disciplines, in consultation with their academic advisor and faculty members.

Wildlife Ecology and Conservation Option

This option is designed for students interested in the research, management and conservation of wildlife and its ecosystems. This option provides considerable flexibility when designing a degree program and allows students to focus on both terrestrial and aquatic conservation management. Job opportunities are available with state and federal agencies; private land management individuals and companies; state, national and international organizations; environmental consulting firms; and as private consultants. Emphasis areas in this option include:

Wildlife Ecology Emphasis. The wildlife ecology emphasis is for students interested in research and management of terrestrial animals and ecosystems, including game, non-game, and endangered species. The ability to be certified is becoming increasingly important for employment. Courses taken meet course certification requirements of The Wildlife Society.

Wildlife and Fisheries Management Emphasis. This emphasis is for students interested in research and management of both aquatic and terrestrial habitats. Courses taken meet course certification requirements of both the American Fisheries Society and The Wildlife Society. The ability to be certified is becoming increasingly important for employment.

Conservation Biology Emphasis. This emphasis is for students interested in biodiversity and its conservation. This emphasis allows the student to focus on various aspects including urban and/or wetland conservation.

Animal Behavior Management Emphasis. This emphasis prepares students to manage behavioral interactions between humans and wildlife in a variety of settings. Understanding animal behavior is essential for a career in animal care positions, at nature centers, zoos, aquaria, captive breeding centers, rehabilitation centers, and protected natural areas on public or private lands. Possible careers include animal damage control, interpretive naturalist, or animal trainers.

Natural Resource Collections and Museums Emphasis. Humans have a fascination with the world around them and enjoy visitations to centers which bring them closer to their world and to their heritage. Such is the intent of museums, nature centers and zoological gardens. Students in this option are prepared for careers in natural history and science museums, botanical gardens, nature centers, zoological parks, and wild animal breeding institutions. Students will receive instruction in program development and presentation, curation and display of museum collections, and the administration of public science education facilities.

Aquatic Ecology and Conservation Option

This option is designed for both, students interested in the research and management of fish, other freshwater and marine organisms, and the ecosystems that sustain them as well as controlled production of organisms in aquatic systems. Careers are available in state and federal resource agencies; fisheries management companies; nongovernmental conservation organizations; environmental consulting firms; and private consultation. In addition careers may be available in supporting areas such as quality control, supply, marketing, distribution, finance, consultation as well as domestic and foreign resource development. Emphasis areas in this option include:

Fisheries Ecology Emphasis. This emphasis is for students interested in research and management of fish, other freshwater and marine organisms, and the ecosystems that sustain them. This emphasis meets American Fisheries Society requirements for certification as an Associate Fisheries Professional.

Aquaculture Emphasis. The Aquaculture emphasis is for students interested in the controlled production of organisms in aquatic systems. Courses in this option are structured to provide the scientific and technological basis of fish farming. This option meets requirements of the American Fisheries Society for certification as an Associate Fisheries Professional.

Vertebrate Zoology Option

This emphasis provides the rigorous training needed for careers in the various aspects of natural resources related to the fields of ichthyology, herpetology, mammalogy and ornithology, including behavior, ecology, evolution, genetics, molecular biology, physiology and systematics. It is a flexible program which permits the inclusion of courses specifically required by schools graduate programs as well as schools of dentistry, law, medicine and veterinary medicine. Emphasis areas in this option include:

Pre-professional Emphasis. This emphasis provides flexibility which permits the inclusion of courses specifically required by schools of dentistry, law, medicine and veterinary medicine.

Ecology and Evolutionary Biology Emphasis. The Ecology and Evolutionary Biology emphasis is for students interested in biological diversity and the ecological processes and population interactions that sustain it. Courses in this option are designed to provide a strong foundation in basic and applied organismal biology that will prepare students for graduate studies as well as careers within governmental and nongovernmental agencies and environmental firms dealing with biological conservation.

3+2 Fellows Program in Wildlife and Fisheries Sciences

This opportunity is designed as a comprehensive research oriented program that allows students to receive both a BS and MS in Wildlife and Fisheries Sciences in 5 years. Students are required to complete 121 hours of undergraduate course work and 32 hours of graduate course work as well as write and defend a thesis. Upon completion of the program students are conferred with a BS and MS degree.

Students participating in the 3+2 program are awarded \$5000 research grants to help fund their thesis projects. In addition, Students that are Honors eligible (3.5 GPA and 9 hours of honors coursework) are encouraged to apply to the University Undergraduate Research Fellows Program administered by the Office of Honors Programs and Academic Scholarships

This program provides an integrated undergraduate/graduate level experience in Wildlife and Fisheries Sciences that allows students to proceed on a fast-track toward their career goals.

Interested students must enter the program as Freshmen or Sophomores and must meet with an advisor regarding application procedures.

University Core Curriculum

Required Courses	(Th-Pr)	Cr
BIOL 111 Introductory Biology and Laboratory.....	(3-3)	4
BIOL 112 Introductory Biology and Laboratory.....	(3-3)	4
COMM 203 Public Speaking.....	(3-0)	3
ENGL 104 Composition and Rhetoric.....	(3-0)	3
MATH 131 Mathematical Concepts—Calculus or MATH 142 Business Mathematics II.....	(3-0)	3
PHIL 240 Introduction to Logic or MATH 141 Business Mathematics I.....	(3-0)	3
POLS 206 American National Government.....	(3-0)	3
POLS 207 State and Local Government.....	(3-0)	3
* KINE 198 Health and Fitness Activity.....	(0-2)	1
* KINE 199 Required Physical Activity.....	(0-2)	1
American and Texas history electives ^{1,2}		6
Humanities elective ^{1,2}		3
Visual and performing arts elective ^{1,2}		3
Social sciences elective ^{1,2}		3
		43

NOTES: 1. To be selected from the University Core Curriculum.

2. The University Core Curriculum includes a requirement for 6 hours of international and cultural diversity courses. Refer to page 20 for a list of acceptable courses. A course satisfying another Core category, a college/department requirement or used as a free elective can be used to satisfy these requirements.

* See page 21.

Wildlife and Fisheries Sciences Core Courses¹

Required Courses	(Th-Pr)	Cr
CHEM 101 and 111 Fundamentals of Chemistry I and Lab.....		4
CHEM 222 Elements of Organic and Biological Chemistry ²	(3-0)	3
CHEM 242 Elementary Organic Chemistry Laboratory ²	(0-3)	1
ENGL 210 Scientific and Technical Writing		
or ENGL 301 Technical Writing	(3-0)	3
GENE 301 Genetics	(3-3)	4
PHYS 201 College Physics	(3-3)	4
RENR 205 Fundamentals of Ecology	(3-0)	3
RENR 215 Fundamentals of Ecology—Laboratory	(0-3)	1
STAT 302 Statistical Methods	(3-0)	3
WFSC 101 Introduction to Wildlife and Fisheries	(1-0)	1
WFSC 304 Wildlife and Fisheries Conservation	(3-0)	3
WFSC 302 Natural History of the Vertebrates ³	(2-2)	3
WFSC 416 Adaptational Biology.....	(3-3)	4
or VTPP 423 Biomedical Physiology ³	(3-3)	
or BIOL 388 Principles of Animal Physiology ³	(3-3)	4
Field Experience ⁴		3
		40

- NOTES: 1. Students currently enrolled at Texas A&M who wish to transfer to a Wildlife and Fisheries Sciences major must have achieved a grade of C or higher in introductory biology and mathematics courses required in the University Core Curriculum (see above). Enrollment in Wildlife and Fisheries Sciences (WFSC) option courses will be restricted to students who have achieved a grade of C or higher in prerequisite courses.
2. Students in the Vertebrate Zoology option should take CHEM 227 (Organic Chemistry I) and 237 (Organic Chemistry Laboratory) in lieu of CHEM 222 and 242.
3. Students in the Vertebrate Zoology option should choose VTPP 423 Physiology.
4. Select from WFSC 300 (Field Studies), WFSC 484 (Internship), WFSC (Directed Studies), or WFSC 491 (Research).

Wildlife Ecology and Conservation Option¹

Required Courses	(Th-Pr)	Cr
Biodiversity electives ²		6
Policy elective ³		3
Earth science elective ⁴		4
Directed electives ⁵		29
		42

- NOTES: 1. A total of 125 Semester hours will be required for a B.S. Degree
2. Select two courses from WFSC 315 (Herpetology), WFSC 401 (Mammalogy), or WFSC 402 (Ornithology).
3. Select from WFSC 303 (Wildlife and Fisheries Laws and Administration), RENR 420 (Natural Resource Law), RENR 470 (Environmental Impact Assessment), or FRSC 406 (Forest Policy).
4. Choose from AGRO 301 (Soil Science), WFSC 414 (Limnology), GEOL 101 (Principles of Geology), or OCNG 251 (3 Credit hours, Oceanography)/OCNG 252 (1 credit hour, Oceanography Laboratory).
5. Directed electives to be chosen in areas related to wildlife ecology, wildlife and fisheries management, management, conservation, animal behavior, or natural resource collections and museums.

Aquatic Ecology and Conservation Option¹

Required Courses	(Th-Pr)	Cr
WFSC 311 Ichthyology.....	(2-3)	3
WFSC 414 Limnology	(3-3)	4
WFSC 417 Biology of Fishes	(3-3)	4
Human dimension elective ²		3
Directed electives ³		28
		42

- NOTES: 1. A total of 125 semester hours will be required for a B.S. Degree
2. Select from WFSC 303 (Wildlife and Fisheries Laws and Administration), RENR 420 (Natural Resource Law), RENR 470 (Environmental Impact Assessment), FRSC 302 (Fundamentals of Environmental Decision Making), MGMT 363 (The Management Process), PHIL 483 (Professional Ethics), POLS 356 (Politics, Law and Policy), or SOCI 328 (Environmental Sociology).
3. Directed electives to be chosen in areas fisheries, aquaculture and related topics.

Vertebrate Zoology Option¹

Required Courses	(Th-Pr)	Cr
PHYS 202 College Physics II.....	(3-3)	4
CHEM 102 and 112 Fundamentals of Chemistry II and Lab.		4
CHEM 228 Organic Chemistry II	(3-0)	3
CHEM 238 Organic Chemistry Laboratory	(0-3)	1
BICH 303 Elements of Biological Chemistry	(3-0)	3
Biodiversity Electives ²		6
Directed electives ³		21
		42

- NOTES: 1. A total of 125 Semester hours will be required for a B.S. Degree
2. Select two courses from WFSC 311 (Ichthyology), WFSC 315 (Herpetology), WFSC 401 (Mammalogy), or WFSC 402 (Ornithology).
3. Directed electives should be chosen in the area of Ecology and Evolutionary Biology or to meet prerequisite requirements for admission to professional schools.



TEXAS A&M
UNIVERSITY

A black and white photograph of a bronze statue of a man with a beard and mustache, wearing a suit and tie. The statue is positioned in the foreground, looking slightly to the left. In the background, there is a large, domed building, likely the Texas State Capitol, partially obscured by trees and foliage.

COLLEGE OF ARCHITECTURE

★ 2008–2009 UNDERGRADUATE CATALOG ★

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College of Architecture

Administrative Officers

Dean	J. Thomas Regan, B.Arch., Grad. Dip.
Executive Associate Dean	Charles Graham, B.Arch., M.A., Ph.D.
Associate Dean for Research and Director of Graduate Studies	Louis G. Tassinary, B.A., J.D., Ph.D.
Assistant Dean for Undergraduate Studies.....	Leslie H. Feigenbaum, B.S., M.S.

General Statement

The College of Architecture offers undergraduate and graduate professional programs to prepare individuals to enter the professions of architecture, landscape architecture, building construction, urban and regional planning and visualization. The planning, design and construction of the world's buildings, cities and landscapes involve a variety of professional skills. The faculty of architects, urban planners, landscape architects, engineers, constructors, lawyers, historians and artists, in collaboration with educators in the humanities and natural and social sciences, help students develop an understanding of the physical, social, economic and political forces that shape our environment.

Undergraduate degree programs are offered in landscape architecture, construction science, environmental design, and urban and regional sciences. Minors in art and architectural history; and global art, design and construction are offered through the Department of Architecture. A minor in urban and regional planning is offered through the Department of Landscape Architecture and Urban Planning. Master's degree programs are offered in architecture, landscape architecture, urban planning, land development, construction management and visualization sciences. Doctor of Philosophy degrees are offered in architecture and urban and regional science.

Each department works with communities and agencies in Texas solving problems associated with the built environment and exposing students to contemporary issues. In addition to such public service endeavors, faculty and students conduct research in planning and development, energy conservation, health facilities design and other areas of contemporary importance. The college is a charter member of the National Architecture Research Centers Consortium.

Because of the important role of computing in the disciplines housed within the College of Architecture, all entering students are required to possess a portable, network-ready personal computer capable of running software appropriate to their academic program. Financial aid is available to assist students in their computer purchases. No student will be denied admission to Texas A&M University based on an inability to purchase a computer. Additional information is available on the college Web site at archone.tamu.edu.

College of Architecture Enrollment Management Policy

Students who meet the entrance requirements for the College of Architecture enter with a lower-level classification in Construction Science (COSL), Environmental Design (ENDL), Landscape Architecture (LANL), or Urban and Regional Sciences (URSL). The lower level consists of University Core Curriculum requirements and introductory courses. Admission into the upper level, which consists of advanced work in the major field of study, will be based on the following criteria:

1. Students must have satisfactorily completed at least 54 hours of course work with a minimum GPR of 2.5 for those courses completed at Texas A&M University.
2. Students must have satisfactorily completed the following courses as part of the 54 hours of course work with a minimum of a 2.5 GPR for those completed at Texas A&M University.

Major Fields of Study		
Environmental Design		
<i>ARCH Studies</i>	<i>Visual Studies</i>	
CARC 481 ENDS 105, 106, 115, 116 ARCH 205, 206, 212, 249, 250 ENGL 104 MATH 141, 142 PHYS 201	VIST 105, 106, 205, 206 MATH 151, 152 VIST 201, 271 ARTS 212 ENDS 115 PHYS 201	
Construction Science	Landscape Architecture	Urban and Regional Studies
CHEM 101/111 COSC 153, 253, 254, 275 ENGL 104 ENGL 210 or COMM 203 MATH 141, 142 PHYS 201/211	ARCH 250 COSC 253 ENDS 101, 150 ENGL 104 LAND 200, 254, 255 LAND 240 or 340 MATH 141, 142 RENR 205, 215 Natural science elective	ENGL 104, 210 MATH 141, 142 POLS 206, 207 ENDS 150 or ARCH 345 PLAN 360, 365 URSC 325 STAT 201 RENR 205, 215, 375

3. **For Construction Science and Environmental Design Majors:**

Students must make a grade of C or better in every College of Architecture course (ARCH, ARTS, CARC, COSC, ENDS, LAND, LDEV, PLAN, VIST) used to satisfy degree requirements. Students must also make a grade of C or better in any course used as an equivalent substitution for College of Architecture courses that satisfy degree requirements.

For Landscape Architecture Majors:

Students must make a grade of C or better in all required courses in a degree program.

4. **For Environmental Design Majors:**

Students applying for the upper level must submit a portfolio that provides documentation of the applicant's design representation and creative problem solving abilities. Portfolios will be reviewed as evidence supporting design ability. Guidelines are outlined on the application form and in the college undergraduate advising office. Students will be admitted according to available space in the Architectural Studies and Visual Studies Options.

5. Students must apply for admission to the upper level through the department. The application is to be submitted the semester or summer session in which all of the above criteria will be met.

- March 1 for summer admittance (for Construction Science, Landscape Architecture, and Urban and Regional Sciences students)
- March 1 for summer and fall admittance (for Environmental Design students)
- June 15 for fall admittance (for Construction Science, Landscape Architecture, and Urban and Regional Sciences students)
- October 1 for spring admittance (for Construction Science and Landscape Architecture students)

Admission will be effective upon successful completion of in-progress courses. If all requirements are not met prior to the start of the following semester, admission will not be granted and registration in all upper-level course work in the College of Architecture canceled. Admission is not guaranteed. If there are more qualified applicants than there are spaces available, preference will be given to students based on their academic achievement.



Transfer Students

Transfer students, who meet the University entrance requirements and who desire to enter a major field of study in the College of Architecture, will be admitted based on available space and current College of Architecture entrance criteria. Following admission, all transfer students are placed on a 2.5 GPR probation for a minimum of 12 credit hours to substantiate competency in required lower-level courses. Transfer students will be admitted into the college with a lower-level classification and may apply for upper-level status after at least one semester at Texas A&M University.

Change of Major

Students currently enrolled in another major at Texas A&M University who desire to change their major field of study into the College of Architecture must fill out a Change of Curriculum application. Deadlines for applications are as follows:

- March 1 for summer admittance (for Construction Science, Environmental Design, Landscape Architecture, and Urban and Regional Sciences students)
- June 15 for fall admittance (for Construction Science, Landscape Architecture, and Urban and Regional Sciences students)
- October 1 for spring admittance (for Construction Science, Landscape Architecture, and Urban and Regional Sciences students)

Students will be notified of action on their applications within 30 days of the deadline date. **The college will admit the best-qualified applicants based on the number of spaces available in their program of choice.**

Semester Away

The College of Architecture requires all upper-level undergraduate students to spend one semester studying abroad or at another university, or in a professional internship. Specific information on these programs is available through each department, the Office of Student Services in the College of Architecture or the Texas A&M Study Abroad Office.

Curriculum in Construction Science

The construction industry is the largest industry in the nation with more than 7.7 million employees who annually produce more than 5 percent of the nation's Gross Domestic Product. Managing the construction process requires a broad understanding of the principles of construction science as well as leadership skills in motivating teams and integrating a wide range of tasks to produce a completed project.

The Construction Science Program, administered by the Department of Construction Science, prepares graduates for a career in construction or a construction-related industry. Courses taught by the Department include construction materials and methods; fundamental design courses in soils and foundations, mechanical and electrical systems and structures; project control systems and management; construction law, labor and contracts; and industry emphasis courses. In addition, related courses from other colleges are included to ensure a broad base of knowledge in business, engineering and construction fundamentals.

The Construction Science Program is accredited by the American Council for Construction Education. Strong ties are maintained with the construction industry via the Construction Industry Advisory Council, an organization of construction and construction-related companies and individuals committed to supporting the Construction Science Program at Texas A&M University.

Because of the important role of computing in the disciplines housed within the College of Architecture, all entering students are required to possess a portable, network-ready personal computer capable of running software appropriate to their academic program. Financial aid is available to assist students in their computer purchases. No student will be denied admission to Texas A&M University based on an inability to purchase a computer. Additional information is available on the college Web site at archone.tamu.edu.

In addition to the academic course work, each student is required to accomplish an approved internship of full-time practical work experience with a contractor, or in a construction-related work activity. Students who wish to continue their education beyond the baccalaureate level may apply for graduate study in a Master of Science program in Construction Management, which is administered by the Department of Construction Science. For more information, please visit our Web site at archone.tamu.edu/cosc.



FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
CHEM 101 Fund. of Chem. I.....	(3-0)	3	COSC 253 Const. Matls. and Meth. I.....	(3-0)	3
CHEM 111 Fund. of Chem. I Lab.....	(0-3)	1	MATH 142 Business Math. II.....	(3-0)	3
COSC 153 Intro. to the Construction Ind.	(3-0)	3	POLS 206 American Natl. Govt.....	(3-0)	3
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	U.S. History Elective ¹		3
MATH 141 Business Math. I.....	(3-0)	3	Visual and Perf. Arts/International and		
U.S. history elective ¹		<u>3</u>	Cultural Div. Elective ²		3
		16	* KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>
					16

SOPHOMORE YEAR

ACCT 209 Survey of Acct. Princ.	(3-0)	3	COSC 275 Estimating I.....	(2-4)	4
COMM 203 Public Speaking.....	(3-0)	3	ECON 202 Prin. of Economics.....	(3-0)	3
COSC 254 Const. Matls. and Meth. II.....	(3-0)	3	ENGL 210 Scientific and Tech. Writing.....	(3-0)	3
PHYS 201 College Physics.....	(3-3)	4	POLS 207 State and Local Govt.....	(3-0)	3
Statistics Elective ³		3	Humanities/International and		
* KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>	Cultural Div. Elective ¹		<u>3</u>
		17			16

JUNIOR YEAR

COSC 321 Structural Systems I.....	(2-3)	3	COSC 494 Internship.....		<u>6</u>
COSC 323 Soils in Construction.....	(1-3)	2			6
COSC 325 Env. Control Systems I.....	(3-0)	3			
COSC 353 Construction Project Mgmt.....	(3-0)	3			
COSC 364 Construction Safety I.....	(1-0)	1			
COSC 375 Estimating II.....	(2-3)	3			
COSC 381 Const. Ind. Prof. Studies.....	(1-0)	<u>1</u>			
		16			

SENIOR YEAR

COSC 301 Construction Surveying.....	(1-2)	2	COSC 465 Advanced Topics in Const. Law....	(3-0)	3
COSC 351 Construction Equip. and Meth.	(3-0)	3	COSC 477 Const. Project Controls.....	(3-0)	3
COSC 421 Structural Systems II.....	(3-0)	3	COSC 483 Const. Inds. Contemp. Issues.....	(1-0)	1
COSC 463 Intro. to Construction Law.....	(3-0)	3	COSC Capstone elective ⁴		3
COSC 475 Const. Project Planning.....	(2-3)	3	Technical elective I ⁵		3
MGMT 309 Survey of Mgmt. Practices.....	(3-0)	<u>3</u>	Technical elective II ⁶		<u>3</u>
		17			16

- NOTES: 1. To be selected from the University Core Curriculum.
 2. Select from the following: ARTS 150, ENDS 101, ARCH 250, LAND 240
 3. Select from the following: STAT 201, STAT 303
 4. Select from the following emphasis areas:
 COSC 440 Interdiscipline Capstone
 COSC 441 Residential Construction
 COSC 442 Commercial Construction
 COSC 443 Industrial Construction
 COSC 444 Highway/Heavy Construction
 COSC 446 Specialty Construction
 5. Select from the following:
 COSC 326 Environmental Controls II
 COSC 422 Structural Systems III
 6. Select from the following:
 COSC 464, [466 and 467], 484, 491 or approved study abroad or approved business minor.

A grade of C or better is required in all College of Architecture courses (ARCH, ARTS, CARC, COSC, ENDS, LAND, LDEV, PLAN and VIST) to satisfy Construction Science degree requirements.

* See page 21.

Curriculum in Environmental Design

The undergraduate curriculum in Environmental Design at Texas A&M University is offered through the Department of Architecture. The curriculum provides opportunities for the study of disciplines focused upon the built and virtual environment. Students pursuing a degree in environmental design study subjects in the arts, humanities, sciences, and engineering. They develop skills and acquire knowledge in problem analysis, principles of design, verbal and visual communications, construction techniques and history. The curriculum provides a studio-based experience in which students learn to synthesize solutions in a variety of proposed or actual design related contexts.

The undergraduate Bachelor of Environmental Design (B.E.D.) allows specialization within two options: Architectural Studies and Visual Studies. Course work within both Options encourages interdisciplinary and comparative perspectives that allow opportunities for communication, team-oriented methods of production and visionary design solutions that respond to a broad range of concerns.

Architectural Studies Option. The Architectural Studies Option focuses on designing the built environment incorporating relationships between people and their environment. The design studios offer a means by which students can synthesize and apply this knowledge. The broad range of course work within this option gives students a better understanding of the complexity of problems facing architects today. It allows students to explore new means by which the profession can better people's lives. Graduates may find employment within a wide range of design and architectural firms. Students interested in professional registration as an architect must complete a National Architectural Accrediting Board (NAAB) accredited Master of Architecture program in addition to the four-year undergraduate Bachelor of Environmental Design degree.

Visual Studies Option. The Visual Studies Option focuses on theories and principles of art, design and digital technology within the context of the studio experience. Students develop specialized skills and acquire knowledge that enable the synthesis of digital and virtual products through the use of traditional and electronic media. The Option encourages interdisciplinary studies that blend artistic, scientific and technical disciplines, explore new media, and investigate the relationship of visualization to other arts and sciences. Graduates find career opportunities as artists or designers in a wide variety of media and communication industries. In addition, the Option prepares students for entry into graduate programs that emphasize coursework in digital media. One such program, the Master of Science (M.S.) in Visualization Science, is housed in the Department of Visualization at Texas A&M University.

Preparation for Professional Studies in Architecture

In the United States, most state registration boards require a degree from an accredited professional degree program as one of the prerequisites for licensure. The National Architectural Accrediting Board (NAAB), which is the sole agency authorized to accredit U.S. professional degree programs in architecture, recognizes two types of degrees: the Bachelor of Architecture and the Master of Architecture.

Master's degree programs may consist of a pre-professional undergraduate degree and a professional graduate degree, which, when earned sequentially, comprise an accredited professional education. However, the pre-professional degree is not, by itself, recognized as an accredited degree.

At Texas A&M, undergraduate students seeking professional architectural registration and a career in architecture are advised to complete the Bachelor of Environmental Design (B.E.D.) degree—Architectural Studies Option. The Bachelor of Environmental Design degree is considered a four-year, pre-professional program.

After completing the B.E.D. degree—Architectural Studies Option, many students enter a two-year Master of Architecture program. Qualified students completing the Bachelor of Environmental Design (B.E.D.) Degree—Visual Studies Option and students completing substantially different curriculums may be considered for admission to graduate studies in the Department of Architecture; however, there will be prerequisite requirements in any area of deficiency and an additional year or more of study for the Master of Architecture may be required. Students should consult the Master of Architecture degree coordinator if they have questions. Other universities may have different entrance requirements for Master's programs and students considering other universities are encouraged to consult with advisors representing these programs.

Enrollment Management – Admittance to Upper-Level Studies

All Environmental Design degree students are admitted to the program with lower-level classification (ENDL). Enrollment in junior and senior level courses is limited to those who have been admitted to upper-level studies. Upon admittance, students earn upper-level (ENDS) classification. Admission within each option may be limited by enrollment restrictions. The criteria for admittance to upper-level studies are outlined in the College of Architecture Enrollment Management Policy (Texas A&M University catalog) and on the application form available in the College of Architecture Undergraduate Studies Office in Langford A219.

Personal Computers

All entering students are required to possess a portable, network-ready personal computer capable of running software appropriate to their academic program. Students desiring financial assistance with their computer purchase can apply through the Financial Aid Office by submitting a 'Request for Change to Cost of Attendance' Form. Additional information is online at <https://financialaid.tamu.edu/>.

No student will be denied admission to Texas A&M University based on an inability to purchase a computer. Computer requirements are listed on the college Web site at archone.tamu.edu.

Transfer and Change of Major Students

Transfer students and Change of Major students (students currently enrolled in another major at Texas A&M University) who are admitted to the Department of Architecture are classified as lower level (ENDL). Transfer students who meet all the criteria for admittance to upper-level studies may immediately apply for admittance to upper level.

Transfer students who have completed at least 24 graded transferable hours, and change of major students who have completed at least 12 graded transferable hours are encouraged to participate in a 10-week summer module offered by the Department of Architecture. The summer module is designed to provide an intensive first-year design studio sequence along with support course work that will enable change of major and transfer students to qualify for sophomore design studios the following semester. This summer module can enable Transfer and Change of Major students to complete the four-year degree in a more efficient and timely manner.

Architectural Studies Option

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ENDS 105 Design Foundations I.....	(2-4)	4	ENDS 106 Design Foundations II.....	(2-4)	4
ENDS 115 Design Com. Foundations II.....	(1-4)	3	ENDS 116 Design Com. Foundations II.....	(1-4)	3
History elective ²		3	History elective ²		3
Communications elective ²		3	Mathematics/Logic elective ²		3
Mathematics elective ²		3	Natural science elective ²		4
		<u>16</u>			<u>17</u>

SOPHOMORE YEAR

ARCH 205 Architecture Design I.....	(2-6)	4	ARCH 206 Architectural Design II or		
ARCH 249 Survey of World Arch. Hist. I.....	(3-0)	3	ARCH 207 Architectural Design II.....	(2-6)	4
ARCH 212 Social and Behavioral Factors			ARCH 250 Survey of World Arch. Hist. II....	(3-0)	3
in Design.....	(3-0)	3	CARC 481 Semester Away Seminar.....	(3-0)	1
PHYS 201 College Physics.....	(3-3)	4	POLS 207 State and Local Govt.....	(3-0)	3
POLS 206 American National Govt.	(3-0)	3	Communications elective ²		3
		<u>17</u>	Directed elective ¹		3
					<u>17</u>

JUNIOR YEAR

ARCH 305 Architectural Design III.....	(2-6)	5	ARCH 312 Design Journal.....	(0-2)	1
ARCH 331 Foundations Structures.....	(3-0)	3	CARC 301 Field Studies or		
ARCH 335 Foundations Systems.....	(3-0)	3	ENDS 494 Internship.....		5
ARCH 350 Hist./Theory of Modern			Directed elective ¹		3
and Contemp. Arch.....	(3-0)	3	Elective.....		3
		<u>14</u>			<u>12</u>

SENIOR YEAR

Senior design sequence ²	8	5	Senior design sequence ²	5
Directed elective ¹	3	3	Directed elective ¹	3
Elective.....	3	3	Elective.....	3
Kinesiology ²	1	1	Kinesiology ²	1
	<u>15</u>			<u>12</u>

- NOTES: 1. To be selected from an approved list available in the Department of Architecture Office.
2. To be selected from the University Core Curriculum.
3. All proposals for undergraduate independent study courses (ARCH, ARTS, CARC and ENDS 485s) must be signed by the supervising instructor and submitted to the department for approval. Forms are available in the Department of Architecture Office. Independent study courses applied to the student's degree plan and taken away from the Texas A&M campus must be supervised by either a Texas A&M faculty member who is in residence at the study away location or the department internship coordinator.
4. Students are encouraged to enroll in no more than 12 credit hours while completing internships during the study away semester.
5. Students may not apply both CARC study away courses and corresponding ENDS and ARTS courses with similar content to their degree plan. Questions regarding similarity of course content should be directed to the program chair.
6. Students should ensure that required course work and selected elective course work meets the International and Cultural Diversity requirement as part of the University's Core Curriculum.
7. Students must take a senior sequence that consists of one of the following: ARCH 405 Architecture Design IV, ARCH 431 Integrated Structures, ARCH 435 Integrated Systems, and ARCH 406 Architectural Design V; or ARCH 407 Integrated Home Architecture Studio, ARCH 432 Integrated Home Structures and Construction, ARCH 436 Integrated Home Architecture Systems, and ARCH 408 Experimental Home Architecture; or Undergraduate thesis consisting of ARCH 491 Advanced Architectural Innovation Research and support courses.

A grade of C or better must be made in all College of Architecture courses (ARCH, ARTS, CARC, COSC, ENDS, LAND, LDEV, PLAN and VIST) and in all track course work. Students must also make a grade of C or better in any course used as an equivalent substitution for College of Architecture courses that satisfy degree requirements.

* See page 21.

Visual Studies Option

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ENDS 104 Comp. and Rhetoric.....	(3-0)	3	ARTS 104 Principles of Graphic Design.....	(1-0)	1
ENDS 115 Design Comm. Foundations I.....	(1-4)	3	ARTS 149 Art History Survey I.....	(3-0)	3
KINE 196 Health and Fitness Activity.....	(0-2)	1	MATH 152 Engineering Math. II.....	(3-2)	4
MATH 151 Engineering Math. I.....	(3-2)	4	POLS 206 American Natl. Govt.....	(3-0)	3
VIST 105 Principles of Design I.....	(2-6)	<u>4</u>	VIST 106 Principles of Design II.....	(2-6)	4
		15	*KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>
					16

SOPHOMORE YEAR

ARTS 150 Art History Survey II.....	(3-0)	3	ARTS 212 Life Drawing.....	(2-3)	3
CPSC 206 Structured Programming in C.....	(3-2)	4	PHYS 201 College Physics.....	(3-3)	4
POLS 207 State and Local Govt.....	(3-0)	3	VIST 206 Visual Studies Studio I.....	(2-6)	4
VIST 201 Writing for Design.....	(0-2)	1	VIST 271 Computing Environments.....	(3-0)	3
VIST 205 Principles of Design III.....	(2-6)	4	VIST 284 Visualization Techniques.....	(0-2)	<u>1</u>
VIST 284 Visualization Techniques.....	(0-2)	<u>1</u>			15
		16			

JUNIOR YEAR

ARTS 349 History of Modern Art.....	(3-0)	3	CARC 301 Field Studies or		
VIST 305 Visual Studies Studio II.....	(1-5)	3	VIST 494 Internship ⁵		6
VIST 375 Foundations of Visualization.....	(3-0)	3	Elective.....		3
Directed elective, computing menu ¹		3	Elective.....		<u>3</u>
Natural science elective ²		<u>4</u>			12
		16			

SENIOR YEAR

VIST 405 Visual Studies Studio III.....	(1-5)	3	VIST 406 Visual Studies Studio IV.....	(1-5)	3
Directed elective, arts menu ¹		3	VIST 441 Science and Tech. Dev.		
Directed elective, computing menu ¹		3	in Visual Arts.....	(3-0)	3
Communication elective ²		3	Directed elective, arts menu ¹		3
U.S. history elective ²		<u>3</u>	Social and behavioral sciences elective ²		3
		15	U.S. history elective ²		<u>3</u>
					15

- NOTES:**
1. To be selected from an approved list available in the Department of Architecture Advising Office.
 2. To be selected from the University Core Curriculum.
 3. All proposals for undergraduate independent study courses (ARCH, ARTS, CARC and ENDS 485s) must be signed by the supervising instructor and submitted to the department for approval. Forms are available in the Department of Architecture Office. Independent study courses applied to the student's degree plan and taken away from the Texas A&M campus must be supervised by either a Texas A&M faculty member who is in residence at the study away location or the department internship coordinator.
 4. Students are encouraged to enroll in no more than 12 credit hours while completing internships during the study away semester.
 5. Students may not apply both CARC study away courses and corresponding ENDS and ARTS courses with similar content to their degree plan. Questions regarding similarity of course content should be directed to the program chair.
 6. Students should ensure that required course work and selected elective course work meets the International and Cultural Diversity requirement as part of the University's Core Curriculum.

A grade of C or better must be made in all College of Architecture courses (ARCH, ARTS, CARC, COSC, ENDS, LAND, LDEV, PLAN, VIST and VIZA). Students must also make a grade of C or better in any course used as an equivalent substitution for College of Architecture courses that satisfy degree requirements.

* See page 21.

Curriculum in Landscape Architecture

Landscape architecture is the profession providing landscape planning, design, and management services to enhance and protect natural and built environments. Landscape architecture as a discipline is devoted to understanding and managing the human and environmental forces that change the landscape. Landscape architects plan and design places for the health, safety, and welfare of citizens through systematic decision-making that integrates science, art, and technology. Individual and community quality of life are enhanced by a design process to improve, protect, and create ecologically sustainable, socially equitable, and economically feasible landscapes. Landscape architects work in urban, suburban and wilderness environments. Our graduates have gained distinction for projects as varied in scale as private gardens, residential communities, urban plazas, college campuses, park facilities and regional conservation plans.

The Bachelor in Landscape Architecture (B.L.A.) program is nationally accredited as a professional degree program. The mission of the program is to prepare students to become professional landscape architects in private and public sector practice. Our educational goal is to produce graduates motivated to be leaders in the field and professionals who are intellectually active, broadly-educated citizens and life-long learners.

The BLA curriculum offers a sequence of courses to prepare students for entry into professional practice. By combining a broad general education and strong professional training, the curriculum emphasizes the acquisition and application of advanced knowledge to develop students' critical thinking and creative problem-solving abilities. The program provides opportunities for students to develop special professional interests in a chosen area of concentration.

Graduates from the BLA program are prepared for employment with private practice firms in landscape architecture, engineering, architecture, or planning; and with federal, state, or local government agencies. Upon graduation students are qualified to pursue licensure in the profession or post graduate education in landscape architecture or a related field.

Because of the important role of computing in the disciplines housed within the College of Architecture, all entering students are required to possess a portable, network-ready personal computer capable of running software appropriate to their academic program. Financial aid is available to assist students in their computer purchases. No student will be denied admission to Texas A&M University based on an inability to purchase a computer. Additional information is available on the college Web site at archone.tamu.edu.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ENDS 101 Design Process.....	(3-0)	3	ARCH 250 World Arch. History II.....	(3-0)	3
ENDS 105 Design Foundations I.....	(2-4)	4	ENGL 104 Comp. and Rhetoric.....	(3-0)	3
LAND 200 Intro. to Land. Arch.....	(1-0)	1	MATH 142 Business Math. II.....	(3-0)	3
MATH 141 Business Math. I.....	(3-0)	3	Natural sciences elective ²		4
U.S. history elective ¹		3	*KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>
*KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>			<u>14</u>

SOPHOMORE YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
COSC 253 Const. Materials and Methods I....	(3-0)	3	COMM 203 Public Speaking.....	(3-0)	3
LAND 240 History of Land. Arch.....	(3-0)	3	LAND 255 Land. Arch. Communication II ...	(2-4)	3
LAND 254 Land. Arch. Communication I	(2-4)	3	POLS 207 State and Local Government.....	(3-0)	3
POLS 206 American National Government...	(3-0)	3	RENr 205 Fund. of Ecology.....	(3-0)	3
U.S. history elective ¹		<u>3</u>	RENr 215 Fund. of Ecology Lab.....	(0-3)	1
		15	Computer elective.....		<u>3</u>
					16

JUNIOR YEAR

ENGL 210 Technical Writing.....	(3-0)	3	GEOL 320 Engineering Geology.....	(3-0)	3
HORT 206 Woody Ornamental Plants.....	(2-2)	3	HORT 308 Landscape Plant Material.....	(2-2)	3
LAND 318 Landscape Design I.....	(2-7)	4	LAND 319 Landscape Design II.....	(2-7)	4
LAND 329 Landscape Const. I.....	(2-4)	3	LAND 330 Landscape Const. II.....	(2-4)	3
Elective ³		<u>3</u>	LAND 340 Land. Arch in America.....	(3-0)	<u>3</u>
		16			16

SENIOR YEAR

GEOG 311 Cultural Geography.....	(3-0)	3	LAND 321 Landscape Design IV.....	(2-9)	5
LAND 310 Landscape Theory.....	(3-0)	3	LAND 331 Landscape Const. III.....	(2-4)	3
LAND 320 Landscape Design III.....	(2-9)	5	PLAN 415 Urban Issues.....	(3-0)	3
PLAN 414 Sustainable Communities.....	(3-0)	3	PHIL Environmental Ethics.....	(3-0)	3
Elective ⁴		<u>3</u>	Elective ³		<u>3</u>
		17			17

SUMMER WORK

LAND 300 Summer Practice⁵

FIFTH YEAR

Semester Away			LAND 421 Landscape Design VI.....	(2-9)	5
LAND 420 Landscape Design V.....	(3-9)	6	LAND 442 Professional Practice.....	(3-0)	3
Electives ³		<u>6</u>	LDEV 467 Land Development.....	(3-0)	3
		12	Elective ³		<u>3</u>
					14

- NOTES:**
- To be selected from the University Core Curriculum.
 - CHEM 101/111, GEOL 101, GEOG 203/213 or PHYS 201 or BIOL 101.
 - Electives must be selected in consultation with the student's departmental advisor.
 - The environmental elective is to be selected from the following list: AGRO 301, 302; COSC 320; HORT 335, 425, 435; LAND 461; FRSC 302; RENr 375, 410, 470; RLEM 320, 316.
 - Successful completion of LAND 300 required in addition to above curriculum. This course will be scheduled in consultation with the student's advisor.

A grade of C or better is required in all College of Architecture courses (ARCH, ARTS, CARC, COSC, ENDS, LAND, LDEV, PLAN and VIST) to satisfy Landscape Architecture degree requirements.

* See page 21.

Curriculum in Urban and Regional Sciences

The Bachelor of Science in Urban and Regional Sciences (BS/URSC) degree program emphasizes the social, economic, cultural and natural factors that govern how communities and society are shaped. Course work provides students with the knowledge and skills needed to develop solutions to community and regional growth and development issues that face our state and nation. Students have an opportunity to specialize in specific aspects of community and regional planning and development issues along with internship and service-learning experiences locally, nationally, and/or internationally.

The BS in Urban and Regional Sciences degree program is based in the Department of Landscape Architecture & Urban Planning (LAUP) within the College of Architecture at Texas A&M University. The BS-URSC program equips students for entry-level positions and prepares them for graduate studies in fields such as Urban Planning and Land Development. The core curriculum, designed to equip students with knowledge and skills to deal effectively with the opportunities and challenges inherent in the development, growth and culture of neighborhoods, cities, and regions, is based on theoretical training in the natural, physical, and social sciences. Students acquire skills that enable them to apply these theories to develop communities, cities, and regions which are safe, healthy, and sustainable.

Critical thinking and analytical skills are emphasized for problem-solving at the community and regional scale. Classroom service-learning experiences enable graduates to more reliably and realistically assess complex community problems, design solutions for overcoming those problems, and evaluate the outcomes of programs and policies in meeting community and regional needs. Specialized Emphasis Area electives are tailored to help students further specialize their career goals in:

- Hazard and emergency planning
- Housing, economic and urban development
- Health and human services planning and policy
- Land development
- Sustainable landscape planning and urban design
- Spatial analysis and planning

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	ENDS 150 History of Architecture or		
MATH 141 Business Math	(3-0)	3	ARCH 345 History of Building Tech.	(3-0)	3
PLAN 365 Introduction to Planning	(3-0)	3	ENGL 210 Science and Tech. Writing	(3-0)	3
POLS 206 American National Govt.	(3-0)	3	MATH 142 Business Math.....	(3-0)	3
History elective		<u>3</u>	POLS 207 State and Local Govt.....	(3-0)	3
		15	History elective		3
			*KINE 198 Health and Fitness Activity		<u>1</u>
					16

SOPHOMORE YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
PLAN 360 Intro. to Urban Plan. Function	(3-0)	3	ECON 202 Principles of Economics.....	(3-0)	3
RENr 205 Fundamentals of Ecology	(3-0)	3	RENr 375 Conservation of Nat. Resources ...	(3-0)	3
STAT 201 Elem. Stat. Inference.....	(3-0)	3	Humanities elective.....		3
URSC 325 Intro. to GIS.....	(2-3)	3	Natural science elective		4
Social science elective or			Sociology elective: SOCI 230, 312, 314, 321,		
SOCI 205 Intro. to Sociology.....		<u>3</u>	or 324.....		<u>3</u>
		15			16

JUNIOR YEAR

LDEV 467 Principles of Land Dev.		3	PLAN 489 Intro. to Planning Law		3
RENr 215 Fundamentals of Eco. Lab.....		1	URSC 336 Public and Private Infrast. Fund. .	(3-0)	3
URSC 305 Analytical Methods	(3-0)	3	URSC 469 Urban Infrastructure	(3-0)	3
URSC 405 Urban and Regional Eco. Dev.		3	Directed elective.....		3
Directed elective.....		3	Elective		3
Directed elective.....		<u>3</u>	* KINE 199 Required Physical Activity.....		<u>1</u>
		16			16

SENIOR YEAR

PLAN/LAND 494 Professional Internship or			URSC 458 Policy Implementation.....	(3-0)	3
Study Abroad		6	URSC 493 URSC Capstone Course		5
Elective		3	Directed elective.....		3
Elective		<u>3</u>	Elective		<u>3</u>
		12			14

Note: Semester Away (PLAN/LAND 494): May be satisfied by study abroad, at another university, internship, or special arrangement by advisor or instructor. Electives may be taken during summer, online, distance education, at another university or college, or at study abroad university.

* See page 21.



TEXAS A&M
UNIVERSITY

A black and white photograph of a bronze statue of Rouse W. Mays, the first president of Texas A&M University. The statue is in the foreground, looking slightly to the left. In the background, the iconic dome of the Texas State Capitol building is visible, partially obscured by trees. The overall tone is historical and academic.

MAYS BUSINESS SCHOOL

★ 2008–2009 UNDERGRADUATE CATALOG ★

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Mays Business School

Administrative Officers

Interim Dean	Ricky W. Griffin, B.B.A., M.B.A., Ph.D.
Executive Associate Dean	Bala Shetty, B.S., M.S., Ph.D.
Associate Dean	David W. Blackwell, B.S., Ph.D.
Associate Dean	Martha L. Loudder, B.B.A., M.B.A., Ph.D.
Director of Undergraduate Program	Peter K. Drysdale, B.B.A., M.S.

General Statement

A goal of Mays Business School is to help develop students to become effective managers, concerned citizens and life-long learners. Through challenging academic and enrichment programs, the business school provides students with numerous opportunities for intellectual, leadership and personal development.

In support of this student development goal, the curriculum in business has a dual emphasis—a broad-based education in the foundation disciplines of the liberal arts and the sciences, and a focused development of business knowledge and behavioral skills.

The program of study in business provides students a background in the basic academic areas—mathematics; humanities; natural, social and behavioral sciences; and, rhetoric and composition. Students simultaneously pursue introductory course work in accounting, economics, business computing systems and the legal environment of business. This broad educational foundation provides an enriching dimension to the university experience that cannot be attained in a more limited course of study.

Upon successful completion of this broad-based course work, the student will begin to focus on a major field of study and a full range of business courses. The major field—chosen from the fields of accounting, finance, management, management information systems, marketing, supply chain management and agribusiness—is designed to prepare students for an entry-level organizational position as well as subsequent career development. Each major has a set of required courses, as well as electives, from which students may gain additional depth in the chosen area. Students admitted to Mays' Business Honors pursue an interdepartmental degree in business honors.

This combination of a broad educational foundation and more specialized study produces graduates uniquely qualified to deal with the rapidly changing and diverse global economy.

Requirements for Graduation

Requirements for graduation are listed in the Texas A&M University Student Rules and this catalog.

With the exception of physical activity and general elective requirements, courses taken to satisfy degree requirements must be taken for letter grades.

In addition, students in Mays Business School must have a GPR of 2.0 in the courses included in the Common Body of Knowledge. Undergraduate business students must take two specific writing-designated (W) courses. The curriculum is designed for the first W course to be taken by the end of the sophomore year. The second W course is major specific and is taken as part of the student's upper-level course work. See your academic advisor for additional information.

Transfer of Credits

Acceptance of transfer of credit for business courses will generally be limited to those courses taught in the freshman and sophomore years at this institution.

Junior- and senior-level business courses completed at another institution must be validated if they are to be used to fulfill degree requirements in Mays Business School. Courses are ordinarily validated from an examination of course materials and may require a validation examination. Validation examinations are free of charge and are typically given during the first week of classes of each long semester. Students should contact the Undergraduate Program Office (Room 238, Wehner Building) for the validation policy and, if applicable, the examination schedule for transfer courses submitted for meeting upper-division business requirements.

Credit by Examination

Undergraduate students may receive credit for certain courses required in undergraduate business curricula by successfully completing a departmental examination. Students should contact the Undergraduate Program Office (Room 238, Wehner Building) for this information. A fee is charged for such an examination.

Students may not receive credit by examination for courses in which they are enrolled, which they have previously failed, or which are prerequisite to courses for which they already have credit. Credit by examination is not acceptable to grant credit for technical writing courses.

Bachelor's Degrees and Departments of Instruction

The academic program of Mays Business School is organized in the following majors: Accounting, Business Honors, Finance, Management, Management Information Systems, Marketing and Supply Chain Management. Bachelor of Business Administration degrees are offered in each of these seven majors.

In conjunction with the College of Agriculture and Life Sciences, Mays Business School also offers a Bachelor of Science in Agribusiness. Different requirements exist for the Bachelor of Business Administration degree than for the Bachelor of Science—Agribusiness degree.

University Studies majors who declare a concentration in business pursue a Bachelor of Science in University Studies. These students enter Mays Business School in the USBU (University Studies with concentration in business) classification. Specific requirements, course offerings, and restrictions exist for the Bachelor of Sciences—University Studies degree. Students should contact the Undergraduate Program Office, (Room 238, Wehner Building) for information on the University Studies concentration in business.

Bachelor of Business Administration

The degree of Bachelor of Business Administration is offered in these seven majors: accounting, business honors, finance, management, management information systems, marketing and supply chain management. Each requires a minimum of 120 semester credit hours of study. The student elects one of these as a “major,” but is also required to study fundamental theory and procedure in each of the basic business functions. In addition, the student takes courses essential to a general liberal education.

The following is a representation of the curriculum requirements by department. Note: The management information systems and supply chain management majors are in the Department of Information and Operations Management.

	Accounting	Business Honors	Finance	Information and Operations Management	Management	Marketing
Common Body of Knowledge	39 hours	39 hours	39 hours	39 hours	39 hours	39 hours
Courses required in major, not included in core	18	21	18	27	21	24
General electives	11	11	5	5	5	8
Other required courses:						
Accounting	—	—	9	—	—	—
Behavioral sciences	3	3	3	3	3*	3*
Business law	3	—	—	—	—	—
Natural sciences	8	8	8	8	8	8
U.S. history and political science	12	12	12	12	12	12
Humanities	3	3	3	3	3	3
Visual and performing arts	3	3	3	3	3	3
International	6**	6**	6**	6**	6**	6**
English and speech	6	6	6	6	6	6
Mathematics	6	6	6	6	6	6
Information and operations management	—	—	—	—	3	—
Economics	—	—	—	—	3	—
Physical activity	2	2	2	2	2	2
Total	120	120	120	120	120	120

* Management and Marketing majors must take PSYC 107, Introduction to Psychology.

** Three hours may be taken outside Mays Business School. Management majors must take MGMT 450, International Environment of Business.

B.B.A. Common Body of Knowledge

Required Courses	Gr
ACCT 229 Introductory Accounting	3
ACCT 230 Introductory Accounting	3
BUSN Integrated Worklife Competencies.....	3
ECON 202 Principles of Economics–Microeconomics	3
ECON 203 Principles of Economics–Macroeconomics	3
FINC 341 Business Finance	3
INFO 210 Fundamentals of Information Systems	3
INFO 303 Statistical Methods.....	3
INFO 364 Operations Management	3
MGMT 211 Legal and Social Environment of Business	3
MGMT 363 The Management Process.....	3
MGMT 466 Strategic Management	3
MKTG 321 Marketing	3
	39



Upper-Level Entry into Accounting, Business Honors, Finance, Management, Management Information Systems, Marketing and Supply Chain Management (B.B.A.)

Students who meet the University and college entrance requirements enter Mays Business School in the BUAD (lower-level business) classification. Enrollment of Mays Business School students in junior- and senior-level business courses is limited to those who have been admitted to upper level (also referred to as upper division) in one of the eight majors (B.B.A.: accounting, business honors, finance, management, management information systems, marketing, supply chain management or B.S.: agribusiness) in the college.

All GEST (General Studies) students are treated as BUAD students for consideration when pre-registering in upper-level business courses. GEST students must be admitted to Mays Business School prior to the first day of the semester for which they have pre-registered in upper-level business courses that are designated for business majors only.

Note: The degree of Bachelor of Science (B.S.) is offered in Agribusiness. B.S. (agribusiness) degree requirements and upper-level entry requirements are different than those for the B.B.A. and are found beginning on page 310.

The B.B.A. (accounting, business honors, finance, management, management information systems, marketing and supply chain management) upper-level entry requirements and application procedures are as follows:

1. To be admitted to an upper-level major, a student must be admitted to Mays Business School and must have:
 - a. Satisfactorily completed at least 60 semester credit hours.
 - b. Satisfactorily completed the following eight courses:

ACCT 229	Introductory Accounting—Financial
ACCT 230	Introductory Accounting—Managerial
ECON 202	Principles of Economics—Microeconomics
ECON 203	Principles of Economics—Macroeconomics
INFO 210	Fundamentals of Information Systems
MATH 141	Business Mathematics I
MATH 142	Business Mathematics II
MGMT 211	Legal and Social Environment of Business
 - c. BUAD students apply for upper level in the semester before they expect to enter upper level. Application deadlines are:
 - April 15 for June (summer semester) entry*
 - July 15 for September (fall semester) entry
 - November 15 for January (spring semester) entry
 - * To enter upper level in the summer, all requirements must be completed by the beginning of the first summer session.
 - d. Admission to an upper-level major may be restricted by the availability of instructional resources.
 - e. Students are encouraged to complete the freshman and sophomore sequence of courses as listed under Curriculum in Business. BUAD and GEST students may pre-register for upper-level courses for the semester for which they have applied for upper level. However, BUAD and GEST students failing to complete upper-level requirements prior to the start of the semester shall not be permitted to remain enrolled in upper-level classes.

2. Transfer students:

Transfer students admitted to Mays Business School will be classified as BUAD (lower-level Business) students until they complete all requirements listed previously in item 1, at which time they may apply for admission to an upper-level major field of study in the business school. Transfer students may immediately apply for upper level when admitted to Mays Business School if, and only if, they meet all upper-level requirements at that time.

3. Change of curriculum students:

Texas A&M students who change curriculum into Mays Business School from another college or department at the University will be classified as BUAD (lower-level Business) students until they complete all requirements listed previously in item 1. Change of curriculum students who meet all upper-level requirements when admitted to the business school may immediately apply for admission to upper level.

4. Preference for available seats in junior- and senior-level business courses will be given to students who have been admitted to a degree granting major in Mays Business School. GEST students are treated as BUAD students and thus are not eligible for enrollment in upper-level business courses. All ineligible students who pre-register for upper-level business classes are subject to cancellation of their enrollment in these courses.

Enrollment of University Studies Majors in Business Courses

Enrollment of University Studies majors in business courses is limited to the following:

ACCT 209	Survey of Accounting Principles
ACCT 210	Survey of Managerial and Cost Accounting Principles
FINC 201	Personal Finance
FINC 409	Survey of Finance Principles
INFO 209	Business Information Systems Concepts
INFO*	Supply Chain Management Concepts
MGMT 105	Introduction to Business
MGMT 209	Business, Government and Society
MGMT 212	Business Law
MGMT 309	Survey of Management
MKTG 402	International Marketing
MKTG 409	Introduction to Marketing

*This course will be listed as INFO 309 beginning Fall 2009.

Curriculum in Business (Lower-Level)

FRESHMAN YEAR*

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	MATH 142 Business Math. II ¹	(3-0)	3
MATH 141 Business Math. I ¹	(3-0)	3	American history elective ^{2,4}		3
American history elective ^{2,4}		3	Humanities elective ⁶		3
Behavioral science elective ³		3	Natural sciences elective ³		4
Natural sciences elective ³		<u>4</u>	**KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>
		16			14

SOPHOMORE YEAR*

ACCT 229 Introductory Accounting	(3-0)	3	ACCT 230 Introductory Accounting	(3-0)	3
COMM 203 Public Speaking.....	(3-0)	3	ECON 203 Principles of Economics.....	(3-0)	3
ECON 202 Principles of Economics.....	(3-0)	3	MGMT 211 Legal and Social Envir. of Business	(3-0)	3
INFO 210 Fundamentals of Information Systems	(3-0)	3	POLS 207 State and Local Govt. ⁴	(3-0)	3
POLS 206 American National Govt. ⁴	(3-0)	<u>3</u>	***BUSN Int. Worklife Competencies ¹⁶		3
		15	**KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>
					16

NOTES: A. BUAD students intending to major in Management Information Systems must add INFO 250 Business Programming Logic and Design (3 credits) to sophomore year curriculum in Business (lower level).

B. BUAD students admitted to Business Honors must add BUSN 125 Business Learning Community I (3 credits) to the freshman year curriculum in Business (lower-level).

* See Upper-Level Entry into accounting, business honors, finance, management, management information systems, marketing and supply chain management (B.B.A.) on page 297.

** See page 21.

*** This course will be listed as BUSN 205 beginning Fall 2009.

See footnotes on page 308.



Curriculum in Accounting

The accounting profession continues to be recognized as one of the world's leading professions and as one offering many opportunities for a challenging career. The major challenge confronting the accounting profession today is the continuous development of accounting and information systems that can be utilized by business firms operating in an increasingly complex global environment. Within this environment, business firms and government units are generating and utilizing information at an accelerating rate.

A degree in accounting provides the opportunity for entry into a career offering a variety of different and challenging paths. Many accounting graduates are employed by public accounting firms that provide assurance, tax and other services to all types of organizations. Other accounting graduates pursue careers with business firms and financial institutions, with all levels of government and as accounting educators. All of these careers provide an opportunity to earn the Certified Public Accountant (CPA) license and to serve society by maintaining the highest levels of integrity. The program listed in the following tables for the junior and senior years leads to the Bachelor in Business Administration (B.B.A.) degree. This degree program provides the minimum credentials necessary for entry into most accounting careers. However, the B.B.A. degree does not meet the minimum requirements to sit for the CPA examination in Texas.

The American Institute of Certified Public Accountants (AICPA) recognizes the need for technically competent graduates entering the accounting profession. In response to the recommendations of the AICPA, other professional accounting organizations, and many professional accounting firms, the State of Texas requires candidates for the CPA certificate to have a minimum of 150 semester hours of college course work, including at least 36 hours of accounting courses. As a consequence, highly motivated students are encouraged to give serious consideration to pursuing advanced studies at the graduate level to enhance their potential for a successful accounting career.

The Department of Accounting offers an integrated Professional Program that students enter during their junior year. The Professional Program offers a curriculum integrating undergraduate and graduate education. Graduates receive a B.B.A. and a Master of Science degree (M.S.). This program offers opportunities for successful and motivated students to pursue academic course work that challenges both their interests and abilities. The courses are taught by experienced faculty with superior teaching and professional credentials and are limited in class size.

The objectives of the Professional Program include developing sound conceptual, technical, analytical and communication skills that are required for success in the accounting profession. The program develops decision making and teamwork skills through extensive use of discussions and case studies. The program enables the student to select a specialization in assurance services/information management, information systems, financial management, marketing, entrepreneurship, or taxation. Each track offers the student an opportunity to participate in a professional accounting internship.

The department also offers a traditional Master's Program (M.S. in Accounting) that students enter after completion of the Bachelor's degree. For more details about the Professional Program or the Master's Program, refer to the Texas A&M University Graduate Catalog or contact the director of the Professional Program in the Department of Accounting.

(See Freshman and Sophomore Years)

JUNIOR YEAR*

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ACCT 327 Financial Reporting I.....	(3-0)	3	ACCT 329 Cost Accounting	(3-0)	3
FINC 341 Business Finance.....	(3-0)	3	ACCT 427 Acct. and Financ. Info. Systems....	(3-0)	3
INFO 303 Statistical Methods.....	(3-0)	3	INFO 364 Operations Management	(3-0)	3
MKTG 321 Marketing	(3-0)	3	MGMT 363 The Management Process.....	(3-0)	3
International elective ⁸		<u>3</u>	Visual and performing arts elective ⁶		<u>3</u>
		15			15

SENIOR YEAR*

ACCT 328 Financial Reporting II	(3-0)	3	ACCT 407 Auditing ¹⁶	(3-0)	3
ACCT 405 Income Tax.....	(3-0)	3	MGMT 466 Strategic Management	(3-0)	3
MGMT 212 Business Law.....	(3-0)	3	International elective ⁸		3
General electives ⁷		3	General electives ⁷		<u>5</u>
General electives ⁷		<u>3</u>			14
		15			

NOTES: No more than 33 hours in accounting can be applied toward the undergraduate degree.

See Department of Accounting advisors for more information on the requirements to sit for the CPA examination.

* See Upper-Level Entry into the accounting, business honors, finance, management, information systems management, marketing and supply chain management (B.B.A.) on page 297.

** Professional Program students will substitute ACCT 320.

See footnotes on page 308.

Curriculum in Business Honors

A Bachelor of Business Administration (B.B.A.) in business honors is a degree available only to students admitted to Mays' Business Honors program. The business honors major is designed for students whose academic excellence is matched by strong character, leadership skills and teamwork. The business honors major prepares students to begin careers in all fields of business or to continue on to a graduate program or professional school.

Students pursuing a B.B.A. in business honors must maintain a cumulative GPR of 3.5. Students are required to complete an internship plus a total of 30 hours of honors course work. Six of these hours are to be chosen from non-business honors courses offered by the university; the other 24 hours are selected from honors courses offered by Mays Business School.

Business honors majors work closely with an academic advisor to identify a set of courses to meet their academic goals. They may pursue a double major in business honors and one of the six other B.B.A. business majors (accounting, finance, management, management information systems, marketing and supply chain management).

Selection through a separate application process is required to participate in Business Honors. Students apply to Mays Business Honors as incoming freshmen through a competitive selection process or during the spring semester of their freshmen year.

Complete information on business honors can be found at the Mays Business Honors Web site at bizhonors.tamu.edu.

NOTE: Business Honors students must add BUSN 125 Business Learning Community I to the freshman year curriculum in Business (lower-level) for a total of 33 credits in the freshman year.

(See Freshman and Sophomore Years)

JUNIOR YEAR*

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
FINC 341 Business Finance**	(3-0)	3	INFO 364 Operations Management**	(3-0)	3
INFO 303 Statistical Methods**	(3-0)	3	MGMT 363 The Management Process**	(3-0)	3
MGKT 321 Marketing**	(3-0)	3	Upper-Division Business Elective***		3
General elective ⁷		3	Upper-Division Business Elective***		3
International elective ⁸		<u>3</u>	Visual and performing arts elective ⁶		<u>3</u>
		15			15

SENIOR YEAR*

BUSN 485 Directed Studies		3	MGMT 466 Strategic Management****	(3-0)	3
Upper-Division Business Elective***		3	Upper-Division Business Elective***		3
Upper-Division Business Elective***		3	General elective ⁷		3
General elective ⁷		3	International elective ⁸		<u>3</u>
General elective ⁷		<u>2</u>			12
		14			

* See Upper-level Entry into accounting, business honors, finance, management, management information systems, marketing and supply chain management (B.B.A.) on page 297.

** Six of the following ten CBK classes (ACCT 229, 230; BUSN 205; FINC 341; INFO 210, 303, 364; MGMT 211, 363; MKTG 321) must be taken as honors.

***Any 300- or 400- level business elective selected in consultation with an Academic Advisor. At least one of the these courses must be designated as writing intensive (W).

****MGMT 466 must be taken as honors.

See footnotes on page 308.



Curriculum in Finance

The business enterprise must raise capital, use it to maximum advantage, and reward investors. Finance is the set of management challenges (and career opportunities) concerned with succeeding at these tasks.

The finance major involves both required and elective courses in three areas. The area of **Managerial Finance** encompasses tools and techniques for valuing productive assets, choosing ways of funding them, and gauging financial success. In the area of **Investments**, theoretical and practical models help assess risks and rewards of stocks, bonds, derivatives, and other “financial assets” (individually and in portfolios), as well as the financial health of firms and institutions offering them to the investing public. The area of **Markets and Institutions** explores the ways in which bankers, brokers, and other financial institutions convert savings into productive capital.

Mays finance graduates with good academic records place well in all these areas, as well as in graduate and professional schools. They work in industry, on Wall Street, in major banking and consulting firms, and as wealth managers. Accordingly, the Department of Finance emphasizes scholarship in its faculty, professionalism in its programs, and innovation in its relationships with employers and mentors.

(See Freshman and Sophomore Years)

JUNIOR YEAR*					
First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ACCT elective ^A		3	ACCT elective ^B		3
FINC 341 Business Finance	(3-0)	3	FINC 434 Managerial Finance I	(3-0)	3
INFO 303 Statistical Methods.....	(3-0)	3	FINC 460 Money and Capital Markets ¹⁶	(3-0)	3
MGMT 363 The Management Process.....	(3-0)	3	INFO 364 Operations Management	(3-0)	3
Visual and performing arts elective ⁶		<u>3</u>	International elective ⁸		<u>3</u>
		15			15
SENIOR YEAR*					
FINC 421 Investment Analysis.....	(3-0)	3	MGMT 466 Strategic Management	(3-0)	3
MKTG 321 Marketing	(3-0)	3	FINC electives ¹⁰		6
ACCT or FINC elective ^{9, 10}		3	International elective ⁸		3
FINC elective ¹⁰		3	General elective ⁷		<u>2</u>
General elective ⁷		<u>3</u>			14
		15			

NOTES: A. ACCT 315, Intermediate Accounting for Non-Accounting Majors I or ACCT 327, Financial Reporting I. Students interested in a double major (Finance and Accounting) must elect ACCT 327 and 328. Students must have a C or better in ACCT 327 before taking ACCT 328.

B. ACCT 316, Intermediate Accounting for Non-Accounting Majors II or ACCT 328, Financial Reporting II or ACCT 329, Cost Accounting. Students must have completed ACCT 327 to elect ACCT 328. Students must have a C or better in ACCT 327 before taking ACCT 328.

* See Upper-Level Entry into accounting, business honors, finance, management, management, information systems, marketing and supply chain management (B.B.A.) on page 297.

See footnotes on page 308.

Curriculum in Information and Operations Management

The B.B.A. degree in Information and Operations Management offers a broad range of career opportunities. Students must select a set of courses from one of two undergraduate major tracks: Management Information Systems (MIS) and Supply Chain Management. In each track, students learn how to use technology to make businesses more efficient, effective, and competitive. Course work includes both the technical and managerial aspects of MIS and Supply Chain Management to ensure that students are well-equipped for a successful career in the dynamic, global business environment. Students with degrees in Information and Operations Management make business better.

Management Information Systems Track. The MIS major produces graduates who are both business analysts (i.e., professionals who understand accounting, marketing, finance, etc.) and information system specialists (i.e., professionals who can implement information systems strategies). Graduates of the program possess the business, technical, and leadership skills to meet the challenges presented by rapidly evolving information technology and the need to effectively incorporate this technology into business strategy and day-to-day operations.

Supply Chain Management Track. The Supply Chain Management major prepares students for a career in designing and managing the activities that deliver products and services to customers. Supply chain activities add direct value to the customer and thus, are extremely valuable to firms. This major produces graduates with strong analytical and problem-solving skills and the ability to work in and coordinate team activities. Graduates possess the business, technical and leadership skills needed to meet the challenges of the rapidly evolving global marketplace.

A list of recommended courses for each track is available from the Department of Information and Operations Management undergraduate advisor (Room 330, Wehner Building).

Management Information Systems (MIS) Track

(See Freshman and Sophomore Years)

NOTE: INFO-MIS majors must add INFO 250 Business Programming Logic and Design (3 credits) to sophomore year curriculum in Business (lower-level) for a total of 34 credits in the sophomore year.

JUNIOR YEAR*

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
INFO 303 Statistical Methods.....	(3-0)	3	MGMT 363 The Management Process.....	(3-0)	3
INFO 364 Operations Management.....	(3-0)	3	MKTG 321 Marketing.....	(3-0)	3
INFO-MIS Foundation course.....		3	INFO-MIS Foundation course.....		3
INFO-MIS Foundation course.....		3	INFO-MIS Directed elective ¹¹		3
International elective ⁸		<u>3</u>	Visual and performing arts elective ⁶		<u>3</u>
		15			15

SENIOR YEAR*

FINC 341 Business Finance.....	(3-0)	3	INFO 439 Management of Info. Systems ¹⁶ ...		3
INFO-MIS Directed elective ¹¹		3	MGMT 466 Strategic Management.....	(3-0)	3
INFO-MIS Directed elective ¹¹		3	INFO-MIS Foundation course.....		3
General elective ⁷		<u>5</u>	International elective ⁸		<u>3</u>
		14			12

* See Upper-Level Entry into accounting, business honors, finance, management, management information systems, marketing and supply chain management (B.B.A.) on page 297.

See footnotes on page 308.

Supply Chain Management (SUP) Track

(See Freshman and Sophomore Years)

JUNIOR YEAR*

FINC 341 Business Finance.....	(3-0)	3	MGMT 363 The Management Process.....	(3-0)	3
INFO 303 Statistical Methods.....	(3-0)	3	MKTG 321 Marketing.....	(3-0)	3
INFO 364 Operations Management.....	(3-0)	3	INFO-SUP Foundation course.....		3
INFO-SUP Foundation course.....		3	INFO-SUP Directed elective ¹¹		3
International elective ⁸		<u>3</u>	International elective ⁸		<u>3</u>
		15			15

SENIOR YEAR*

INFO-SUP Foundation course.....		3	INFO 465 Information Technology for Supply Chain Management ¹⁶	(3-0)	3
INFO-SUP Foundation course.....		3	MGMT 466 Strategic Management.....	(3-0)	3
INFO-SUP Directed elective ¹¹		3	INFO-SUP Directed elective ¹¹		3
Visual and performing arts elective ⁶		3	General elective ⁷		<u>5</u>
General elective ⁷		<u>3</u>			<u>14</u>
		15			14

* See Upper-Level Entry into accounting, business honors, finance, management, management information systems, marketing and supply chain management (B.B.A.) on page 297.

See footnotes on page 308.

Curriculum in Management

The B.B.A. in Management offers a broad range of career opportunities. A management student develops the skills and knowledge necessary to plan, organize, make decisions, communicate, and lead effectively in a variety of work settings. The management major provides the opportunity to acquire competencies in preparation for work in human resource management, entrepreneurship and small business, retail and services industries, non-profit and governmental entities, and global enterprises. Written and oral communication skills, teamwork abilities, and organization proficiencies are emphasized. Overall, the major affords the student maximum choice flexibility of jobs, organizations and industries, as well as provides a solid foundation for pursuing graduate studies in business, law, and a variety of other disciplines.

(See Freshman and Sophomore Years)

JUNIOR YEAR*					
First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ECON 322 Appl. Microecon. Theory			INFO 305 Int. Business Statistics.....	(3-0)	3
or			INFO 364 Operations Management	(3-0)	3
ECON 323 Microeconomic Theory.....	(3-0)	3	MGMT 373 Managing Human Resources ⁶ ...	(3-0)	3
INFO 303 Statistical Methods.....	(3-0)	3	MGMT 450 Int. Env. of Business ⁸	(3-0)	3
MGMT 363 The Management Process	(3-0)	3	Visual and performing arts elective ⁶		<u>3</u>
MKTG 321 Marketing	(3-0)	3			15
International elective ⁸		<u>3</u>			
		15			
SENIOR YEAR*					
FINC 341 Business Finance.....	(3-0)	3	MGMT 466 Strategic Management	(3-0)	3
MGMT 439 Negotiations	(3-0)	3	MGMT elective ¹²		3
MGMT elective ¹²		3	MGMT elective ¹²		3
MGMT elective ¹²		3	General electives ⁷		<u>5</u>
Business elective ¹³		<u>3</u>			14
		15			

* See Upper-Level Entry into accounting, business honors, finance, management, management information systems, marketing and supply chain management (B.B.A.) on page 297.

See footnotes on page 308.

Curriculum in Marketing

Marketing involves developing goods and services to satisfy customers' needs and then making them available at the right places, at the right times and at competitive prices. Marketing also provides information to help customers decide whether specific goods and services will meet their needs.

Recent changes in social and economic systems have created new challenges for marketing professionals. Increasingly, they must focus on both domestic and global opportunities and the explosive changes that new technology brings. They must also be continually responsive to cultural differences, quality concerns and ethical issues.

A career path in marketing typically begins in an entry-level position in advertising, retailing, logistics and distribution, marketing research, personal selling, or product management. Opportunities are available in manufacturing, wholesale and retail, as well as nonprofit organizations such as universities, government agencies, relief agencies and charitable organizations.

Success in marketing requires understanding a number of fundamental concepts, principles, theories, tools and techniques. Courses are designed to help students acquire this knowledge and to develop competencies needed throughout a marketing career.

(See Freshman and Sophomore Years)

JUNIOR YEAR*

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
FINC 341 Business Finance.....	(3-0)	3	INFO 364 Operations Management.....	(3-0)	3
INFO 303 Statistical Methods.....	(3-0)	3	MKTG 322 Buyer Behavior.....	(3-0)	3
MGMT 363 The Management Process.....	(3-0)	3	MKTG elective ¹⁴		3
MKTG 321 Marketing.....	(3-0)	3	International elective ⁸		3
General elective ⁷		<u>3</u>	Visual and performing arts elective ⁶		<u>3</u>
		15			15

SENIOR YEAR*

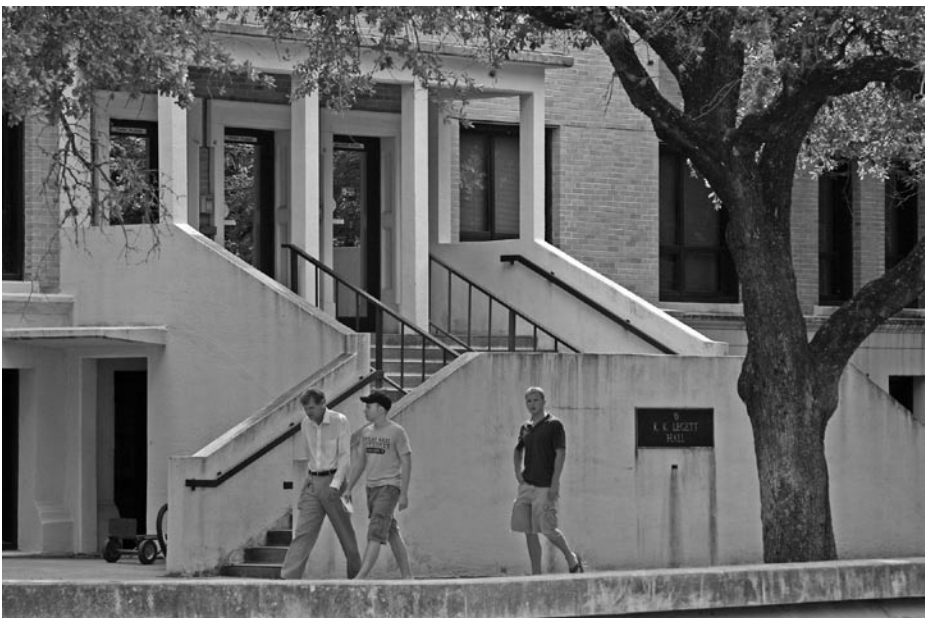
MKTG 323 Marketing Research.....	(3-0)	3	MGMT 466 Strategic Management.....	(3-0)	3
MKTG elective ¹⁴		3	MKTG 448 Marketing Management ¹⁶	(3-0)	3
MKTG elective ¹⁴		3	MKTG elective ¹⁴		3
General elective ⁷		3	Business elective ¹⁵		3
International elective ⁸		<u>3</u>	General elective ⁷		<u>2</u>
		15			14

* See Upper-Level Entry into accounting, business honors, finance, management, information systems management, marketing and supply chain management (B.B.A.) on page 297.

See footnotes on page 308.

Notes for Preceding Curricula in Accounting, Business Honors, Finance, Information and Operations Management, Management, and Marketing

1. MATH 131, 151, 171 will be accepted in lieu of MATH 142. MATH 152, 166 and 172 will be accepted in lieu of MATH 141.
2. To be selected from any American history course.
3. To be chosen from the University Core Curriculum list of natural sciences in this catalog. Information on this requirement also is in the Undergraduate Program Office, Room 238, Wehner Building.
4. For those students under ROTC contract, see section on "Requirement in Political Science (Government) and History" in this catalog.
5. To be selected from a specific list of courses in anthropology, psychology, sociology and women's studies. Students majoring in management or marketing must take PSYC 107.
6. To be chosen from the University Core Curriculum list of humanities or visual and performing arts, respectively, in this catalog. Information on this requirement also is available in the Undergraduate Program Office, Room 238, Wehner Building.
7. Elective courses are open to any course offered for University credit and may be taken on a satisfactory/unsatisfactory basis.
8. Six hours required. Three hours may be taken outside Mays Business School. Management majors must take MGMT/IBUS 450 as three of these required credit hours. A complete list of approved courses is available in the Undergraduate Program Office, Room 238, Wehner Building.
9. Any 300- or 400-level accounting course except ACCT 315, 316, 327 and 328. Before enrolling in ACCT 489, students should consult with the finance department advisor.
10. Any finance course except FINC 201, 309, 409, 478 and 484.
11. To be selected in consultation with an information and operations management academic advisor. A list of acceptable courses is available in the Undergraduate Program Office, Room 238, Wehner Building, or in the department academic advising office.
12. Any MGMT course except required MGMT courses and MGMT 105, 209, or 309.
13. Any 300- or 400-level business course (ACCT, FINC, IBUS, INFO, MKTG) except MGMT 300-499; FINC 309, 409, 341; IBUS 450, 452, 457; INFO 303, 305, 364; MKTG 309, 409, 321.
14. Any MKTG course except required MKTG courses and MKTG 309, 409.
15. Any 300- or 400-level business course (ACCT, FINC, IBUS, INFO, MGMT) except MKTG 300-499; FINC 309, 409, 341; IBUS 401, 402; INFO 303, 364; MGMT 309, 363, 466.
16. Undergraduate business students must take two (2) specific writing-designated (W) courses in their major. This course is an approved W course. See your academic advisor for additional information.



Bachelor of Science Agribusiness

The Bachelor of Science is offered in Agribusiness. The B.S. Agribusiness degree prepares students for careers in the nation’s growing agribusiness sector which provides the products and services for the production, processing and distribution of food and fiber. With the potential for expanded export opportunities, the need for graduates for agribusiness positions is increasing. The agribusiness program combines the common body of knowledge requirements of a degree in business with course work emphasizing the understanding of the unique institutional and managerial challenges facing agribusiness firms. Students integrate business management principles with technical knowledge to develop practical decision-making skills.

B.S.—Agribusiness Common Body of Knowledge

Required Courses	Credit
ACCT 229 Introductory Accounting	3
ACCT 230 Introductory Accounting	3
AGEC 217 Fundamentals of Agricultural Economics Analysis	3
AGEC 440 Agribusiness Strategic Analysis	3
AGEC 481 Ethics in Agribusiness and Agricultural Economics	1
ECON 202 Principles of Economics	3
ECON 203 Principles of Economics	3
FINC 341 Business Finance	3
INFO 303 Statistical Methods	3
INFO 364 Operations Management	3
MGMT 211 Legal and Social Environment of Business	3
MGMT 363 The Management Process	3
MKTG 321 Marketing	3
	37

B.S.—Agribusiness Major Field

Courses	Credit
AGEC 105 Introduction to Agricultural Economics	3
AGEC 317 Economic Analysis for Agribusiness Management	3
AGEC 340 Agribusiness Management	3
AGEC 414 Agribusiness and Food Market Analysis	3
AGEC 429 Agricultural Policy	3
AGEC 430 Macroeconomics of Agriculture or FINC 460 Money and Capital Markets	3
AGEC 431 Cases in Agribusiness Finance	3
ECON 322 Applied Microeconomic Theory or ECON 323 Microeconomic Theory	3
	24

Upper-Level Entry into Agribusiness (B.S.)

The requirements and procedures for consideration for upper level are as follows:

1. In order to be considered for upper level and possible admission into the program of study in agribusiness, a student must have:
 - a. Satisfactorily completed at least 60 semester credit hours.
 - b. Satisfactorily completed the following eight courses:
 - ACCT 229, 230
 - AGEC 217
 - ECON 202, 203
 - MATH 141, 142
 - MGMT 211
 - c. Students should complete the freshman and sophomore sequence of courses as listed under Curriculum in Agribusiness. Following this sequence will allow the timely application for consideration for upper level.
 - d. Admission, if granted, will be effective upon successful completion of the in-process courses; however, if all requirements are not met prior to the start of the next semester, admission will be revoked.
2. Transfer Students: Transfer students admitted to Mays Business School are classified as BUAG (lower-level Agribusiness) students until they complete all requirements listed previously in item 1.
3. Change of curriculum students: Texas A&M students who change curriculum into Mays Business School from another college or department at the University will be classified as BUAG (lower-level Agribusiness) students until they complete all requirements previously listed in item 1.

Curriculum in Agribusiness (B.S.)

FRESHMAN YEAR**

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
AGEC 105 Intro. to Ag. Econ.	(3-0)	3	MATH 142 Business Math. II	(3-0)	3
ENGL 104 Composition and Rhetoric	(3-0)	3	American history ^{1,2}		3
MATH 141 Business Math. I	(3-0)	3	Directed elective–behavioral science ³		3
American history ^{1,2}		3	Natural sciences elective ¹		4
Natural sciences elective ¹		<u>4</u>	*KINE 198 Health and Fitness Activity	(0-2)	<u>1</u>
		16			14

SOPHOMORE YEAR**

ACCT 229 Intro. Accounting	(3-0)	3	ACCT 230 Intro. Accounting	(3-0)	3
ECON 202 Principles of Economics	(3-0)	3	AGEC 217 Fund. of Ag. Econ. Analysis ⁸	(1-4)	3
MGMT 211 Legal and Social Envir. of Bus. ...	(3-0)	3	ECON 203 Principles of Economics	(3-0)	3
POLS 206 American Natl. Govt. ²	(3-0)	3	POLS 207 State and Local Govt. ²	(3-0)	3
Technical agriculture elective ⁴		<u>3</u>	Communications elective ⁵		3
		15	*KINE 199 Required Physical Activity	(0-2)	<u>1</u>
					16

JUNIOR YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
AGEC 340 Agribusiness Mgmt.	(3-0)	3	AGEC 317 Econ. Anlys. for Agribus. Mgmt... (3-0)	(3-0)	3
ECON 323 Microeconomic Theory	(3-0)	3	AGEC 429 Agricultural Policy ⁸	(3-0)	3
FINC 341 Business Finance	(3-0)	3	INFO 364 Operations Management	(3-0)	3
INFO 303 Statistical Methods	(3-0)	3	Directed elective–international ⁶		3
MGMT 363 The Management Process	(3-0)	3	Humanities elective ¹		<u>3</u>
MKTG 321 Marketing	(3-0)	<u>3</u>			15
		18			

SENIOR YEAR

AGEC 431 Cases in Agribusiness Finc. ⁸	(3-0)	3	AGEC 414 Agribus. and Food Mkt. Anlys..... (3-0)	(3-0)	3
AGEC 481 Ethics in Agribusiness and Agricultural Economics	(1-0)	1	AGEC 430 Macroeconomics of Ag. or		
Directed elective–international ⁶		3	FINC 460 Money and Capital Markets	(3-0)	3
General electives ⁷		4	AGEC 440 Agribus. Strategic Analysis	(3-0)	3
Visual and performing arts elective ¹		<u>3</u>	General electives ⁷		<u>3</u>
		14			12

- NOTES: 1. To be selected from the University Core Curriculum.
 2. For those students under ROTC contract, see section on "Requirement in Political Science (Government) and History" in this catalog.
 3. Selected from a specific list of courses in anthropology, psychology, sociology and women's studies.
 4. Three hours of technical agriculture electives to be selected from any course offered by the College of Agriculture and Life Sciences, EXCEPT 285s, 484s, 485s and AGECE courses.
 5. To be selected from AGJR 404, ENGL 203, 235, 236, 241, 301, COMM 205 or 243.
 6. Six hours are required. Three hours of international course work may be taken outside Mays Business School. A complete list of approved courses is available in the Undergraduate Program Office, Room 238, Wehner Building, or in the Undergraduate Business Student Handbook.
 7. Any Texas A&M or transfer course, except KINE 198 and KINE 199, not used to meet other requirements.
 8. Undergraduate students must take two writing-designated (W) courses in their major. This course is an approved W course in the major.

* See page 21.

**See Upper-Level Entry Requirements into Agribusiness on see page 310.

Curricular Options

International Certificate Programs. To meet the challenges of increased business globalization Mays Business School has created a variety of international certificate programs. Each program offers Mays students seeking a B.B.A. (accounting, business honors, finance, management, management information systems, marketing and supply chain management) or B.S. (agribusiness) degree the opportunity to study international business, develop understanding of other cultures and language knowledge to meet global business challenges.

Students who pursue any of the international certificate programs must complete all requirements for the specific program prior to graduation. Specific certificate requirements are available in the Undergraduate Program Office, Room 238 Wehner, of Mays Business School or in the Undergraduate Programs Office, Room 331 Blocker, of the Department of Agricultural Economics. The current requirements for each program may be found on the Center for International Business Studies Web site at cibs.tamu.edu.

Certificate in International Business

Requirements include at least 18 hours of specific course work and completion of an approved international work or study abroad experience.

Certificate in European Union Business

Requirements include 21 hours of specific course work, completion of an approved European Union work or study abroad experience, and demonstration of proficiency in a European Union language.

Certificate in Latin American Business

Requirements include 21 hours of specific course work, completion of an approved Latin American work or study abroad experience, and demonstration of proficiency in a dominant Latin American language—Spanish or Portuguese.

The College of Agriculture and Life Sciences' Department of Agricultural Economics (AGEC) offers a Certificate in International Trade and Agriculture (CITA). The program requires 15 hours of course work. Students must earn a grade of C or better in each course used to fulfill CITA requirements. Specific certificate requirements are available in the AGEC Undergraduate Programs Office, Room 331 Blocker.

Mays Business Honors. Mays Business Honors offers special opportunities for exceptionally qualified and motivated students to pursue academic course work that challenges their interests and abilities. The major recognizes the importance and need for interdepartmental business course work to solve complex problems. Outstanding students and faculty are brought together in an environment designed to encourage initiative, creativity and independent thinking.

To be eligible for application to Mays Business Honors, applicants must be admitted to Mays Business School and meet certain minimum requirements, which may include high school class rank, standardized test scores, National Merit or National Achievement status, application essay(s) and Texas A&M University cumulative GPR. Enrollment is by application and is limited. Complete information is available in Room 242, Wehner Building, and on the Mays Business Honors Web site at bizhonors.tamu.edu.

Cooperative Education. Cooperative education is designed to augment the academic program of study with on-the-job training. The co-op student is eligible to participate in this program on completion of 45 credit hours, and must have a 2.5 GPR. Interested students should contact the Cooperative Education Office at (979) 845-7725.



Restrictions on Two Degrees

Mays Business School is enrollment managed; demand for admission to the undergraduate business program consistently exceeds available educational resources. Priority is given to qualified applicants for their initial bachelor's degree.

Double Major. Students may elect two major fields of study within the B.B.A. degree. The student must satisfy all University and Business School requirements and complete all curriculum requirements for each major. This option leads to the granting of one B.B.A. degree with two majors. Students who double major must meet certain GPR and application deadline requirements.

Double Degree. Approval of double degrees (B.B.A. with B.A. or B.S.) is granted by exception only. A written appeal for a double degree may be submitted; the appeal should reflect an excellent academic record, support from the B.A. or B.S. granting college, and a compelling justification.

Second Degree. Postbaccalaureate admission to Mays is severely restricted and granted by exception only. Applicants for a postbaccalaureate business degree may present a case for an exception to this enrollment restriction in the essay of a complete Texas A&M admission application. Generally, eligible applicants are denied postbaccalaureate admission but may be encouraged to apply, instead, to an appropriate graduate degree program.

International and Cultural Diversity Requirement

Texas A&M University requires its students to meet an **International and Cultural Diversity** requirement as part of the University's Core Curriculum. Meeting this requirement will require the careful selection of courses. The student is directed to page 20 of this catalog for detailed information regarding this requirement and also is encouraged to seek the advice of the student's academic advisor.

In the B.S.—Agribusiness and B.B.A. curricula the 6 hours of approved international elective courses simultaneously fulfill the University's International and Cultural Diversity Core Curriculum requirement.



TEXAS A&M
UNIVERSITY

A black and white photograph of a bronze statue of a man with a beard, wearing a suit and tie. The statue is in the foreground, looking slightly to the left. In the background, there is a large, domed building, likely the Texas State Capitol, partially obscured by trees and foliage.

**COLLEGE OF
EDUCATION AND
HUMAN DEVELOPMENT**

★ 2008–2009 UNDERGRADUATE CATALOG ★

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College of Education and Human Development

Administrative Officers

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Associate Dean for Academic Affairs.....	James B. Kracht, B.A., M.A., Ph.D.
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Associate Dean for Graduate Program Development	Patricia Goodson, B.A., M.Ph., M.A., Ph.D.
Assistant Dean for Finance and Administration	Kelli Shomaker, B.B.A.
Assistant Dean for Administrative Services	Becky Carr, B.S., M.Ed., Ph.D.

General Statement

Within Texas A&M University, the College of Education and Human Development plays a proactive role in shaping the state and national educational agenda. To this end, programs in the College of Education and Human Development attempt to (1) develop thinking professionals whose research adds to the store of knowledge regarding teaching and learning, (2) produce exemplary teachers and administrators to serve in school systems of the state and nation, and (3) assist Texas and the nation in using up-to-date knowledge to improve educational practice in diverse settings. In summary, the College of Education and Human Development has three key functions: research, teaching and service.

Production of knowledge is central to the College of Education and Human Development's research role. The College of Education and Human Development supports both basic and applied research activities. Of particular interest is the effort to translate research findings into models and prescriptions that will result in substantive educational improvement in field settings.

In discharging its teaching function, the College of Education and Human Development seeks to prepare highly qualified professionals for a wide variety of educational settings. Teacher preparation programs are particularly committed to providing students with the ability to use sophisticated technologies in their instructional repertoires.

Service to the state and nation through teaching, supervising and assisting schools, state agencies, other institutions of higher education, and businesses and industries is a strong commitment of the College of Education and Human Development. Increasingly, these service efforts build on new knowledge generated through the College of Education and Human Development's research activities.

The College of Education and Human Development is responsible for managing programs for the preparation of certified school personnel. Other programs in the college prepare students for specific human service roles in the private sector and within state and community agencies. College of Education and Human Development majors include interdisciplinary studies (certification) EC-4, middle school, bilingual and special education; technology management and human resource development; health (including school health education), kinesiology (including physical education certification), and sport management. Students seeking middle school certification also have a choice of majoring in English

(offered through the College of Liberal Arts). Students interested in any elementary, middle school or secondary certification programs are responsible for meeting with an advisor in the Department of Teaching, Learning and Culture's Office of Undergraduate Advising. Advisors have available specific information regarding all program options.

Students seeking secondary certification in areas other than health or kinesiology must major in an academic discipline offered through the appropriate college. Professional education courses for secondary certification are offered by the College of Education and Human Development. Students interested in secondary certification must report to an advisor in the Department of Teaching, Learning and Culture's Office of Undergraduate Advising to access additional information about the multiple routes to secondary certification at the post-baccalaureate level.

Teaching fields, specialization areas and endorsements/delivery systems may be chosen from the following:

Agricultural Science	Mathematics
Bilingual (EC-4)	Middle School English
Chemistry	Middle School Science/Mathematics
Computer Science	Middle School Social Studies/ Reading-Language Arts
Early Childhood	Physical Science
English Language Arts and Reading	Reading
English as a Second Language	Science
Health (EC-12)	Social Studies
History	Spanish
Horticulture	Special Education
Kinesiology (EC-12)	
Life Science	

The College of Education and Human Development carries out its mission of research, teaching and service through the following departments: Educational Administration and Human Resource Development, Educational Psychology, Health and Kinesiology, and Teaching, Learning and Culture. Other contributing entities include Agricultural Education, the Principals' Center, the Center for Mathematics, Science and Technology Education, the Center for Distance Learning Research, and the Counseling and Assessment Clinic. Detailed descriptions of College of Education and Human Development departments are provided on the following pages. The College of Education and Human Development is required by Federal policy to make available the summary report of students' scores on the TExES examination. This information is available from the Associate Dean for Academic Affairs in the College of Education and Human Development.

General Requirements for Admission to Professional Programs

The programs of study in the College of Education and Human Development are composed of two phases—the pre-professional phase and the professional phase. The pre-professional phase consists of basic University Core Curriculum requirements and introductory courses to the major field of study. The professional phase consists of advanced work in the major field of study, courses in the professional undergirding disciplines and professional studies courses.

Upon entering the College of Education and Human Development, students are assigned a general College of Education and Human Development major that tracks the pre-professional phase of their chosen program. To advance to the professional phase of the chosen program and to be accepted into the professional major, students must meet the program entry requirements and be accepted by the program faculty. **Students are responsible for contacting the departmental advisors to obtain information about specific requirements for their major and program areas.**

Requirements for Admission to the Professional Phase of Teacher Education Programs

The State of Texas establishes standards for teacher education programs. All certification programs at Texas A&M are in compliance with these requirements. Students must meet state, University, College of Education and Human Development and department/program requirements for matriculation into a teacher education program. **Students are responsible for contacting the departmental advisors to obtain information about specific requirements for their major and program areas.** College-wide requirements for admission to teacher education include the following:

1. An approved degree/certification plan, teaching field plan(s), and application for admission to teacher education programs.
2. Minimum GPR of 2.5 based on all Texas A&M grades that apply to the student's degree/certification plan. A 2.75 GPR is required for PreK-4 and middle school programs.
3. Minimum GPR of at least 2.5 on all course work completed at Texas A&M.
4. Minimum GPR of 2.5 computed on all teaching field/major emphasis courses (those taken at Texas A&M and those taken elsewhere and transferred here) with a grade of C or higher in each teaching field/major emphasis course.
5. A grade of C or higher in each course in the INST major/professional education (TEED/TEFB) sequence.
6. Satisfy the English proficiency requirement by:
 - a. earning a grade of B or higher in ENGL 104 (or receiving credit by exam for the course); or
 - b. earning a grade of B or higher in ENGL 203, 210, 235, 236, 241 or 301; and
 - c. earning no grade below C in any course taken in (a) or (b) above.

7. Pass the THEA, ACCUPLACER, ASSET or COMPASS test or show proof of exemption from the test with appropriate TAAS (TAKS), SAT or ACT scores.
8. Have junior classification with a minimum of 15 semester credit hours at Texas A&M, and completion of University Core Curriculum and foundation requirements applicable to the respective degree program.
9. NOTE: Health and Kinesiology majors must have a grade of C or better in scientific foundation courses.
10. A \$200 fee will be assessed during the semester he/she is admitted to the Teacher Education Program. The \$200 Admission to Teacher Education fee is non-refundable.

Teacher Education Retention Policy

A student, after being admitted to teacher education, who fails to continue to meet all requirements, will be dropped from the program and may not continue in or register for any professional teacher education course. Any student removed from or who discontinues student teaching because of unsatisfactory performance will be dropped from the teacher education program. A student dropped from the teacher education program may apply through their respective department for readmission to the teacher education program. A student who is readmitted within one year from the date of termination will not have to pay the admission to teacher education fee again; a student who requests readmission one year or more after being dropped must pay the required teacher education admission fee.

Requirements for Admission to Student Teaching

1. Complete a student teaching application a semester in advance, February 1 for fall placement and September 15 for spring placement. Health, kinesiology and agricultural education majors must see their advisors for deadlines.
2. Formal Admission to Teacher Education.
3. Completion of all Education/Interdisciplinary Studies and professional courses with a grade of C or better in each course and a minimum GPR of 2.5 in the major emphasis area.
4. Grade of C or better in COMM 203 (except kinesiology).
5. (Secondary only) All certification course work must be completed. Each teaching field must have a grade of C or better in each course and a minimum GPR of 2.5 in each teaching field. Health and kinesiology majors must see departmental advisors.
6. Minimum GPR varies by program, and students must see their advisor.
7. Minimum 2.5 GPR on all course work taken at Texas A&M.

Requirements for Admission to the Professional Phase of Non-Certification Programs

The following requirements must be met by students seeking admission to the professional phase of non-certification programs.

1. An approved degree plan and application for admission to the professional phase of non-certification programs.
2. Minimum GPR as stated in program requirements available from departmental advisor.
3. Satisfy the English proficiency requirement as stated in program requirements available from departmental advisor.
4. Pass the THEA, ACCUPLACER, ASSET or COMPASS test or show proof of exemption from the test with appropriate TAAS (TAKS), SAT or ACT scores.
5. Have sophomore or junior classification with a minimum of 15 semester credit hours at Texas A&M, and completion of University Core Curriculum requirements applicable to the respective degree program.
6. Must have a grade of C or higher in all major, professional development, and scientific foundation courses.
7. Admission to professional phase of some programs may be competitive. See departmental advisor.
8. Students must meet departmental criteria before acceptance into an approved internship. (Please see departmental advisor.)

NOTE: As several of the College of Education and Human Development's **teacher education programs are undergoing change and are pending approval**, the programs offered, admission to professional programs, admission to professional phase of teacher education, retention policy, and requirements for admission to student teaching are subject to change. Students should check with advisors in the appropriate departments to receive the most current policies and procedures.

International and Cultural Diversity Requirement

Texas A&M University requires its students to meet an International and Cultural Diversity requirement as part of the University's Core Curriculum. Meeting this requirement will require the careful selection of courses. The student is directed to page 20 of this catalog for detailed information regarding this requirement and also is encouraged to seek the advice of the student's academic advisor.

Curriculum in Agricultural Science (Teaching Option)

Experiences provided in agricultural science prepare the graduate to direct a program of agricultural science as an integral part of the high school educational system or to function effectively in extension education. The teaching option in agricultural science provides a well-rounded education in areas involving teacher–student and teacher–community relationships, scientific agriculture and general education.

Courses involving teacher–student and teacher–community relationships offered in the agricultural science curriculum are educational psychology, secondary school teaching methods, principles of agricultural education, course building, methods of developing agricultural experience programs, preparation of instructional materials and student teaching in agricultural science and technology. These courses are designed to develop basic educational philosophies, methods of selecting problems to be taught, and methods of teaching in-school youth and adults involved in agriculture.

A minimum of 48 semester hours in scientific agriculture is required by the Texas Education Agency for teacher certification in agricultural science. This provides an opportunity for the graduate to have a knowledge of scientific agriculture that is essential for the successful teaching of agriculture. Master of Agriculture, Master of Education, Master of Science, Doctor of Education and Doctor of Philosophy degrees are also available to majors in agricultural education.

The curriculum is fortified by courses in English, history, political science, and natural, physical, behavioral and biological sciences. Courses in these subjects provide prospective teachers of agricultural science and technology with adequate academic and technical experiences needed to direct effective programs for youth and adults.

For further information, see the section on Agricultural Science under the College of Agriculture and Life Sciences. The Department of Agricultural Education administers the program in agricultural science. The department, in conjunction with the Department of Horticultural Sciences, also administers the certification program in vocational horticulture.

Educational Administration and Human Resource Development

The Department of Educational Administration and Human Resource Development prepares people for many professional careers associated with the broad fields of corporate education. The Bachelor of Science in Human Resource Development and the Bachelor of Science in Technology Management are designed to encourage students to achieve a bachelor's degree and to enter the profession in their area of specialty. The programs prepare graduates to assume responsibility for enhancing technology, developing workplace competence and strengthening student achievement in their career paths.

Curricula in Human Resource Development

The curricula for Human Resource Development provides students with the content and course sequence to enter the workforce in either educational or business and industry models. The program stresses application in real settings as well as strong foundations in knowledge, and has strong field-based components. The following courses have been combined to give students a well-rounded foundation in the roles and responsibilities in education and business settings.

Bachelor of Science

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ENGL 104 Comp. and Rhetoric	(3-0)	3	HIST 106 History of the U.S.....	(3-0)	3
HIST 105 History of the U.S.....	(3-0)	3	MATH 141 Business Math. I.....	(3-0)	3
PHIL 205 Tech. and Human Values			POLS 207 State and Local Govt.....	(3-0)	3
or			Humanities elective ¹		3
PHIL 251 Intro. to Philosophy.....	(3-0)	3	Natural science elective ¹		4
POLS 206 American Natl. Govt.....	(3-0)	3	*KINE 199 Required Physical Activity.....	(0-2)	1
Social and behavioral sciences elective ¹		3			17
*KINE 198 Health and Fitness Activity	(0-2)	1			
		16			

SOPHOMORE YEAR

ACCT 209 Survey of Acct. Principles	(3-0)	3	COMM 203 Public Speaking.....	(3-0)	3
ENGL 210 Sci. and Tech. Writing	(3-0)	3	INFO 209 Business Info. Systems Concepts...	(3-0)	3
MATH 142 Business Math. II	(3-0)	3	MGMT 209 Business, Govt. and Society	(3-0)	3
Natural science elective ¹		4	Visual and performing arts elective ¹		3
Elective ²		3	Elective ²		2
		16			14

JUNIOR YEAR

EHRD 303 Foundations of HR Development	(3-0)	3	EHRD 374 Organizational Development	(3-0)	3
EHRD 371 Applied Learning Principles ¹	(3-0)	3	EHRD 473 Intro. to Distance Learning	(3-0)	3
EHRD 372 Training and Development in Human Resource Development	(3-0)	3	EHRD 475 Multimedia Development for Training and Instruction	(3-0)	3
EPSY 435 Educational Statistics ²			EHRD 481 Seminar	(3-0)	3
or			MKTG 409 Intro. to Marketing	(3-0)	3
STAT 303 Statistical Methods ²	(3-0)	3			15
MGMT 309 Survey of Management	(3-0)	3			
		15			



SENIOR YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ALED 442 Professional Communication in Agriculture and Life Sciences.....	(3-0)	3	EHRD 484 Professional Internship ^{3,4}		<u>12</u>
EHRD 405 Prin. and Practices of Leadership in Human Resource Development	(3-0)	3			12
EHRD 491 Research		3			
FINC 409 Survey of Finance Principles.....	(3-0)	3			
PSYC 352 Organizational Psychology	(3-0)	<u>3</u>			
		15			

total hours 120

- NOTES: 1. To be selected from the University Core Curriculum.
 2. To be chosen in consultation with academic advisor.
 3. Prerequisite EHRD 481 Human Resource Development Seminar.
 4. Writing intensive course requirement.

Students must have completed 60 hours to register for 300/400-level courses.

Six hours of international and cultural diversity are required. Selection must be from courses on the approved list. Selection can be courses that also satisfy the requirement for social and behavioral sciences, visual and performing arts, humanities, or electives.

* See page 21.

Curricula in Technology Management

The curricula for Technology Management provides students with the content and course sequence to enter the workforce in either educational or business and industry models. The program stresses application in real settings as well as strong foundations in knowledge, and has strong field-based components. The following courses have been combined to give students a well-rounded foundation in the roles and responsibilities in education and business settings.

Bachelor of Science

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ENGL 104 Comp. and Rhetoric	(3-0)	3	HIST 106 History of the U.S.....	(3-0)	3
HIST 105 History of the U.S.....	(3-0)	3	MATH 141 Business Math. I.....	(3-0)	3
PHIL 205 Tech. and Human Values			POLS 207 State and Local Govt.....	(3-0)	3
or			Humanities elective ¹		3
PHIL 251 Intro. to Philosophy.....	(3-0)	3	Natural science elective ¹		4
POLS 206 American Natl. Govt.....	(3-0)	3	* KINE 199 Required Physical Activity.....	(0-2)	1
Social and behavioral sciences elective ¹		3			17
* KINE 198 Health and Fitness Activity	(0-2)	1			
		16			

SOPHOMORE YEAR

ACCT 209 Survey of Acct. Principles	(3-0)	3	COMM 203 Public Speaking.....	(3-0)	3
CPSC 110 Programming			INFO 209 Business Info. System Concepts....	(3-0)	3
or			MGMT 209 Business, Govt. and Society	(3-0)	3
CPSC 206 Structured Programming in C.....	(3-2)	4	Visual and performing arts elective ¹		3
ENGL 210 Sci. and Tech. Writing	(3-0)	3	Elective ²		3
MATH 142 Business Math. II	(3-0)	3			15
Natural science elective ¹		4			
		17			

JUNIOR YEAR

EHRD 371 Applied Learning Principles ⁴	(3-0)	3	EHRD 475 Multimedia Development for Training and Instruction	(3-0)	3
EHRD 473 Intro. to Distance Learning	(3-0)	3	EHRD 476 Managing Technical Networks ...	(3-0)	3
EHRD 474 Distance Networking for Training and Development	(3-0)	3	EHRD 479 Contracts and Grants	(3-0)	3
EPSY 435 Educational Statistics ²			EHRD 481 Seminar	(3-0)	3
or			MKTG 409 Intro. to Marketing	(3-0)	3
STAT 303 Statistical Methods ²	(3-0)	3			15
MGMT 309 Survey of Management	(3-0)	3			
		15			

SENIOR YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ALED 440 Principles of Tech. Change.....	(3-0)	3	EHRD 484 Professional Internship ^{3,4}		<u>12</u>
EHRD 491 Research	(3-0)	3			12
FINC 409 Survey of Finance Principles.....	(3-0)	3			
Electives ²		<u>4</u>			
		13			

total hours 120

- NOTES: 1. To be selected from the University Core Curriculum.
 2. To be chosen in consultation with academic advisor.
 3. Prerequisite EHRD 481 Human Resource Development Seminar.
 4. Writing intensive course requirement.

Students must have completed 60 hours to register for 300/400-level courses.

Six hours of international and cultural diversity are required. Selection must be from courses on the approved list. Selection can be courses that also satisfy the requirement for social and behavioral sciences, visual and performing arts, humanities, or electives.

* See page 21.

Educational Psychology

The Department of Educational Psychology offers two undergraduate certification programs: Bilingual Education and special education. Also offered are undergraduate courses designed to assist prospective educators in understanding human learning and development and to teach.

At the graduate level, the department offers the Master of Science, Master of Education and Doctor of Philosophy degrees. At the master’s level, students may emphasize educational technology; Bilingual Education; cognition, creativity, intelligence, and development; research, measurement and statistics; school counseling; or special education. Doctoral specializations include counseling psychology; cognition, creativity, intelligence and development; Bilingual Education; learning and technology; research, measurement, and statistics; school psychology; and special education.

Hispanic Bilingual Education Program

The Department of Educational Psychology offers an undergraduate degree program in Interdisciplinary Studies that includes certification in Bilingual Education and general elementary education, grades EC through 4. This program prepares teachers to instruct students who are served in bilingual classes or in general education classes at the elementary level. Students interested in certification in Bilingual Education should contact the undergraduate advisor in 701I Harrington.

Special Education Program

The Department of Educational Psychology offers an undergraduate degree program in Interdisciplinary Studies that includes certification in special education, EC through grade 12, and regular education, EC through grade 4, within the constraints of Texas Certification and No Child Left Behind mandates. This program prepares teachers to instruct students who are served by special education services. Graduates will be prepared to work with students in a wide range of grade levels and settings, serving students with mild to severe disabilities. Students interested in certification in Special Education should contact the undergraduate advisor in 701I Harrington.

Requirements for Admission to Professional Phase

The undergraduate curricula in the Department of Educational Psychology are composed of two phases: the pre-professional phase and the professional phase. Upon acceptance into the department, all students enter the pre-professional phase and are assigned a lower-division classification (EDIS). The pre-professional phase consists of University Core Curriculum requirements and introductory courses to the major field of study. After successful completion of these requirements, students are eligible to apply for admission into the professional phase. Cohorts in Bilingual and Special Education are limited in number and students are admitted on a competitive basis. If admitted to the professional phase of the program, students will be assigned an upper-level classification (INST). The professional phase consists of advanced work in the major field of study and professional development courses, with field-based experiences.

Requirements for Admission to the Professional Phase of Teacher Education Programs

The State of Texas establishes standards for teacher education programs. All certification programs at Texas A&M are in compliance with these requirements. There are three routes to certification at Texas A&M University: 1) traditional certification program, 2) post-baccalaureate program, and 3) alternative certification program. Students must meet state, University, College of Education and Human Development and department/program requirements for matriculation into a teacher education program. Below are the requirements for the traditional certification program. Students are responsible for contacting a departmental advisor to obtain information about specific requirements for majors and program areas, as some programs have requirements beyond those listed below. University-wide requirements for admission to teacher education include the following:

1. An approved degree plan or certification and teaching field plan(s).
2. Minimum GPR of 2.5 based on all course work completed at Texas A&M University (See departmental advisor for additional grade requirements).
3. Completion of all required University core courses.
4. A grade of B or higher in all certification courses (See departmental advisor for additional grade requirements).
5. Satisfaction of English proficiency requirement by
 - a. Earning a grade of B or higher in ENGL 104 (or receiving credit by exam for the course); or
 - b. Earning a grade of B or higher in ENGL 210, 235, 241, or 301; and
 - c. Earning no grade below C in any course taken in (a) or (b) above.
6. Pass the THEA, ACCUPLACER, ASSET or COMPASS test or show proof of exemption from the test with appropriate TAAS (TAKS), SAT or ACT scores.
7. Oral interview required for admission to upper level for Hispanic Bilingual Education.
8. Documentation of foreign language and computer literacy requirements on file in the Texas A&M University Office of Admissions and Records.
9. Transcripts from all institutions of higher education on file in the Texas A&M University Office of Admissions and Records.

A non-refundable \$200 application fee will be assessed to each application.

Requirements for Admission to Student Teaching

1. Successful admission to Professional Phase of Teacher Education.
2. Complete Application for Student Teaching by the given deadlines for each semester.
3. Completion of all courses listed on the degree plan. All course work must have a grade of C or better. (See departmental advisor for additional grade requirements.)
4. A minimum GPR of 3.0 in upper-level courses in Special Education. (See departmental advisor for additional grade requirements.)
5. A minimum GPR of 2.5 on all course work completed at Texas A&M. (See departmental advisor for additional grade requirements.)
6. Satisfaction of Spanish proficiency requirements (Hispanic Bilingual Education ONLY).
7. In addition to #6, satisfactory performance on the written and oral Spanish proficiency component of the Hispanic Bilingual Education program admission process.

Curriculum in Bilingual Education

The following curriculum leads to a Bachelor of Science degree in Interdisciplinary Studies with certification in Bilingual Education and general education, EC-4. Students are required to meet with their assigned academic advisor prior to registration each semester.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	ENGL 210 Sci. and Tech. Writing	(3-0)	3
HIST 105 or 106 History of the US.....	(3-0)	3	HIST 226 History of Texas.....	(3-0)	3
MATH 141 Business Math I.....	(3-0)	3	MATH 142 Business Math II	(3-0)	3
POLS 206 American Natl. Govt.....	(3-0)	3	POLS 207 State and Local Govt.....	(3-0)	3
*KINE 198 Health and Fitness Activity	(0-2)	<u>1</u>	*KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>
		13			13

SUMMER SEMESTER

Science elective ¹	4
SPAN 311 Hispanic Culture and Civil. to the 18th Century or SPAN 312 Hispanic Culture and Civil.: 18th Century to Present	(3-0) <u>3</u>
	7

SOPHOMORE YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ENGL 360 Children's Literature.....	(3-0)	3	ECON 202 Prin. of Economics		
INST 310 Understanding Special Pop.....	(3-0)	3	or		
SPAN 302 Contrastive Grammar.....	(3-0)	3	ECON 203 Prin. of Economics.....	(3-0)	3
TEFB 273 Intro. to Culture, Comm., Society and Schools.....	(2-3)	3	EFPB 210 Family Inv. and Emp.....	(2-3)	3
Science elective ¹		<u>4</u>	GEOG 305 Geog. of Texas.....	(3-0)	3
		16	Science elective ²		4
			**Visual and performing arts elective.....		<u>3</u>
					16

SUMMER SEMESTER

EPSY 320 Child Development.....	(3-0)	3
MATH 365 Structure of Math. I.....	(3-0)	3
SPAN 303 Composition and Conversation.....	(3-0)	<u>3</u>
		9

JUNIOR YEAR

BEFB 472 Bil. and Dual. Lang. Methods.....	(3-0)	3	BEFB 470 Bil. Assess. and Monitoring.....	(3-0)	3
BEFB 474 Bilingualism.....	(3-0)	3	BEFB 476 Content Area Instr. for Bil. Prog... ..	(3-0)	3
SEFB 312 Effective Reading Instruct. for Students with Disabilities.....	(2-3)	3	RDNG 301 Reading Acquisition in Early Childhood.....	(3-0)	3
SEFB 471 Classroom Mgmt. and Behavioral Intervention.....	(2-3)	3	RDNG 312 Assessmt. in Reading Instruct. in Early Childhood Education.....	(3-0)	3
SPAN 320 Intro. to Hispanic Literature.....	(3-0)	<u>3</u>	SPAN 310 Oral Expression.....	(3-0)	<u>3</u>
		15			15

SUMMER SEMESTER

EPSY 435 Educational Statistics.....	(3-0)	3
MATH 366 Structure of Math. II.....	(3-0)	3
RDNG 302 Teaching Reading Through Children's Literature (W course).....	(3-0)	<u>3</u>
		9

SENIOR YEAR

ECFB 400 Soc. St. Methods in ECE.....	(2-6)	3	BEFB 425 Student Teaching in Hisp. Bilingual Education.....	(3-0)	3
ECFB 420 Sci. Methods in ECE.....	(2-6)	3	BEFB 426 Effective Instruct. of Hisp. Students of Diverse Abilities.....	(3-0)	<u>3</u>
ECFB 440 Math. Methods in ECE.....	(2-6)	3			6
RDNG 440 Rdnng/LA Methods in ECE.....	(3-0)	<u>3</u>			
		12			

total hours 131

- NOTES: 1. Science elective to be chosen from BIOL 101, BIOL 107, BIOL 111.
2. Science elective to be chosen from CHEM 101/111, 106/116; PHYS 201 or GEOL 101.

* See page 21.

** See page 18.

Curriculum for Special Education

The following curriculum leads to a Bachelor of Science degree in Interdisciplinary Studies with certification in Special Education K-12. Students are required to meet with their assigned academic advisor prior to registration each semester.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	ENGL 210 Sci. and Tech. Writing.....	(3-0)	3
HIST 105 History of U.S.			MATH 142 Business Math II.....	(3-0)	3
or			POLS 207 State and Local Govt.....	(3-0)	3
HIST 106 History of the U.S.....	(3-0)	3	History elective ²		3
MATH 141 Business Math I.....	(3-0)	3	*KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>
POLS 206 American Natl. Govt.....	(3-0)	3			13
*KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>			
		13			

SUMMER SEMESTER

English elective ³	3
Science elective ⁴	<u>4</u>
	7

SOPHOMORE YEAR

ENGL 360 Children's Literature.....	(3-0)	3	EPFB 210 Family Inv. and Emp.....	(2-3)	3
INST 310 Understanding Special Pop.....	(3-0)	3	SPED 302 Instr. Des. St. w/ Disabl.....	(3-0)	3
TEFB 273 Intro. to Culture, Comm., Society and Schools.....	(2-3)	3	Geography elective ⁷		3
English elective.....		3	Social science elective ⁶		3
Science elective ⁴		<u>4</u>	**Visual and performing arts elective.....		<u>3</u>
		16			15

SUMMER SEMESTER

EPSY 321 Adolescent Development.....	(3-0)	3
INST 301 Educational Psychology.....	(3-0)	<u>3</u>
		6



JUNIOR YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
EPFB 428 Collab. in School Set. (W course) ..	(3-0)	3	EDTC 311 Adaptive/Assistive Technology	(3-0)	3
EPFB 484 Field Experiences	(3-0)	3	EPFB 484 Field Experiences	(3-0)	3
SEFB 310 Instr. Strat. St. w/ Disabl.	(2-3)	3	SEFB 311 Assess. of Students with Disab.	(2-3)	3
SEFB 312 Eff. Reading Instr. St. w/ Disabl. ...	(2-3)	3	SEFB 414 Methods and Issues in Low-Incidence Disabilities	(3-0)	3
SEFB 471 Classroom Mgmt.	(2-3)	<u>3</u>	SEFB 442 Teach. Students with Emotional Disturb. and Behavior Disorders	(2-3)	<u>3</u>
		15			15

SENIOR YEAR

EPSY 435 Educational Statistics	(3-0)	3	SEFB 425 Student Teaching	(0-12)	3
INST 322 Found. of Ed. in a Multi. Society ...	(3-0)	3	SEFB 426 Effective Instruction of Students of Diverse Abilities	(2-3)	<u>3</u>
INST 332 Second Lang. Instruct and Assess. or					6
BEFB 472 Bilingual and Dual Language Methodologies	(3-0)	3			
SEFB 320 Ed. and Employment Issues in Secondary Special Ed. (W course)	(3-0)	3			
KINE 429 Adapted Physical Activity	(2-2)	<u>3</u>			
		15			

total hours 121

- NOTES: 1. Science elective to be chosen from BIOL 113/123, BIOL 107, BIOL 101.
 2. History elective to be chosen from HIST 226, 301, 305, 307, 319, 451, 455, 460.
 3. Select from list of approved courses; see advisor for list.
 4. Science elective to be chosen from CHEM 101/111, 106/116; PHYS 201, 350; GEOG 203, 405; or GEOL 101.
 5. See advisor for list of approved emphasis area courses.
 6. Social Science elective to be chosen from ECON 202, 203; GEOG 201, 204.
 7. Geography elective to be chosen from GEOG 202, 301, 305, 355.
 8. Reading courses to be selected from RDNG 371, 372, 411.

* See page 21.

** See page 18.

Health and Kinesiology

The Department of Health and Kinesiology offers degrees in health, kinesiology and sport management. Several tracks are offered for students who are interested in a career in these fields. All students majoring in the Department of Health and Kinesiology are assigned an advisor in accordance with their career choice.

The curricula in health, kinesiology and sport management offer opportunities to obtain professional preparation for careers as health and physical education teachers in public and private schools, coaches, sport administrators, community health educators, clinical and applied exercise physiologists, exercise scientists, recreational leaders (in non-school agencies), sports marketing professionals, athletic administrators and in the sport management field. The department also provides training for students interested in allied health and medical related professional schools, e.g., physical therapy, occupational therapy, physicians' assistant or medicine.

The Department of Health and Kinesiology also offers minors in Coaching, Dance and Sport Management. The Coaching and Dance minors consist of 18 credit hours. The Sport Management minor is 15 credit hours. A list of courses and enrollment information regarding the minor may be obtained from the Office of Student Affairs in the Department of Health and Kinesiology.

The Department of Health and Kinesiology also offers the Master of Education, Master of Science, Doctor of Education and Doctor of Philosophy degrees.

Teacher Certification

Students majoring in either health or kinesiology may qualify for a Provisional Teaching Certificate after being admitted to teacher education, completing the prescribed requirements, and being recommended by the department to the Texas Education Agency through the University's Council for Teacher Education. Completion of this degree and other academic requirements does not automatically assure that the student will be recommended for a teaching certificate. Students interested in Texas certification for a teaching career must apply for, and be admitted to, the professional phase of teacher education. See the section entitled "Requirements for Admission to the Professional Phase of Teacher Education" for additional information. Students should see an academic advisor for specific courses.

Non-Teacher Certification Tracks

Students may seek a career other than public school teaching. The department offers opportunities in Community Health, Exercise Science and Sport Management. Students are encouraged to declare career intentions early so that appropriate course work and field experiences may be planned. Students pursuing careers other than teaching are not eligible for teacher certification. These opportunities are briefly summarized in the following descriptions of each track.

Students interested in obtaining a degree must apply for, and be admitted to, the professional phase of a specific track (i.e., Exercise Science, Sport Management, or Community Health). See the section entitled "Requirements for Admission to the Professional Phase of Non-Certification Tracks" for additional information.

Departmental Advising

Because of the wide variety of careers in health, kinesiology and sport management and the difference in course requirements for each, it is essential for students to take advantage of the advising opportunities offered by the department. Students are assigned to an academic advisor in accordance with their degree choice. Students are encouraged to declare career intentions early so appropriate course work may be planned. All undergraduate advising matters are handled by the advisors in the department's Office of Student Affairs. Information concerning entrance to professional schools in health-related fields is available from the Office of Professional School Advising.

Students are encouraged to become involved in professional organizations and extracurricular activities that afford opportunities for becoming involved in their respective professions.

General Requirements for Admission to Professional Phase

The curricula in the Department of Health and Kinesiology are composed of two phases: The pre-professional phase and the professional phase. Upon acceptance into the department, all students enter the pre-professional phase and are assigned a lower-division classification in Health (EDHL), Kinesiology (EDKI) or Sport Management (EDSM). The pre-professional phase consists of University Core Curriculum requirements and introductory courses to the major field of study. After successful completion of these requirements, students may be accepted into the professional phase and assigned an upper-level classification in Health (HLTH), Kinesiology (KINE) or Sport Management (SPMT). The professional phase consists of advanced work in the major field of study and professional development courses. Students are not guaranteed automatic admission to the professional phase.

Requirements for Admission to the Professional Phase of Teacher Education

The State of Texas establishes standards for teacher education. All certification programs at Texas A&M University are in compliance with these requirements. Students must meet State, University, College of Education and Human Development and department/program requirements for matriculation into teacher education. Students are responsible for contacting the Office of Student Affairs in the Department of Health and Kinesiology to obtain information about specific requirements, which include the following.

1. Physical Education: Complete ENGL 104 and 210 with a grade combination of B/C or higher.
School Health: Complete ENGL 104 and COMM 203 with a grade combination of B/C or higher.
2. Complete the following courses with a grade of C or better:
 - a. Physical Education: BIOL 111 and 319; KINE 121, 213, 240, 307 and 199M (4); KNFB 322; PHYS 201.
 - b. School Health: BIOL 111, 319, and 320; CHEM 101/111; HLTH 210, 231, 236, 240 and 332; KNFB 322; MATH (3).

3. GPR requirements:
 - a. minimum of 2.5 on all course work completed at Texas A&M.
 - b. minimum of 2.5 on all course work that applies to the degree plan.
 - c. minimum of 2.5 on all major (HLTH and KINE) courses.
 - d. minimum of 2.5 in all teaching fields.
4. A grade of C or better must be made in each of the following: science, professional development, major (HLTH and KINE) and teaching field courses (those courses taken at Texas A&M and those taken elsewhere and transferred to Texas A&M).
5. Pass the THEA, ACCUPLACER, ASSET or COMPASS test or show proof of exemption from the test with appropriate TAAS (TAKS), SAT or ACT scores.
6. Complete application for the professional phase of teacher education before the deadline during the semester all above criteria are met (see academic advisor for date).
7. Demonstrate swimming proficiency (for KINE majors).

NOTE: A \$200 non-refundable fee will be assessed upon admission to the professional phase of Teacher Education.

Requirements for Admission to Student Teaching

1. Successful admission to Professional Phase of Teacher Education.
2. Complete Application for Student Teaching before the deadline for the semester preceding enrollment in KNFB 416 (Kinesiology) or HLTH 415 (Health).
3. Complete all degree plan course work except KNFB 450.
4. GPR requirements:
 - a. minimum of 2.5 on all course work completed at Texas A&M.
 - b. minimum of 2.5 on all course work that applies to the degree plan.
 - c. minimum of 2.5 computed for each: professional development, major and second teaching field courses.
5. A grade of C or better must be made in each of the following: science, professional development, major and second teaching field courses (those courses taken at Texas A&M and those taken elsewhere and transferred to Texas A&M).
6. Complete final defense of portfolio.

Requirements for Admission to the Professional Phase of Non-Certification Tracks

The following requirements must be met by students seeking admission to the professional phase of non-certification tracks in Health and Kinesiology.

1. **Kinesiology:** Complete ENGL 104 and ENGL/COMM elective with a grade combination of B/C or higher.
Health: Complete ENGL 104 and COMM 203 with a grade combination of B/C or higher.
2. Complete the following courses with a grade of C or better:
 - a. **Sport Management:** COMM 203; ECON 202; ENGL 104; SPMT 217.
 - b. **Exercise Science:** BIOL 111, 112, 319 and 320; CHEM 101/111 and 102/112; KINE 121 and 213; MATH 131 and 141; PHYS 201 and 202.
 - c. **Community Health:** BIOL 111, 319, and 320; CHEM 101/111; HLTH 210, 231, 240 and 331; MATH (3).
3. Minimum of 2.25 on all course work completed at Texas A&M except Sport Management which requires a 2.00. Community health and allied health require a 2.5 on all degree plan course work for admission to the professional phase.
4. Pass the THEA, ACCUPLACER, ASSET or COMPASS test or show proof of exemption from the test with appropriate TAAS (TAKS), SAT or ACT scores.
5. Applied Exercise Physiology and Sport Management have additional requirements. Please see your academic advisor for these.
6. Admission to the professional phase for field-based tracks (applied exercise physiology, community health, sport management) is competitive and not guaranteed. Please contact your advisor regarding admission.

Requirements for Admission to Internship

1. Successful admission to Professional Phase of Non-Certification Track.
2. Complete Intent to Intern form by the deadline the semester preceding enrollment in SPMT 402 (Sport Management), KINE 483 (Exercise Science) and HLTH 415, 425 and 440 (Community Health).
3. Minimum 2.25 on all course work completed at Texas A&M except Sport Management which requires a 2.00.
4. A grade of C or better must be made in each of the following: Science, professional development and major courses (those courses taken at Texas A&M and those taken elsewhere and transferred to Texas A&M).
5. Complete all degree plan courses prior to internship experience.

Curricula in Kinesiology

The following curricula lead to a Bachelor of Science degree in Kinesiology. There are several tracks designed to prepare students for a variety of careers in public school education and exercise science. The Division also provides training for students interested in health-related professional schools, e.g., physical therapy, occupational therapy, physician's assistant or medicine. There are some common course requirements for all tracks. The additional hours for each track are specifically designed to prepare students for that field of study. The following are common core curriculum and foundation courses. The sequencing of these courses should be determined in consultation with an appropriate academic advisor. The International and Cultural Diversity requirement may be satisfied by careful selection of electives. Students should consult their advisor to ensure proper course selection.

CORE CURRICULUM AND FOUNDATION COURSES

Required Courses	(Th-Pr)	Cr
BIOL 111 Introductory Biology	(3-3)	4
BIOL 319 Integrated Human Anatomy and Physiology I	(3-3)	4
BIOL 320 Integrated Human Anatomy and Physiology II	(3-3)	4
ENGL 104 Comp. and Rhetoric.....	(3-0)	3
ENGL/Comm. Core Elective		1
KINE 121 Physical and Motor Fitness Assessment	(1-2)	2
KINE 213 Foundations of Kinesiology	(3-0)	3
MATH 131 Math Concepts - Calculus or MATH 142 Business Math II	(3-0)	3
MATH 141 Business Math I.....	(3-0)	3
PHYS 201 College Physics	(3-3)	4
POLS 206 American National Government.....	(3-0)	3
POLS 207 State and Local Government	(3-0)	3
PSYC 107 Introduction to Psychology	(3-0)	3
History electives ¹		6
Humanities elective ¹		3
Visual and performing arts elective ¹		3
KINE 198 Health and Fitness Activity.....	(0-2)	1
*KINE 199 Majors (2) Required Physical Activity	(0-2)	2
 Common Upper-Level Courses		
KINE 318 Athletic Injuries	(3-0)	3
KINE 426 Exercise Biomechanics	(3-3)	4
KINE 433 Exercise Physiology	(3-0)	3

NOTE: 1. To be chosen in consultation with academic advisor.

* Participation in band or athletics cannot be used for KINE 199 credit. KINE 199 activities cannot be repeated for credit and must be taken for a grade.

All-Level Physical Education Teacher Certification Option

This option is offered to students wishing to teach physical education in public or private school. The all-level certification qualifies the recipient to teach in preschool–12th grades in physical education/wellness only. This degree plan includes a full semester of student teaching in a public school setting after the completion of course work. This degree plan will provide a program that will lead to successful completion of the certification requirements outlined by the State of Texas. Additional program information is available on the Department of Health and Kinesiology Web site hlknweb.tamu.edu or by contacting the advising office in the department.

ALL-LEVEL CERTIFICATION

Required Courses	(Th-Pr)	Cr
HLTH 421 Elementary School Health Instruction.....	(3-0)	3
KINE 199 Required Physical Activity (Majors)	(0-2)	4
KINE 215 Fundamentals of Coaching	(1-0)	1
KINE 240 Computer Technology in Health and Kinesiology	(2-2)	3
KINE 307 Lifespan Motor Development	(3-0)	3
KINE 308 Integrated Adventure Education	(2-3)	3
KINE 311 Fundamentals of Rhythm and Dance (Meets VPA req.).....	(2-3)	3
KINE 425 Tests and Measurements	(3-0)	3
KINE 429 Adapted Physical Activity.....	(2-2)	3
KNFB 315 Elementary School Physical Activity.....	(2-2)	3
KNFB 322 Teaching and Schooling in Modern Society	(2-2)	3
KNFB 323 Teaching Skills I	(2-3)	3
KNFB 416 Middle and Secondary School Physical Activity.....	(2-2)	3
KNFB 450 Supervised Student Teaching.....	(0-30)	6
PSYC 307 Developmental Psychology	(3-0)	3
Support field electives ¹		9

NOTE: 1. To be chosen in consultation with your academic advisor.

Exercise Science Track

This track is offered to prepare and educate students who wish to enter the field of exercise science. Students are exposed to a strong science background making them excellent candidates for employment opportunities in exercise related areas (cardiac rehabilitation, corporate or private fitness), advanced graduate studies (motor behavior, exercise physiology) or professional school (medical, dental or physical therapy). Course prerequisites for medical, dental or physical therapy professional schools are included in the various programs under this track. All health and kinesiology majors must consult with an academic advisor for proper course selection.

Required Courses		
BIOL 112 Introductory Biology II	(3-3)	4
CHEM 101 Fund. of Chemistry I.....	(3-0)	3
CHEM 111 Fund. of Chemistry I Lab.....	(0-3)	1
CHEM 102 Fund. of Chemistry II	(3-0)	3
CHEM 112 Fund. of Chemistry II Lab.....	(0-3)	1
KINE 427 Therapeutic Principles	(3-0)	3
PHYS 202 College Physics II.....	(3-3)	4
STAT 302 Statistical Methods	(3-0)	3
Electives (required and elective) ¹		31

NOTE: 1. To be chosen in consultation with your advisor.

Curricula in Sport Management

The following curriculum leads to a Bachelor of Science degree in Sport Management. This degree is designed to prepare students for careers as administrators and managers in athletic, health and country clubs, as well as entry-level management positions in college and professional athletic organizations. Through this program, students are prepared for a diversity of roles in the areas of sport marketing and promotions, facility management and planning, activity programming and events management. Students may elect a track to complete an internship or may select the non-internship track. The internship, following course work, provides students with on-the-job experience and networking opportunities. Students in the internship track will have also completed a Business minor. The non-internship track allows students to study sport management from a specific perspective with the goal of continued educational experiences in graduate or professional school, obtaining a post-baccalaureate internship or securing an entry-level position in a sport organization. Students in the non-internship track must complete 2 minors/cognates from a list of approved minors/cognates (i.e., Business, Journalism, Speech Communications, etc.). There are common course requirements for both tracks.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ENGL 104 Comp. and Rhetoric	(3-0)	3	ECON 202 Principles of Economics.....	(3-0)	3
SPMT 217 Foundations of Sport Mgmt.....	(3-0)	3	ENGL 210 Sci. and Tech. Writing	(3-0)	3
MATH 141 Business Math. I.....	(3-0)	3	MATH 142 Business Math. II	(3-0)	3
History elective ¹		3	History elective ¹	(3-0)	3
Visual and performing arts elective		3	Humanities elective ¹		3
KINE 199 Req. Physical Activity.....	(0-2)	1	KINE 198 Health and Fitness Activity.....	(0-2)	1
		<u>16</u>			<u>16</u>

SOPHOMORE YEAR

COMM 203 Public Speaking.....	(3-0)	3	POLS 207 State and Local Govt.....	(3-0)	3
KINE 240 Comp. Tech. in Health and Kine..	(2-2)	3	PSYC 304 Psyc. of Sports and Phy. Activity...	(3-0)	3
POLS 206 American Natl. Govt.	(3-0)	3	Directed elective/minor ¹		3
Directed elective/minor ¹		3	Natural science elective		4
Natural science elective		4	Elective		3
		<u>16</u>			<u>16</u>

The following are common junior- and senior-level courses required for both tracks.

KINE 319 Sociology of Sport.....	(3-0)	3
SPMT 333 Sport Management	(3-0)	3
SPMT 421 Legal Aspects of Sport.....	(3-0)	3
SPMT 422 Financing Sport Operations	(3-0)	3
SPMT 423 Marketing Aspects of Sports	(3-0)	3
SPMT 482 Seminar	(1-0)	1
STAT 303 Statistical Methods	(3-0)	3
Sport management electives ¹		6

The internship track must also complete the following courses.

ACCT 209 Survey of Accounting Principles.....	(3-0)	3
FINC 409 Survey of Finance Principles.....	(3-0)	3
SPMT 402 Pre-Internship Field Experience.....	(1-0)	1
SPMT 484 Internship in Kinesiology		12
MGMT 209 Business, Government and Society.....	(3-0)	3
MGMT 309 Survey of Management	(3-0)	3
MKTG 409 Introduction to Marketing	(3-0)	3
Directed elective ¹		3

The non-internship track must also complete the following courses.

SPMT 482 Seminar	(1-0)	1
Minor/cognate ¹		9-15
Minor/cognate ¹		9-15
Directed elective ¹		0-12

NOTE: 1. To be chosen in consultation with your academic advisor.

Curricula in Health

The goals of the curriculum leading to a Bachelor of Science in Health are to more effectively develop literate, informed professionals capable of making the world healthier and more humane. Students receive a general education through a broad exposure to information. They also receive a specialized education through course work designed to help them develop as a professional, expand their knowledge and skills related to health and prepare them for professional practice.

The curriculum in health offers three options: the Allied Health track, the Community Health track and the School Health track. The Allied Health track prepares students who want to pursue further education in an allied health field primarily nursing and occupational therapy. The Community Health track prepares health educators for work in public and/or voluntary health agencies. The School Health track meets the requirements for teacher certification in health at the K-12 level.

The Community Health and Allied Health track have these common courses for the first two years.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ENGL 104 Comp. and Rhetoric	(3-0)	3	BIOL 111 Intro. Biology I.....	(3-3)	4
HLTH 210 Intro. to the Discipline.....	(3-0)	3	COMM 203 Public Speaking.....	(3-0)	3
MATH 141 Business Math. I.....	(3-0)	3	HLTH 216 First Aid.....	(1-2)	2
History elective ¹		3	MATH 142 Business Math. II	(3-0)	3
Social sciences elective ¹		<u>3</u>	History elective ¹	(3-0)	<u>3</u>
		15			15

SOPHOMORE YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
CHEM 101 Fund. of Chemistry I.....	(3-0)	3	BIOL 319 Integ. Human Anat. and Phys. I....	(3-3)	4
CHEM 111 Fund. of Chemistry I Lab.....	(0-3)	1	HLTH 236 Race, Ethnicity and Health.....	(3-0)	3
HLTH 231 Healthy Lifestyles.....	(3-0)	3	HLTH 240 Comp. Tech. in Health and Kine.	(2-2)	3
POLS 206 American Natl. Governement.....	(3-0)	3	POLS 207 State and Local Govt.....	(3-0)	3
Humanities elective ¹		3	KINE 198 Health and Fitness.....	(0-2)	1
Visual and performing arts elective ¹		<u>3</u>	KINE 199 Req. Physical Activity.....	(0-2)	<u>1</u>
		16			15

The following are common junior- and senior-level courses required for both tracks.

BIOL 320 Integ. Human Anatomy and Physiology II.....	(3-3)	4
HLTH 335 Human Diseases.....	(3-0)	3
HLTH 342 Human Sexuality.....	(3-0)	3
HLTH 353 Drugs and Society.....	(3-0)	3
HLTH 482 Seminar in Grant Writing.....	(1-0)	1

The Community Health track requires completion of the following additional courses.

HLTH 331 Community Health.....	(3-0)	3
HLTH 415 Health Education Methodology.....	(3-0)	3
HLTH 425 Health Program Evaluation.....	(3-0)	3
HLTH 440 Cont. Issues for Community Health Interns.....	(3-0)	3
HLTH 484 Internship in Health.....	(0-36)	12
Health electives ¹		12
Electives ¹		9

The Allied Health track must also complete the following courses.

HLTH 221 Safety Education.....	(3-0)	3
HLTH 334 Women's Health.....	(3-0)	3
HLTH 403 Consumer Health.....	(3-0)	3
HLTH 410 Worksite Health Promotion.....	(3-0)	3
HLTH 429 Environmental Health.....	(3-0)	3
HLTH 482 Seminar.....	(1-0)	1
Directed electives ¹		18
Electives.....		11

NOTE: 1. To be chosen in consultation with your academic advisor.

Bachelor of Science Degree in Health

School Health Option

The curriculum of the School Health Option prepares individuals to teach only health at all levels in the public and private schools. Students are encouraged to take electives in a support field that can lead to certification in an additional content area. After completion of the course work, students are required to complete a full semester of student teaching in the public schools.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ENGL 104 Comp. and Rhetoric	(3-0)	3	BIOL 111 Intro. Biology I.....	(3-3)	4
HLTH 210 Intro. to the Discipline.....	(3-0)	3	COMM 203 Public Speaking.....	(3-0)	3
MATH 141 Business Math. I.....	(3-0)	3	HLTH 231 Healthy Lifestyles.....	(3-0)	3
History elective ¹		3	MATH 142 Business Math. II.....	(3-0)	3
Humanities elective ¹		3	History elective ¹	(3-0)	3
KINE 199 Req. Physical Activity.....	(0-2)	<u>1</u>			<u>16</u>
		16			

SOPHOMORE YEAR

CHEM 101 Fund. of Chemistry I.....	(3-0)	3	BIOL 319 Integ. Human Anat. and Phys. I	(3-3)	4
CHEM 111 Fund. of Chemistry I Lab.....	(0-3)	1	HLTH 240 Comp. Tech. in Health and Kine.....	(2-2)	3
HLTH 216 First Aid	(1-2)	2	KNFB 322 Teaching and School. in Mod. Soc.....	(2-3)	3
POLS 206 American Natl. Govt.....	(3-0)	3	POLS 207 State and Local Govt.....	(3-0)	3
Visual and performing arts elective ¹		3	PSYC 107 Intro. to Psychology.....	(3-0)	<u>3</u>
Elective ¹		3			<u>16</u>
KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>			16
		16			

JUNIOR YEAR

BIOL 320 Int. Human Anat. and Phys. II.....	(3-3)	4	HLTH 353 Drugs and Society	(3-0)	3
HLTH 332 School Health Program	(3-0)	3	INST 310 Understanding Special Pop.....	(3-0)	3
HLTH 421 Elementary School Health Inst....	(3-0)	3	KNFB 323 Intro. to Secondary School Teach.	(2-2)	3
PSYC 307 Developmental Psychology	(3-0)	3	Health electives ¹		6
Health elective ¹		<u>3</u>	Electives ¹		<u>3</u>
		16			18

SENIOR YEAR

HLTH 335 Human Diseases.....	(3-0)	3	KNFB 450 Student Teaching	(0-30)	<u>6</u>
HLTH 342 Human Sexuality.....	(3-0)	3			6
HLTH 415 Health Education Methodology...	(3-0)	3			
HLTH 482 Seminar in Grant Writing.....	(1-0)	1			
KINE 425 Tests and Measurements	(3-0)	3			
Health elective ¹		<u>3</u>			
		16			

NOTE: 1. To be chosen in consultation with your advisor.

Teaching, Learning and Culture

The Department of Teaching, Learning and Culture is responsible for undergraduate programs that lead to certification at the early childhood/elementary, middle, secondary and post baccalaureate levels. Note these exceptions: (1) students interested in teaching either health or physical education must major in the Department of Health and Kinesiology; (2) students interested in teaching agricultural science must major in the Department of Agricultural Education; (3) students interested in secondary certification can be certified through the Secondary Graduate Certification Program or the Secondary Accelerate Certification Program.

Early Childhood/Elementary or Middle Grades Certification

Baccalaureate Degree Programs. Most students interested in early childhood/elementary (PreK-4) or middle school (4-8) certification pursue a program leading to the Bachelor of Science degree (B.S.) with a major in interdisciplinary studies (INST). The INST degree certification programs prepare students for the many diverse instructional roles assumed by public school teachers. A maximum of 127 credit hours is required for the INST degree. Within this program, students may focus on: (1) early childhood (PreK–grade 4); (2) middle school (grades 4–8 math and science); and (3) middle school (grades 4–8 language arts and social studies). For complete information, see an advisor in the Department of Teaching, Learning and Culture's Office of Undergraduate Advising in Heaton Hall.

There is another baccalaureate elementary certification program available for students majoring in English. For information about this program, see an advisor in the College of Liberal Arts.

Eligibility. Students must meet the requirements for a bachelor's degree in the college and the department in which they are majoring. Further, they must meet specific admission and performance standards established by the Department of Teaching, Learning and Culture as well as requirements for professional education and certification established by the State of Texas. These requirements include admission to teacher education, admission to student teaching and qualification for initial certification. **It is the responsibility of the student to contact the Department of Teaching, Learning and Culture's Office of Undergraduate Advising for specific information pertaining to program changes.**

Requirements for Admission to Teacher Education Early Childhood/Elementary or Middle Grades Certification Programs

Please see an advisor in the Department of Teaching, Learning and Culture's Office of Undergraduate Advising for current information.

**Requirements for Admission to Teaching Education
Early Childhood/Elementary and Middle Grades Education Program**

1. Pass all sections of THEA or have state-authorized exemption.
2. Completion of a minimum 45 hours of pre-professional course work from degree program (includes University Core Curriculum courses).
3. Completion of a minimum of 32 hours of University Core Curriculum courses with no grade lower than a C.
4. Completion of TEFB 273 or INST 310 with a grade of B or higher (equivalent courses from a community college may be substituted).
5. Completion of English Proficiency grade requirement by earning a B/C grade combination in ENGL 104 and one of the following courses: 210, 235, 236, 241, or 301.
6. A GPR of 2.75 on all course work on a degree plan with no grade lower than a C.
7. Transcripts for all institutions of higher education on file in the Texas A&M University Office of Admissions and Records.
8. Approved and signed degree plan on file in the Advising Office of the Department of Teaching, Learning and Culture.
9. Payment of a \$200 non-refundable fee following acceptance into the Teacher Education Program-Professional Phase.

These requirements must be seen as minimum standards only. Successful fulfillment of all of the above requirements does not guarantee admission to the program. Admission also depends upon the number of places available and the number of applications received each year. If more qualified students apply than the available number of spaces, admission may be based on selection factors at the time of application, such as GPA in pre-professional courses, number of hours needed to complete the program, and enrollment in prerequisite courses.

Secondary Graduate Certification Program

A post-baccalaureate program leading to initial teacher certification at the secondary level is available. This program includes a public school year internship and graduate courses which may be used toward meeting requirements for the Master of Education degree (M.Ed.) in curriculum and instruction. A complete description is given under Secondary Certification. Complete information on Post-Baccalaureate Certification Programs is available from the TLAC graduate programs office located in Heaton Hall.

Requirements for Admission to Student Teaching

1. Complete a student teaching application by the given deadlines. For fall placement, the application must be submitted by February 1. For spring placement, the application must be submitted by September 10. Health and kinesiology majors and agricultural education majors must see their advisors for deadlines.
2. Formal admission to teacher education.
3. Completion of all courses listed on the degree plan. All Education/Interdisciplinary Studies and professional courses with a grade of C or better.
4. All certification course work must be completed. Each emphasis/teaching field must have a grade of C or better in each course with a minimum GPR of 2.75 in teacher emphasis/teaching field.
5. COMM 203 must be completed with a grade of C or better.
6. A minimum of 2.75 on all course work completed at Texas A&M.
7. A minimum of 2.75 on all course work that applies to the degree plan, taken at Texas A&M.
8. A minimum of 2.75 on all course work that applies to the emphasis/teaching field, taken at Texas A&M.

Curriculum for Early Childhood–Grade 4 Generalist Certification

Programs in the Department of Teaching, Learning and Culture are based upon new State standards. Students should check with the advisors in the appropriate departments to receive the most current programs, policies and procedures.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
BIOL 111 Introductory Biology I.....	(3-3)	4	CHEM 106 Molecular Sci. for Citizens.....	(3-0)	3
ECON 202 Principles of Economics			CHEM 116 Molecular Sci. for Citizens Lab....	(0-3)	1
or			HIST 105 History of the U.S.		
ECON 203 Principles of Economics			or		
or			HIST 106 History of the U.S.....	(3-0)	3
GEOG 201 Intro. to Human Geography			KINE 311 Fund. Rhythms and Dance.....	(2-3)	
or			or		
GEOG 204 Economic Geography.....	(3-0)	3	MUSC 201 Music and the Human Exp.....	(3-0)	
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	or		
MATH 141 Business Math. I.....	(3-0)	3	THAR 101 Intro. to Western Theatre.....	(2-3)	3
POLS 206 American Natl. Govt.....	(3-0)	<u>3</u>	MATH 131 Math. Concepts—Calculus		
		16	or		
			MATH 142 Business Math. II.....	(3-0)	3
			POLS 207 State and Local Govt.....	(3-0)	3
			* KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>
					17



SOPHOMORE YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
COMM 203 Public Speaking.....	(3-0)	3	ENGL 360 Literature for Children	(3-0)	3
ENGL 210 Sci. and Tech. Writing			INST 310 Understanding Special Pop.....	(3-0)	3
or			INST 322 Found. of Ed. in a Multi. Society...	(3-0)	3
ENGL 241 Advanced Composition.....	(3-0)	3	TEFB 273 Intro. to Culture, Comm.,		
GEOG 203 Planet Earth: Intro.			Society and Schools	(2-3)	3
Earth Sys. Sci.			Science elective ¹		<u>4</u>
or					16
GEOL 101 Principles of Geology	(3-3)	4			
HIST 226 History of Texas					
or					
HIST 416 Texas Since 1845	(3-0)	3			
MATH 365 Structure of Math. I	(3-0)	3			
*KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>			
		17			

SUMMER SEMESTER

STAT 303 Statistical Methods	(3-0)	<u>3</u>
		3

JUNIOR YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ECHE 321 Yng. Child and Early Chldhd. Ed.....	(2-3)	3	ECHE 332 Planning and Curriculum Dev. for Early Chldhd. Ed.....	(2-6)	3
ECHE 331 Creat. Inquiry Arts Yng. Child.	(2-3)	3	EPSY 320 Child Development.....	(3-0)	3
MATH 366 Structure of Math. II.....	(3-0)	3	GEOG 202 Geography of the Global Village or		
RDNG 301 Rdng. Acq. in Early Chldhd. Ed.....	(3-0)	3	GEOG 301 Geography of the U.S. or		
RDNG 312 Assess. in Reading Instruction in Early Chldhd. Ed.....	(3-0)	<u>3</u>	GEOG 305 Geography of Texas.....	(3-0)	3
		15	INST 334 Assessmt. of Eng. Lang. Learners...	(3-0)	3
			RDNG 302 Tchng. Rdng. through Chldrn. Lit.	(3-0)	3
			RDNG 411 Language and Reading.....	(3-0)	<u>3</u>
					18

SUMMER SEMESTER

INST 332 Second Lang. Inst. and Assess.	(3-0)	<u>3</u>
		3

SENIOR YEAR

ECFB 400 Social Studies Methods in Early Chldhd. Ed.....	(2-6)	3	ECFB 497 Residency in Early Chldhd. Ed.	<u>6-9</u>
ECFB 420 Sci. Meth. in Early Chldhd. Ed.....	(2-6)	3		<u>6-9</u>
ECFB 430 Orgnzt., Motivn. and Mgmt. in Early Chldhd. Ed.....	(2-6)	3		
ECFB 440 Math. Meth. in Early Chldhd. Ed.	(2-6)	3		
RDNG 440 Rdng./Lang. Arts Methods in Early Chldhd. Ed.....	(2-6)	<u>3</u>		
		15		

total hours 129–132

NOTES: 1. Science elective to be chosen from ENTO 222, GEOG 203, GEOL 101, PHYS 289, WFSC 335 or WFSC 409/420.

* See page 21.

**Curriculum for
Middle Grades Certification:
Math/Science Specialist**

Programs in the Department of Teaching, Learning and Culture are based upon new State standards. You must consult with an advisor in the Department of Teaching, Learning and Culture (Heaton Hall) prior to enrolling in course work each semester or term.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
BIOL 111 Introductory Biology I.....	(3-3)	4	BIOL 112 Introductory Biology II	(3-3)	4
COMM 203 Public Speaking.....	(3-0)	3	GEOG 203 Planet Earth: Intro.		
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	Earth Sys. Sci.		
HIST 105 History of the U.S.			or		
or			GEOG 101 Principles of Geology	(3-3)	4
HIST 106 History of the U.S.....	(3-0)	3	HIST 226 History of Texas		
MATH 141 Business Math. I.....	(3-0)	<u>3</u>	or		
		16	HIST 416 Texas Since 1845	(3-0)	3
			MATH 131 Math. Concepts—Calculus		
			or		
			MATH 142 Business Math. II	(3-0)	3
			MUSC 201 Music and the Human Exp.....	(3-0)	
			or		
			THAR 101 Intro. to Western Theatre	(2-3)	3
			* KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>
					18

SOPHOMORE YEAR

INST 310 Understanding Special Pop.....	(3-0)	3	CHEM 101 Fundamentals of Chem. I.....	(3-0)	3
MATH 365 Structure of Math. I.....	(3-0)	3	and		
POLS 206 American Natl. Govt.....	(3-0)	3	CHEM 111 Fundamentals of Chem. I Lab.	(0-3)	1
TEFB 273 Intro. to Culture, Comm.,			or		
Society and Schools	(2-3)	3	CHEM 106 Molecular Sci. for Citizens	(3-0)	3
* KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>	and		
		13	CHEM 116 Molecular Sci. for Citizens Lab....	(0-3)	1
			MATH 366 Structure of Math. II.....	(3-0)	3
			PHYS 205 Concepts of Physics	(3-3)	4
			POLS 207 State and Local Govt.....	(3-0)	3
			STAT 303 Statistical Methods	(3-0)	<u>3</u>
					17

SUMMER SEMESTER

ANTH 205 Peoples and Cultrs. of the World					
or					
ARTS 149 Art History Survey I					
or					
ARTS 150 Art History Survey II					
or					
ENGL 361 Literature for Adolescents	(3-0)	3			
Science elective ¹					<u>3-4</u>
					6-7

JUNIOR YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ASTR 101 Basic Astronomy	(3-0)	3	MATH 368 Intro. Abstract Math. Struc.....	(3-0)	3
ASTR 102 Observational Astronomy.....	(0-3)	1	MEFB 352 Planning and Development		
INST 322 Found. of Ed. in a Multi. Society...	(3-0)	3	for Middle Grades Curriculum	(2-6)	3
INST 332 Second Lang. Inst. and Assess.....	(3-0)	3	RDNG 372 Reading and Writing across		
MATH 367 Basic Concepts of Geometry	(3-0)	3	the Middle Grades Curriculum.....	(3-0)	3
MEFB 351 Intro. to Middle Grades:			WFSC 409 Int. Nat. Resources		
Adolescent Dvlpmnt., Phil. and Orgnztn. .	(2-6)	<u>3</u>	for Classroom Use.....	(0-3)	1
		16	WFSC 420 Ecology and Society.....	(3-0)	<u>3</u>
					13

SUMMER SEMESTER

MASC 351 Problem Solving in Math.....	(3-0)	3			
MEFB 490 Orgnztn., Motivtn. and Mgmt.					
in Middle Grades Clsrn.	(2-6)	<u>3</u>			
		6			

SENIOR YEAR

MASC 450 Integrated Math.	(3-0)	3	MEFB 497 Residency in Middle Grades Ed...	<u>6-9</u>
MATH 403 Math. and Technology.....	(3-0)	3		<u>6-9</u>
MEFB 460 Math Meth. in Middle Grades	(2-6)	3		
MEFB 470 Sci. Meth. in Middle Grades	(2-6)	3		
RDNG 490 Assess. in Reading Inst.				
in Middle Grades.....	(2-6)	<u>3</u>		
		15		

total hours 130-134

NOTES: 1. Science elective to be chosen from ATMO 201/202, BIOL 319, 355; CHEM 102, ENTO 313, GEOG 203, 405, GEOL 330, OCNG 251/252, PHYS 201, SCEN 285, 485, WFSC 335.

* See page 21.



**Curriculum for
Middle Grades Certification:
Language Arts/Social Studies Specialist**

Programs in the Department of Teaching, Learning and Culture are based upon new State standards. You must consult with an advisor in the Department of Teaching, Learning and Culture (Heaton Hall) prior to enrolling in course work each semester or term.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
BIOL 111 Introductory Biology I.....	(3-3)	4	GEOG 203 Planet Earth: Intro. Earth Sys. Sci.		
ECON 202 Principles of Economics			or		
or			GEOG 101 Principles of Geology	(3-3)	4
ECON 203 Principles of Economics			HIST 105 History of the U.S.	(3-0)	3
or			MATH 131 Math. Concepts—Calculus		
GEOG 204 Economic Geography.....	(3-0)	3	or		
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	MATH 142 Business Math. II	(3-0)	3
MATH 141 Business Math. I.....	(3-0)	3	MUSC 201 Music and the Human Exp.....	(3-0)	
POLS 206 American Natl. Govt.....	(3-0)	<u>3</u>	or		
		16	THAR 101 Intro. to Western Theatre	(2-3)	3
			POLS 207 State and Local Govt.....	(3-0)	3
			*KINE 198 Health and Fitness Activity	(0-2)	<u>1</u>
					17

SOPHOMORE YEAR

COMM 203 Public Speaking.....	(3-0)	3	ENGL 323 The American Renaissance		
ENGL 227 Amer. Lit.: Colonial to Amer. Ren.			or		
or			ENGL 336 Life and Lit. of the Southwest		
ENGL 228 Amer. Lit.: Civil War to Prsnt.	(3-0)	3	or		
HIST 106 History of the U.S.	(3-0)	3	ENGL 339 African-American Lit.		
HIST 226 History of Texas			or		
or			ENGL 362 Hispanic Lit. in the U.S.....	(3-0)	3
HIST 416 Texas Since 1845	(3-0)	3	ENTO 222 Insects and Human Society		
Literature elective ¹		3	or		
* KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>	Science elective ²	(3-0)	3
		16	GEOG 201 Intro. to Human Geography		
			or		
			GEOG 202 Geography of the Global Village	(3-0)	3
			INST 310 Understanding Special Pop.....	(3-0)	3
			TEFB 273 Intro. to Culture, Comm., Society and Schools	(2-3)	3
			English elective ³		<u>3</u>
					18

SUMMER SEMESTER

STAT 303 Statistical Methods.....	(3-0)	<u>3</u>
		3

JUNIOR YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
INST 322 Found. of Ed. in a Multi. Society...	(3-0)	3	INST 332 Second Lang. Inst. and Assess.....	(3-0)	3
MEFB 351 Intro. to Middle Grades: Adolescent Dvlpmnt., Phil. and Orgnztn.	(2-6)	3	INST 334 Assessmt. of Eng. Lang. Learners...	(3-0)	3
RDNG 371 Multicultural and Interdisc. Lit. for Middle Grades	(3-0)	3	MEFB 352 Planning and Development for Middle Grades Curriculum	(2-6)	3
RDNG 372 Reading and Writing across the Middle Grades Curriculum.....	(3-0)	3	RDNG 381 Language and Reading in Middle Grades.....	(3-0)	3
History elective ⁴		3	Geography elective ⁶		<u>3</u>
Political science elective ⁵		<u>3</u>			15
		18			

SUMMER SEMESTER

MEFB 490 Orgnztn., Motivtn. and Mgmt. in Middle Grades Clsrn.	(2-6)	<u>3</u>
		3

SENIOR YEAR

MEFB 450 Soc. Stud. Meth. in Mdle. Grades.....	(2-6)	3	MEFB 497 Residency in Middle Grades Ed. ...	<u>6-9</u>
RDNG 470 Rdng./Lang. Arts Methods in Middle Grades Education	(2-6)	3		6-9
RDNG 490 Assess. in Reading Inst. in Middle Grades.....	(2-6)	3		
Political science elective ⁵		<u>3</u>		
		12		

total hours 127-130

- NOTES: 1. Literature elective must be satisfied by 3 hours chosen from ENGL 221, 222, 227, 228, 231 or 232.
 2. Science elective to be chosen from ANTH 225, ATMO 201/202, OCNL 251/252, PHYS 289, WFSC 335 or 409/420.
 3. English elective must be satisfied by 3 hours chosen from ENGL 203, 210, 241 or 301.
 4. History elective to be chosen from HIST 258, 301, 307, 319, 336, 342, 345, 348, 352, 355, 356, 359, 361, 362, 363, 374, 412, 421, 440, 441, 455, 456, 457, 460, 461, 473.
 5. Political science elective must be satisfied by 3 hours chosen from POLS 314, 315, 316, 317 or 319, and 3 hours chosen from POLS 329, 331, 347, 369, 415 or 421.
 6. Geography elective to be chosen from GEOG 301, 305, 311, 320, 355.

* See page 21.

Secondary Graduate Certification Program

This program is designed for those candidates who have completed the baccalaureate degree and desire initial certification at the secondary level. Candidates are admitted upon recommendation of departmental advisors and progress through summer, fall and spring as a cohort. The certification program requires completion of 21 graduate semester credit hours and the successful completion of appropriate State examinations. A full public school year internship and the opportunity to apply all course work toward the Master of Education degree are unique features of this program. The candidate may, upon approval by the department and a cooperating school district, serve as an intern in a full-time salaried teacher of record position, in a part-time salaried teaching position, or as a paid substitute teacher. All candidates will serve a full public school year internship whether in a salaried or non-salaried position.

Prerequisites

Completion of the following prior to the first summer session:

1. Baccalaureate degree from an accredited institution with a GPR of 2.75.
2. Nine (9) semester credit hours.
INST 310 Special Populations or SPED 621* Overview of Exceptional Students
INST 301 Educational Psychology or EPSY 602* Educational Psychology
TEFB 322 Teaching and Schooling in a Modern Society or TEFB 324 Teaching Skills II
EPSY 321 Adolescent Development or EPSY 646* Issues in Child and Adolescent Development
* Because these graduate courses are prerequisite for admission to the program, they may be applied toward a Master's degree but not toward certification.
3. Course work for one teaching field as approved by the teaching field advisor.
4. Admission to Graduate Studies and the Department of Teaching, Learning and Culture with a minimum quantitative GRE score of 400 and a suggested verbal GRE score of 400.
5. Pass the appropriate content area TExES exam.

Course of Study for Secondary Certification at the Post-Baccalaureate Level

Enrollment in the following courses is limited to candidates pursuing initial secondary certification in the post-baccalaureate program.

Summer Session I: 9 credit hours:

Credit

- 3 EDCI 611 Teaching English as a Second Language (3-0)
- 3 TEED 602 Contemporary Perspectives on Education (2-3)
- 3 TEED 649 Instructional Strategies in Academic Specialties in the Middle and Senior High School: Principles and Applications (2-3)

Fall Semester: 6–9 credit hours:

Credit

- 3 TEED 682 Seminar
- 3–6 TEED 684 Professional Internship. Full day of in-school activities.

Candidates in a one-half time paid or non-paid internship may, with approval of an advisor, enroll in 3 credit hours of approved course work, providing it does not interfere with the internship day.

Spring Semester: 6–9 Credit hours:

Credit

- 3 TEED 682 Seminar
- 3–6 TEED 684 Professional Internship. Full day of in-school activities.

Recommendation for Certification. Upon successful completion of the three prerequisite courses, the teaching field plan (minimum of 24 credit hours) during the summer, fall and spring semesters, a demonstrated competency in speech and technology, and passing scores on all State-required examinations, candidates will be recommended for certification.

NOTE: To complete the Master of Education degree, candidates will enroll in Teaching, Learning and Culture foundation courses and courses in their teaching field(s) as approved by their graduate advisory committee. The department also offers a “certification only” option for secondary certification. Contact the TLAC office for information about the accelerate option.

Secondary Certification Through Accelerate Online Program

This program is designed for those candidates who have completed the baccalaureate degree and desire initial certification at the secondary level. The program is designed to provide college graduates with a program of teacher preparation that can be completed in 12-18 months. The Accelerate Online program provides an individual with the flexibility of completing teacher certification through online instructional modules followed by a year-long paid internship in a secondary public school in Texas. Other information and additional program requirements can be obtained from Lynn Beason at lbeason@coe.tamu.edu or (979) 458-3968.



TEXAS A&M
UNIVERSITY

A black and white photograph of a bronze statue of Dwight Look, a man with a beard and mustache, wearing a suit and tie. The statue is in the foreground, and in the background, the large, domed building of the Texas A&M University is visible, partially obscured by trees.

**DWIGHT LOOK
COLLEGE OF
ENGINEERING**

★ 2008–2009 UNDERGRADUATE CATALOG ★

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Dwight Look College of Engineering

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General Statement

Engineering is the application of science and mathematics to the solution of relevant problems in our society. To a great extent, our current standard of living and high level of technology are due to the diligent and innovative efforts of engineers. In spite of the increasing expense of basic resources, modern engineers have succeeded in maintaining stable costs for a wide variety of goods, and at the same time have used their design and analysis abilities to introduce new products and technologies for the betterment of mankind.

The accelerating pace of industrial and technological developments has created an ever-increasing demand for highly qualified, professional engineers to maintain the momentum already achieved, and to extend and direct its course. The ever-expanding population and the increased demands for goods and services have imposed new challenges to present and future engineers to provide for these things and, at the same time, minimize the unwanted side effects of such efforts. Engineers recognize that all actions taken have their respective costs, and that solutions to long-standing societal problems are not found in confrontation but in careful, thorough planning and study. With a pragmatic background in problem solving, engineers are perhaps best qualified to address society's problems.

The complexities of today's environment are such that all resources must be used in the best possible manner. Thus, the Look College of Engineering, through its curricula, strives to educate and train engineers who have the breadth of vision to formulate and solve the problems of today and the future. It is expected that a student who conscientiously applies himself or herself and successfully completes one of these broad engineering programs will be not only technically trained but also humanly and socially educated, and thus well prepared to make a significant contribution to the world in which he or she works.

The mission of the Dwight Look College of Engineering is to serve the state, nation and global community by providing engineering graduates who are well founded in engineering fundamentals, instilled with the highest standards of professional and ethical behavior, and prepared to meet the complex technical challenges of society.

To achieve this mission the college is committed to:

- ensuring an academic environment conducive to our faculties achieving the highest levels of academic and research excellence;
- building upon our traditional partnerships with industry, engineering practitioners and former students, to enhance our impact on the profession of engineering;
- encouraging excellence, innovation and cross-disciplinary initiatives in education and research;
- providing national and international leadership in undergraduate and graduate engineering education;
- becoming the engineering college of choice for the increasingly diverse citizenry of the state; and
- encouraging and supporting opportunities for our students to grow beyond their chosen disciplines by participation in ethics, leadership programs, study-abroad programs and research.

A student engineer can pursue any one of several career plans, according to personal ambitions, interests and abilities. The student may choose the traditional B.S. degree and consider advanced research-oriented graduate programs leading to the M.S. and Ph.D. degrees. Alternatively, the student may select the Doctor of Engineering program which is directed toward professional engineering practice and leads to the Doctor of Engineering degree. Within the Look College of Engineering, the undergraduate programs in aerospace, agricultural, biological systems, biomedical, chemical, civil, computer, electrical, industrial, mechanical, nuclear, ocean, petroleum and radiological health engineering are accredited by the Engineering Accreditation Commission of ABET, Inc. (formerly the Accreditation Board for Engineering and Technology). The electronics, manufacturing and mechanical engineering technology program, a meld of the manufacturing engineering technology and mechanical engineering technology programs, will be submitted for accreditation review at the next general review of the engineering technology programs in 2006-2007. The Computer Science program is accredited by the Computing Accreditation Commission of ABET, Inc.

After graduation an engineer will probably work as a member of a team to solve a problem, or to design a product or process. Individually, the engineer's responsibility can include many of the following: 1) the conception of the idea, including a careful delineation of the problem, 2) the design of the item or process, including operational and production requirements, 3) the selection of materials, 4) the determination of markets, 5) the assessment of sociological effects and determination of methods for controlling these effects, 6) the design or selection of machines for production and 7) the control of costs. At the present time, over two-thirds of all the technical and a large percentage of the managerial positions in industry are occupied by engineers. In addition, the reindustrialization of our nation will call for engineers to play even more of a leadership role in the future.

Entrance and Enrollment Requirements

The minimum requirements for entrance to the University are listed in the earlier pages of this catalog. Because of the importance of science and mathematics to engineering, high school students who aspire to a career in engineering are encouraged to take as many of these courses as possible. In particular, high school preparation should include four years of mathematics and four years of science emphasizing algebra, geometry, trigonometry, calculus, chemistry, physics and biology.

A critical step in an engineering education is proper individual placement in the first courses undertaken. The College strongly recommends the following guidelines to students participating in the math advanced placement examinations in high school. Incoming engineering students can earn advanced placement (AP) credits for MATH 151 with a score of 4 on the Calculus AB exam or 3 on the BC exam, and for MATH 151 and 152 by a score of 4 on the BC exam. While the student can accept these AP credits and enroll in the next course in the engineering mathematics sequence, we recommend a more conservative decision about accepting advanced placement credits in math. As a general rule, we recommend engineering students accept one less AP math credit than entitled to by these scores, and in some cases we may make a more conservative recommendation. Students should discuss this choice with their departmental undergraduate advisor before registering for mathematics classes. New Student Conferences and associated Credit by Examination tests provide information to advisors so that students are started at a level which may differ from the printed curriculum but which is appropriate to their aptitudes and background. All freshmen admitted into engineering take a mathematics assessment test before the New Student Conferences and should review algebra, trigonometry and geometry prior to taking the test. Because of the importance of computers to engineers, the Look College of Engineering encourages incoming freshmen to purchase a personal computer.



Students who meet the University and college entrance requirements enter the Look College of Engineering with a lower-division classification. Enrollment in sophomore-, junior- and senior-level engineering courses will be restricted to those students who have been moved from that lower division to a major degree sequence within the Look College of Engineering. As noted below, students enrolled in engineering technology will take a limited number of sophomore-level engineering technology courses while in the lower-division classification. Admission to a major degree sequence may be limited by the availability of instructional resources. To be considered for admission to a major degree sequence a student must be in good academic standing and have received credit for specific courses referred to as the Common Body of Knowledge (CBK) courses.

Students seeking major degree sequence admission to Computer Science must have credit for CPSC 121, 181 and 221, ENGL 104, MATH 151, 152 and 302, and 8 hours of basic science or equivalent. Students seeking admission to a major degree sequence in Engineering Technology (ET), Electronics or Telecommunications ET option, must have credit for CHEM 107; CPSC 206; ENGL 104; ENTC 210, 219 and 250; MATH 151 and 152; and PHYS 218. Students seeking admission to a major degree sequence in Engineering Technology, Manufacturing and Mechanical ET option, must have credit for CHEM 107; ENGL 104; ENGR 111 and 112; ENTC 181, ENTC 206 or 207; MATH 151 and 152; and PHYS 218. Students seeking admission to a major degree sequence in industrial distribution must have credit for CHEM 107, ENGL 104, IDIS 240, MATH 141 and 151, and PHYS 201. All other students seeking admission to a major degree sequence in engineering must have credit for CHEM 107, ENGL 104, ENGR 111 and 112, MATH 151 and 152, and PHYS 218 and 208 or equivalent.

For most programs acceptance into the upper division of a degree sequence depends on (1) completing all CBK courses with a grade of C or better; (2) achieving the program's desired grade average for the CBK courses; and (3) achieving the program's desired cumulative grade point average for courses taken at Texas A&M University. For most majors, grades of C or better are required in the CBK courses. For complete details concerning policies for repeating courses and admission to a major degree sequence in the Look College of Engineering, students should contact the Engineering Student Services and Academic Programs Office or the departmental advisor in their major department. Students may be allowed to remain as a lower-division student up to 60 hours, provided that they are in good standing and making progress as defined by their major department. At the 60-hour limit, students may be blocked from further registration in that department if the CBK and overall GPR requirements for upper division have not been achieved.

Transfer students, regardless of transfer hours, are admitted with a lower-division classification and must meet the same standards and criteria for admission to a major degree sequence as described above.

Although students are required to declare an intended major, many students enter engineering without a firm choice of major. As an aid to making a decision, the freshman courses ENGR 111 and 112, Foundations of Engineering, introduce students to engineering problems from the various disciplines. In addition, students may participate in career counseling sessions and attend presentations, career fairs and other activities sponsored by student engineering professional societies. Departmental advisors at New Student Conferences will help students select courses to fit their objectives.

Fast Track Program

Each participating department in the Look College of Engineering has streamlined its program for Fast Track participants by substituting specific graduate courses for selected undergraduate offerings. Academically qualified students take these 600-level courses during their senior year, earning graduate credit while fulfilling undergraduate requirements through "credit by exam." The individual department sets its own grade and exam requirements for earning dual credit. The department also establishes the maximum number of credit hours allowed for acceleration, usually five to seven.

Industry-University Cooperative Education

Cooperative education is a study-work plan of education in which a student alternates periods of attendance in college or university with periods of employment in industry related to his or her major. Students who choose this degree plan must complete at least 12 months of experience in order to receive the cooperative education certificate.

The practice of engineering is an art which is learned through practice as well as in the classroom. The cooperative education program provides the education that can be achieved from practice by having the student work with professional engineers on the job. Consequently, the student who graduates with the cooperative education certificate has both the academic background and the practical experience to qualify him or her for more meaningful employment in the profession of engineering. The cooperative education work periods also provide an income for students that allows them to pay for their school expenses.

Those who wish additional information concerning this program should contact the Associate Director of Cooperative Education.

Advanced Study

Students who rank in the upper half of their undergraduate class should give serious consideration to developing their full intellectual potential in engineering by continuing with advanced studies at the graduate level. Two routes are available for students. The traditional master of science and doctor of philosophy degrees should be considered by students who wish to go into research fields. For those students interested in the practice of professional engineering, the master of engineering and doctor of engineering degrees should be given serious consideration. The professional doctor of engineering degree was established in the fall of 1974 to fill a need for better-educated engineers in the practice of engineering. Students may enter this program at any time after they receive the bachelor's degree in engineering by applying and being accepted to a departmental graduate program within the Look College of Engineering. Master's level degrees require a minimum of one year of course work after the bachelor's, and the doctoral degrees require a minimum of an additional two years of course work. The doctor of philosophy also requires a dissertation based on research by the student, and the doctor of engineering requires at least one year of internship experience in industry or government.

For more information concerning these programs, please refer to the *Texas A&M University Graduate Catalog* or contact the Office of the Dean of Engineering.

The engineering programs also provide a foundation for further education in the fields of medicine, law or business. An engineering background will prepare the individual to understand, contribute to and embrace technical advances in these fields.

Curricula in Engineering

The freshman year is almost identical for degrees in aerospace engineering, biological and agricultural engineering, biomedical engineering, chemical engineering, civil engineering, computer engineering, electrical engineering, industrial engineering, mechanical engineering, nuclear engineering, ocean engineering, petroleum engineering and radiological health engineering, thus allowing a student with adequate grades to change majors within the Look College of Engineering. Although listed in eight semesters, most students will change the sequence and number of courses taken in any semester. However, deviations from the prescribed course sequence should be made with care to ensure that prerequisites for all courses are met.

In addition to the listed freshman year, please refer to the specific major curriculum for other requirements.

FRESHMAN YEAR**

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ENGL 104 Comp. and Rhetoric	(3-0)	3	CHEM 107 Chemistry for Engineers ³	(3-3)	4
ENGR 111 Foundations in Engineering I	(1-3)	2	ENGR 112 Foundations in Engineering II.....	(1-3)	2
MATH 151 Engineering Mathematics I ¹	(3-2)	4	MATH 152 Engineering Mathematics II	(3-2)	4
PHYS 218 Mechanics	(3-3)	4	PHYS 208 Electricity and Optics	(3-3)	4
University Core Curriculum elective ²		3	University Core Curriculum elective ²		3
* KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>	* KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>
		17			18

- NOTES: 1. Entering students will be given a placement test in mathematics. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.
2. To be selected from the University Core Curriculum. Of the 18 hours shown as University Core Curriculum electives, 3 must be from visual and performing arts, 3 from social and behavioral sciences, 6 from U.S. history, and 6 from POLS 206 and 207. The required 6 hours from international and cultural diversity may be met by courses satisfying the visual and performing arts, social and behavioral sciences, and the political science and history requirements if they are also on the approved list of international and cultural diversity courses (see page 20).
3. BMEN, CHEN and RHEN require 8 hours of freshman chemistry, which may be satisfied by CHEM 101/111 or CHEM 107 and 102/112; Credit by Examination (CBE) for CHEM 101/111 or CHEM 107 plus CHEM 102/112; or 8 hours of CBE for CHEM 101/111 or CHEM 107 and CHEM 102/112.

* See page 21.

**A grade of C or better will be required for the Common Body of Knowledge (CBK) Courses (MATH 151 and 152; PHYS 208 and 218; CHEM 107 (CHEM 102/112 for BMEN, CHEN and RHEN majors); ENGL 104; ENGR 111 and 112) and any other courses designated by the individual engineering departments. Prerequisites for the CBK courses will not be included in the calculations for CBK grade point average. See descriptions of individual majors and written requirements available from the departmental offices.

Energy Engineering Certificate

The objective of the Energy Engineering Certificate program is to better prepare undergraduate students to face the challenges of world energy supply and demand and how to ensure a sustainable energy future. The program will educate engineering majors and suitably prepared science majors about all energy sources, their development, generation, conversion, transmission, and use; with an emphasis on the importance of improving the standard of living for all people while at the same time preserving and improving the environment. To earn the Energy Engineering Certificate, a student must complete a minimum of 12 semester credit hours which includes one required course and three additional courses to be selected from a specified list. Completion of the certificate will be recorded on the student's University transcript.

For further information contact the specific department advisor or the Engineering Student Services and Academic Programs Office, Room 204 Zachry Engineering Center, (979) 845-7200.

Engineering Project Management Certificate

The Engineering Project Management Certificate program is intended to help meet the requirements of industry by educating undergraduate engineering students to understand complex engineering projects, project organizations and project management methods. Students completing this program will be able to work effectively in multidisciplinary engineering projects immediately after completion and to advance more rapidly within the project management organization and profession. The management of projects entails technical knowledge, engineering skills and management skills. The certificate program consists of (4) three-hour courses for a total of 12 credit hours. Two of the courses are technical electives, which can count toward the student's BS degree depending on the student's department. Core requirements include CVEN 333 (or departmental equivalent) and MGMT 309 or 363. The additional six hours are comprised of one or two engineering electives and up to one management elective in the Mays Business School. The certificate will be awarded upon completion of the B.S. degree in the Look College of Engineering. Completion of the certificate will be recorded on the student's University transcript.

For further information contact a specific engineering departmental advising office or the Engineering Student Services and Academic Programs Office, Room 204 Zachry Engineering Center, (979) 845-7200.

Engineering Scholars Program Honors Certificate

The Engineering Scholars Program (ESP) Honors Certificate offers academically talented students the opportunity to pursue engineering studies of a depth and range that will fully challenge their abilities and meet their interests. Engineering honors students have the opportunity to enroll in honors courses, obtain early involvement in graduate studies and participate in honors contracting and honors independent study. During their second and third year, students take part in special interdisciplinary seminars that focus on the practice of engineering in industry, research and development. These seminars promote student interaction with faculty, industry professionals and graduate student researchers. The ESP certificate is recorded on the student's permanent University transcript.

The Engineering Scholars Program Honors Certificate is administered through the Office of the Dean of Engineering in close collaboration with each engineering department. A departmental coordinator in each degree program is responsible for setting policy and advising and mentoring the honors students in their department.

For further information contact the Engineering Scholars Program Honors Certificate coordinator in a specific engineering department or the Engineering Student Services and Academic Programs Office, Room 204 Zachry Engineering Center, (979) 845-7200.

International Engineering Certificate

Advances in communications and transportation technologies coupled with a historical trend of nations moving towards market economies have made it possible for companies to function using the best locations and resources no matter where in the world. The resources available are of a wide variety including money, state-of-the-art technologies, know-how and scientific discoveries, raw materials, components, and human resources. An effective engineer in this global environment is one that complements his/her core technical knowledge with excellent cross-cultural competence and international exposure. The certificate program prepares graduates for positions in multinational companies and foreign organizations. All courses in the program must be completed with a grade of C or better. To earn the certificate, which is noted on the student's permanent transcript, students are required to satisfy the following:

- Language Component¹: Six (6) credits of at least 200 level courses in a single language (excluding English).
- Internationalization Component²: Six (6) credits from the International and Cultural Diversity courses in the University Core Curriculum.
- Global Engineering Design Component: Three (3) credits from one of the following:
 - ENGR 410 Global Engineering
 - Design course in an engineering department with significant international component
- International Experience Component³: Three (3) credits. The international experience component is individualized and must be approved by the College of Engineering.

NOTES: 1. Students could place out of these courses with AP credit or by showing proficiency by exam. These courses can be taken in or outside the US. However, immersion language to gain this basic level of language learning will not count for the international experience.

2. At least one course must have significant focus on international diversity.

3. May be satisfied by an approved study abroad program, international internship, directed study or research experience, or another approved course or field experience. The minimum time period to be abroad is one summer term. Students are encouraged to go abroad in programs that are appropriate to their academic and career objectives.



Polymer Specialty Certificate

The Polymer Specialty Certificate is designed to provide a strong interdisciplinary educational program for undergraduate engineering and suitably prepared science students interested in pursuing a polymer career. The certificate will also provide knowledge to reduce the training time required to turn Texas A&M students into productive members of the industrial workforce. This program is the first of its kind offered in the State of Texas. No schools in the State of Texas offer a formal polymer curriculum, despite the significant role the polymer industry plays in the state's economy. The Polymer Specialty Certificate consists of (4) three-hour courses for a total of 12 credit hours. The required courses are MEEN 458 and CHEM 466 or CHEN 451. In addition, the remaining six hours are to be selected from a list of approved courses of which three hours can be substituted with an approved individual research experience. Completion of the certificate will be recorded on the student's University transcript.

For further information contact the Polymer Technology Center, an engineering departmental advising office or the Engineering Student Services and Academic Programs Office, Room 204 Zachry Engineering Center, (979) 845-7200.

Safety Engineering Certificate

The Safety Engineering Certificate prepares the graduate for positions in several areas of safety engineering. Students completing 15 semester credit hours of the following courses earn a Safety Engineering Certificate and the specialty is recorded on the students' permanent University transcript. This specialty is administered through the Office of the Dean of Engineering. The Safety Certificate has been on transcripts since Spring 1994. The Safety Program coordinator reviews each student's course work prior to certification; both the coordinator and the Dean must then approve each student before the certificate is awarded.

To earn the certificate, students are required to take:

Course	(Th-Pr)	Cr
SENG 310 Industrial Hygiene Engineering ...	(3-0)	3
SENG 312 Systems Safety Engineering	(3-0)	3
SENG 321 Industrial Safety Engineering	(3-0)	3

Students select one of the following:

CVEN 405 Environmental Protection and Public Health	(3-0)	3
SENG 309 Radiological Safety	(3-0)	3
SENG 313 Product Safety Engineering	(3-0)	3
SENG 322 Fire Protection Engineering	(3-0)	3
SENG 455 Process Safety Engineering	(3-0)	3
SENG 477 Air Pollution.....	(3-0)	3

In addition, students select:

SENG 424 Sys. Safety Analysis and Design ...	(1-6)	3
or		
SENG 439 Ergonomics Design	(1-6)	3
or		
Any preapproved engineering capstone design course that has a safety element in the design project. Examples include: AGEN 480, CHEN 426, CVEN 456.		

For further information, contact the Mary Kay O'Connor Process Safety Center, an engineering departmental advising office or the Engineering Student Services and Academic Programs office, Room 204, Zachry Engineering Center, (979) 845-7200.

Curriculum in Aerospace Engineering

Aerospace Engineering is a complex rapidly changing field that includes aerodynamics, structures and materials, propulsion, dynamics and control, and astrodynamics. The primary application of aerospace engineering is to the design and development of flight vehicles such as aircraft, missiles, spacecraft and satellites; but aerospace engineering is also important and applicable to other vehicles and systems such as submarines, automobiles, trains, trucks, buses and rapid transit.

The mission of the Aerospace Engineering program is (1) to provide a quality undergraduate and graduate aerospace engineering education, (2) to advance the engineering and science knowledge base through research, (3) to assist industry in technical applications and innovation, and (4) to serve the aerospace profession through leadership in these areas. To achieve this mission, the educational objectives established by the Aerospace Engineering undergraduate program are to produce graduates whose expected accomplishments within two to five years of graduation are (1) to have successful careers in industry, private practice, or government, or have pursued advanced graduate studies; (2) to be skilled practitioners who apply their knowledge and skills to solve relevant engineering problems in the aerospace or a related profession; and (3) to function well in teams, communicate well, continue enhancing their professional competence, and understand the impact of engineering solutions. To carry out these educational objectives, the goals of the program are (1) using a high quality faculty, to provide a comprehensive aerospace engineering education that develops in students the fundamental skills necessary for the design, synthesis, analysis and research development of aircraft, spacecraft and other high technology flight systems; and (2) to prepare students for the aerospace engineering profession and related fields by developing in them the attributes needed so that they can contribute successfully to society and to the engineering profession now and in the future.

The curriculum is generally composed of three topical areas which are (1) core courses composed of humanities, visual and performing arts, international and cultural diversity, and social sciences, (2) basic science and mathematics, and (3) engineering science and design. The core courses are intended to broaden a student's education and to provide training in oral and written communication skills. In addition, they ensure an awareness of our cultural heritage and contemporary human situation. The basic science and mathematics courses provide the necessary foundation for the engineering science courses. The latter start at the sophomore year with topics common to many fields of engineering and continue in the last two years with sequences in aerodynamics, structures and materials, propulsion, and dynamics and control. These provide a strong fundamental basis for advanced study and specialization, while technical electives offer a concentration of study in fields of special interest. Design philosophy and practice are developed throughout the curriculum so as to relate analysis to aerospace engineering design; and the design of aerospace system components is particularly emphasized in the junior- and senior-level courses. A senior-level two-semester design sequence, involving specific goals, objectives, and constraints, integrates analysis and design tools and requires students working in small teams to design, build, test, and even fly an aerospace system such as an aircraft, rocket or spacecraft. Application of modern engineering and computational tools is required and emphasized in all courses.

The department is pleased to offer a Bachelor of Science in Aerospace Engineering with Honors degree option. This option was proposed by our students and implemented for our students. Very few programs across the country offer this type of experience within Aerospace Engineering. You will be provided with the opportunity to enhance your learning experience through one-on-one research with a faculty mentor, introduction to advanced aerospace theories, and much more.

The department's laboratories are used to supplement theoretical studies in the major disciplines. Several water and wind tunnels for low-speed and supersonic aerodynamic studies, a jet engine test facility, numerous research aircraft, a flight simulator, a satellite laboratory with Integrated Concurrent Engineering Capability, a robotics laboratory, and state-of-the-art materials and structures testing equipment are available; and all are equipped with modern instrumentation. The department and the University provide an extensive array of computing resources.

The department participates in the Cooperative Education Program which provides an opportunity for qualified students to obtain practical engineering work experience with participating companies. The co-op degree plan includes three or four work periods which are integrated with full-time study semesters.

In addition, the department offers many undergraduate research opportunities. The department also offers programs of study leading to the M.Eng., M.S., and Ph.D. degrees (see the *Texas A&M University Graduate Catalog*).

(See Freshman Year)

SOPHOMORE YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
AERO 201 Intro. to Aerospace Engr. ¹	(3-0)	3	AERO 212 Thermodynamics for Aerospace Engineers ¹	(2-2)	3
AERO 211 Aerospace Engineering Mechanics ¹	(2-2)	3	AERO 214 Aerospace Engineering Principles of Continuum Mechanics ¹	(2-2)	3
AERO 213 Material Science for Engineers ¹	(2-2)	3	AERO 320 Numerical Methods ¹	(2-3)	3
AERO 220 Intro. to Aero. Computation	(1-2)	2	ECEN 215 Principles of Electrical Engr. ¹	(2-2)	3
MATH 251 Engineering Mathematics III ¹	(3-0)	3	MATH 308 Differential Equations ¹	(3-0)	<u>3</u>
University Core Curriculum electives ²		<u>3</u>			<u>15</u>
		17			

JUNIOR YEAR

AERO 301 Theoretical Aerodynamics ¹	(3-0)	3	AERO 303 High Speed Aerodynamics ¹	(3-0)	3
AERO 302 Aerospace Lab. I	(1-3)	2	AERO 305 Aerospace Lab. II	(1-3)	2
AERO 304 Structural Analysis I ¹	(4-0)	4	AERO 306 Structural Analysis II ¹	(3-0)	3
AERO 310 Aerospace Dynamics ¹	(3-0)	3	AERO 351 Aerothermo. and Propulsion ¹	(3-0)	3
Technical writing ³		3	AERO 421 Dynamics of Aerospace Vehicles ¹	(3-0)	3
University Core Curriculum elective ²		<u>3</u>	Science elective ⁴		<u>3</u>
		18			17

SENIOR YEAR

AERO 401 Aerospace Vehicle Design I ¹	(2-3)	3	AERO 402 Aerospace Vehicle Design II.....	(0-6)	2
AERO 423 Space Technology I.....	(3-0)	3	AERO 452 Heat Transfer and Viscous Flows .	(3-0)	3
Computational Methods/Mathematics ⁵		3	ENGR 482 Ethics and Engineering.....	(2-2)	3
Design elective ⁶		3	Technical elective ⁷		3
Technical elective ⁷		<u>3</u>	University Core Curriculum electives ²		<u>6</u>
		15			17

- NOTES: 1. Requires a grade of C or better (includes all courses that are used as prerequisites for the AERO degree plan courses).
2. To be selected from the University Core Curriculum. Of the 18 hours shown as University Core Curriculum electives, 3 must be from visual and performing arts, 3 from social and behavioral sciences, 6 from U.S. history, and 6 from POLS 206 and 207. The required 6 hours from international and cultural diversity may be met by courses satisfying the visual and performing arts, social and behavioral sciences, and the political science and history requirements if they are also on the approved list of international and cultural diversity courses (see page 20).
3. To be selected from ENGL 210 or 301.
4. To be selected from PHYS 222, 306, 309 or 314.
5. To be selected from AERO 430 or MATH 401.
6. AERO 405, 417, 426, 428, 472 or 489 if designated as an AERO design elective. Requires a grade of C or better in prerequisite courses.
7. Approved technical electives include: AERO 404, 405, 406, 417, 419, 420, 422, 424, 425, 426, 428, 430, 435, 440, 445, 472, 485 (maximum of 3 hours with prior written approval of department head, senior classification), 489; MEMA 467; ECEN 421; ENGR 385 (3 hours). Requires a grade of C or better in prerequisite courses. Courses cannot double count for Design Elective, Technical Elective, or Computational Methods/Mathematics.

The Safety Engineering Certificate is available for students pursuing this degree. See page 364 for detailed information.

Curriculum in Biological and Agricultural Engineering

Biological and agricultural engineers apply their knowledge of physical and biological sciences, mathematics, engineering principles and engineering design to the production and processing of food and fiber, to the preservation of environmental quality, to biological systems and processes, and to machine systems that interface with all of these. Because of their broad general engineering background, biological and agricultural engineering graduates are sought by a wide variety of employers. Recent employers include environmental consulting firms, equipment manufacturers, crop storage and handling industries, the cotton and forest products industries, food and feed processing industries, concentrated animal production industries, biotechnology companies, electric utility companies, chemical companies, and governmental agencies. Biological and agricultural engineers are making significant contributions to meeting many basic needs of society such as maintaining food quality, quantity and safety; improving environmental quality; and enhancing the quantity and quality of our water resources.

The Biological and Agricultural Engineering Department provides quality education, research and outreach in engineering and technology for the world's agricultural, biological, environmental and food systems. Our undergraduate programs provide a high quality education for engineering and systems management students to fulfill the needs of industries we serve and advance our reputation as a world leader in engineering and systems management education.

The biological and agricultural engineering program develops graduates who can pursue engineering careers in industry, academia, consulting or government. The curriculum is designed

- to produce graduates to serve the engineering needs of clientele in environmental and natural resources, machine systems, food processing, bioprocessing, and agricultural production and processing;
- to produce graduates who are successfully employed in engineering jobs in industry, government or academia;

- to maintain our national and international reputation for program excellence; and
- to produce graduates who continue to be engaged in professional development.

Students learn to apply fundamental knowledge of biological and physical sciences, mathematics, and engineering principles to formulate and solve engineering problems. Engineering design is integrated throughout the curriculum, along with opportunities to develop communication, learning, and teamwork skills, culminating in a capstone design experience. Electives in the curriculum allow the student to specialize in

- **Environmental and Natural Resources Engineering**—design and management of systems affecting soil, water, and air resources.
- **Food and Bioprocess Engineering**—design and development of systems for processing and handling of food and agricultural products and processes involving cells, enzymes, or other biological components.
- **Machine Systems Engineering**—design and development of machines and machine systems for food, feed and fiber production and processing.

Students select courses with the assistance of faculty advisors in an individualized advising system. Faculty members also assist with professional development and job placement for students.

The biological and agricultural engineering program is jointly administered by the College of Agriculture and Life Sciences and the Dwight Look College of Engineering, and the curriculum is fully accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology. The department is one of the largest in North America and is consistently ranked as one of the top two in the nation.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
AGLS 101 Modern Ag. Systems	(1-0)	1	BIOL 113 Introductory Biology I	(3-3)	3
BAEN 150 Intro. to Biol. and Ag.			CHEM 107 Chemistry for Engineers	(3-3)	4
Engineering Design.....	(0-2)	1	ENGR 112 Foundations of Engr. II	(1-3)	2
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	MATH 152 Engineering Math. II.....	(3-2)	4
ENGR 111 Foundations of Engr. I.....	(1-3)	2	University Core Curriculum elective ²		3
MATH 151 Engineering Math. I ¹	(3-2)	4	* KINE 199 Required Physical Activity.....	(0-2)	1
PHYS 218 Mechanics	(3-3)	4			17
* KINE 198 Health and Fitness Activity.....	(0-2)	1			
		<u>16</u>			

SOPHOMORE YEAR

ENGL 210 Scientific and Tech. Writing.....	(3-0)	3	BAEN 265 Inv. Tech. for Biol.		
MATH 251 Engineering Math. III	(3-0)	3	and Ag. Engr.	(1-6)	3
MEEN 221 Statics and Particles Dynamics....	(2-2)	3	BAEN 320 Eng. Thermodynamics.....	(2-2)	3
MEEN 222 Materials Science	(3-0)	3	CVEN 305 Mechanics of Materials.....	(3-0)	3
PHYS 208 Electricity and Optics	(3-3)	4	MATH 308 Differential Equations.....	(3-0)	3
		<u>16</u>	Science elective ³		4
					<u>16</u>

JUNIOR YEAR

BAEN 340 Fluid Mechanics.....	(3-0)	3	BAEN 365 Unit Ops. for Biol. and Ag. Engr.	(2-3)	3
BAEN 354 Engr. Properties of Biological Materials.....	(2-2)	3	BAEN 366 Transport Processes in Biological Systems.....	(3-0)	3
BAEN 375 Des. of Ag. Mach. and Struc.	(3-0)	3	BAEN 370 Meas. and Control of Bio. Sys. and Ag. Processes	(2-2)	3
CHEM 222 Elements of Org. Biol. Chem.	(3-0)	3	Mathematics elective ³		3
ECEN 215 Prin. of Electrical Engr.	(2-2)	<u>3</u>	University Core Curriculum elective ²		<u>3</u>
		15			15

SENIOR YEAR

BAEN 479 Biol. and Ag. Engr. Design I.....	(1-2)	2	BAEN 480 Biol. and Ag. Engr. Design II.....	(1-5)	3
BAEN 481 Seminar.....	(1-0)	1	Engineering elective ⁴		3
ENGR 482 Ethics and Engineering.....	(2-2)	3	Technical elective ³		3
Engineering electives ⁴		6	University Core Curriculum electives ²		<u>6</u>
University Core Curriculum electives ²		<u>6</u>			15
		18			

- NOTES: 1. Entering students will normally be given a placement test in mathematics. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.
2. To be selected from the University Core Curriculum. Of the 18 hours shown as University Core Curriculum electives, 3 must be from visual and performing arts, 3 from social and behavioral sciences, 6 from U.S. history, and 6 from POLS 206 and 207. The required 6 hours from international and cultural diversity may be met by courses satisfying the visual and performing arts, social and behavioral sciences, and the political science and history requirements if they are also on the approved list of international and cultural diversity courses (see page 20).
3. Science, mathematics and technical electives are to be selected from a departmental approved list in consultation with an academic advisor to enhance the chosen career emphasis.
4. Engineering electives must include at least 6 hours of departmental engineering courses and are to be selected from an approved list in consultation with the academic advisor to enhance the chosen career emphasis.

The Systems Safety Engineering specialty is available for students pursuing this degree. See page 364 for detailed information.

* See page 21.



Curriculum in Biomedical Engineering

The curriculum in biomedical engineering involves the development and application of engineering science and technology for living and medical systems. Although there have been individuals working in biomedical engineering for centuries, today's modern educational programs are specifically designed to prepare engineers for this challenging field. The curriculum described is broadly based around a basic core of courses to prepare students for team involvement with other engineers and with physicians and life scientists in working to solve a wide array of biological and medical problems. Elective courses are included to accommodate individual student specialty interests. Students interested in medical school can meet admission prerequisites through slight modifications and additions to the curriculum.

The departmental program objectives are to produce high quality graduates who:

1. have a broad-based education in engineering, life and natural sciences, who are well prepared for further graduate studies, careers in the medical device or biotechnology industries, or entry into medical or other health related professional schools.
2. will become leaders in biotechnology industries, medicine, and other public sectors;
3. will apply acquired knowledge appropriately, work professionally with others, effectively communicate ideas and technical information, and continue to learn and improve their knowledge base and skills.

These objectives are met through a modern and comprehensive curriculum taught by a well prepared, professionally active and dedicated faculty. In addition, the program actively supports professional development among the students through individual study and research opportunities, cooperative education and internships, and student society activities. These goals are measured by the success of the graduates in finding rewarding professional employment, and by admission to respected graduate and professional schools.

Design is an important part of biomedical engineering and design skills are emphasized throughout the curriculum, beginning with the introduction of a structured approach to design in the freshman year, and culminating in the two-semester senior design course sequence that requires application of a wide range of engineering methods to a focused design project. Other courses in biomedical engineering and in supporting disciplines include examples of the application of the principles to design, as well as specific design exercises. The curriculum is accredited by the Engineering Accreditation Commission of the Accreditation Board of Engineering and Technology.

To be admitted into the upper division program in biomedical engineering, a lower-division student must earn a grade of C or better in each of the Common Body of Knowledge (CBK) courses (CHEM 101/111 and 107, ENGL 104, ENGR 111 and 112, MATH 151 and 152, and PHYS 208 and 218) and have a GPR in these courses, as well as overall, which meets or exceeds a standard set by the program to control the number of students in the upper division consistent with the program's resources. Additionally, all biomedical engineering majors are required to earn a grade of C or better in BMEN 231, BMEN 240, BMEN 282, ECEN 214, MATH 251, MATH 308, VTPP 434 and VTPP 435. See footnote to Freshman Year for additional requirements in chemistry.

(See Freshman Year)

SOPHOMORE YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
BMEN 231 Foundations of Biomechanics	(3-0)	3	BMEN 240 Biosolid Mechanics	(3-0)	3
BMEN 282 Engineering Biology	(3-0)	3	CPSC 206 Structured Programming in C.....	(3-2)	4
MATH 251 Engineering Mathematics III.....	(3-0)	3	ECEN 214 Electric Circuit Theory	(3-3)	4
VTPP 434 Physiology for Bioengineers I	(3-3)	4	MATH 308 Differential Equations.....	(3-0)	3
University Core Curriculum elective ¹		<u>3</u>	VTPP 435 Physiology for Bioengineers II	(3-3)	<u>4</u>
		16			18

JUNIOR YEAR

BMEN 305 Bioinstrumentation Lab.....	(0-3)	1	BMEN 306 Biomeasurement Lab	(0-3)	1
BMEN 321 Biomedical Electronics.....	(3-0)	3	BMEN 322 Biosignal Analysis	(3-0)	3
BMEN 341 Biofluids and Heat Transfer	(3-0)	3	BMEN 342 Biomaterials	(3-0)	3
BMEN 343 Intro. to Biomaterials.....	(2-2)	3	Technical electives ²		6
ENGL 301 Technical Writing ³	(3-0)	3	University Core Curriculum elective ¹		<u>3</u>
MATH 304 Linear Algebra	(3-0)	<u>3</u>			16
		16			

SENIOR YEAR

BMEN 420 Medical Imaging	(3-0)	3	BMEN 450 Medical Device Case Study	(1-0)	1
BMEN 453 BME Design Project I.....	(0-6)	2	BMEN 454 BME Design Project II	(0-6)	2
ENGR 482 Ethics and Engineering	(2-2)	3	Technical electives ²		9
Technical elective ²		3	University Core Curriculum elective ¹		<u>3</u>
University Core Curriculum elective ¹		<u>3</u>			15
		14			

NOTES: 1. To be selected from the University Core Curriculum. Of the 18 hours shown as University Core Curriculum electives, 3 must be from visual and performing arts, 3 from social and behavioral sciences, 6 from U.S. history, and 6 from POLS 206 and 207. The required 6 hours from international and cultural diversity may be met by courses satisfying the visual and performing arts, social and behavioral sciences, and the political science and history requirements if they are also on the approved list of international and cultural diversity courses (see page 20).

2. Technical electives are to be selected in consultation with student's advisor from an approved list available from the departmental office.

3. Suitable ENGL course may be substituted in consultation with student's advisor.

The Safety Engineering Certificate is available for students pursuing this degree. See page 364 for detailed information.

Curriculum in Chemical Engineering

Chemical engineering is a broad field of engineering and thus requires a diverse preparation in science and engineering. Distinguishing chemical engineering from other engineering disciplines is its use of chemical and biochemical reactions to produce products and materials for society. Traditionally, chemical engineers have provided leadership in the petrochemical, refining, chemical, polymer, and food processing industries. Because of strengths in the foundation sciences of mathematics, chemistry, physics and biology, as well as in engineering, this leadership role has now extended to the biochemical, biomedical, high-tech materials, semi-conductor and microelectronics, nanotechnology, environmental quality, safety, and a host of other areas. Chemical engineers have consistently commanded starting salaries among the highest of all college graduates because of the combined breadth and depth of their education.

The mission of the Artie McFerrin Department of Chemical Engineering at Texas A&M is to educate and prepare students for leadership roles in global industry, government, and academia; to attract top students to chemical engineering; to define and develop new directions in chemical engineering fundamentals and practices, and in chemical engineering education and curricula; to be a valuable resource and service base to the State, the Nation and to industry; and to provide leadership in solving problems of social and economic importance.

Objectives of the chemical engineering program are that 1) our graduates demonstrate the foundation and depth for successful chemical engineering careers in industry, academia or government, 2) our graduates demonstrate the foundation and breadth to obtain, apply and transfer knowledge across disciplines and into emerging areas of chemical engineering and related fields, 3) our graduates demonstrate effective communication, leadership and teaming skills, and 4) our graduates demonstrate that they have a sense of responsibility, are ethical in the conduct of their profession, and have an appreciation for the impact of their profession on society.

The chemical engineering curriculum provides a balanced education in virtually all aspects of chemical engineering principles and practice and includes education in economics, humanities and communication. Chemical engineering courses emphasize fundamentals and methods that are applicable to the analysis, development, design and operation of a wide variety of chemical engineering systems and processes, thereby providing the necessary background for entry into the wide array of activities described above. At the same time, specific example applications provide the student with insight into the ability of chemical engineers to work in such a variety of areas. The sequence of courses converges in the senior year into a comprehensive capstone design course that includes elements of economics, safety and environmental issues. The course provides an experience much like that of an industry design project. It is this philosophy of fundamentals, applications and design that has enabled our chemical engineering graduates to adapt readily to a dynamic and rapidly changing world and to solve problems they have not previously experienced.

To supplement course work, well-equipped laboratories provide our students with experiences in operating and analyzing a variety of unit operations and process control equipment and in the use of the modern computational tools and software used in chemical engineering.

Admission to upper-level status in chemical engineering is a prerequisite for enrolling in the chemical engineering course sequence. Specific academic performance requirements must also be met for advancement from sophomore to junior and junior to senior level in the chemical engineering course sequence (the undergraduate advisor should be consulted for specific requirements).

The two required Chemical Engineering specialty courses in the senior year provide the student an opportunity to acquire in-depth knowledge in one or more specialized areas of chemical engineering practice. These courses extend and apply the fundamentals developed in the basic courses. The courses are to be taken from a prescribed list, which includes such topics as biotechnology, materials engineering, microelectronics processing, polymer engineering, math models, etc. Other courses may also be acceptable, with special approval. This requirement may be met by taking a variety of courses in different areas, or a sequence of courses with emphasis in a specific area. Students interested in this option should consult with an advisor.

The department is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology and the American Institute of Chemical Engineers and compares favorably with the best in the nation.

(See Freshman Year¹)

SOPHOMORE YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
CHEM 227 Organic Chemistry I.....	(3-0)	3	CHEM 228 Organic Chemistry II	(3-0)	3
CHEM 237 Organic Chemistry Lab.....	(0-3)	1	CHEM 238 Organic Chemistry Lab.	(0-3)	1
CHEN 204 Elem. Chemical Engineering	(2-3)	3	CHEN 205 Chemical Engineering		
CHEN 282 Engineering Biology	(3-0)	3	Thermodynamics I	(3-0)	3
MATH 251 Engineering Mathematics III.....	(3-0)	3	MATH 308 Differential Equations.....	(3-0)	3
Elective ²		3	Electives ²		6
		16			16

JUNIOR YEAR

CHEM 316 Quantitative Analysis	(2-0)	2	CHEM 322 Physical Chemistry for		
CHEM 318 Quantitative Analysis Lab.....	(0-3)	1	Engineers	(3-0)	3
CHEN 304 Chemical Engineering Fluid			CHEM 325 Physical Chemistry Lab. I.....	(0-3)	1
Operations.....	(3-0)	3	CHEN 323 Chemical Engineering Heat		
CHEN 313 Chemical Eng. Materials	(3-0)	3	Transfer Operations.....	(3-0)	3
CHEN 320 Chemical Engineering Analysis...	(3-0)	3	CHEN 354 Chem. Engineering Thermo. II ...	(3-0)	3
Elective ²		3	ENGL 210 Scientific and Tech. Writing		
Elective ²		3	or		
		18	ENGL 301 Technical Writing	(3-0)	3
			Technical elective ³		3
					16

SENIOR YEAR

CHEM 326 Physical Chemistry Lab. II.....	(0-3)	1	CHEM 426 Chemical Engineering Plant Design.....	(1-6)	3
CHEM 414 Chemical Engineering Lab. I.....	(0-3)	1	CHEM 433 Chemical Engr. Lab. II.....	(0-3)	1
CHEM 424 Chemical Engineering Mass Transfer Operations.....	(3-0)	3	CHEM 464 Chemical Engineering Kinetics ..	(3-0)	3
CHEM 425 Process Integration, Simulation and Economics.....	(2-3)	3	CHEM specialty electives ¹		6
CHEM 455 Process Safety Engr.	(3-0)	3	Elective ²		3
CHEM 461 Process Dynamics and Control....	(3-0)	3			16
CHEM 481 Seminar	(0-2)	1			
		<u>15</u>			

- NOTES: 1. Entering students will normally be given placement tests in chemistry, mathematics and English. Test results will be used to select the appropriate starting courses, which may be at a higher or lower level. CHEM 101/111 (4 hr.) or 107 (4 hr.) is a prerequisite for CHEM 102/112 (4 hr.); credit for CHEM 101/111 by placement exam is possible for those with adequate background in chemistry.
2. To be selected from the University Core Curriculum. Of the 18 hours shown as University Core Curriculum electives, 3 must be from visual and performing arts, 3 from social and behavioral sciences, 6 from U.S. history, and 6 from POLS 206 and 207. The required 6 hours from international and cultural diversity may be met by courses satisfying the visual and performing arts, social and behavioral sciences, and the political science and history requirements if they are also on the approved list of international and cultural diversity courses (see page 20). In addition, ENGR 482/PHIL 482 must be taken.
3. To be selected from courses at 300-level or above; or any 100–400-level CPSC course (others by petition).
4. To be selected from CHEM 409, 440, 451, 458, 459, 471, 474, 475, 489; ENGR 385; MEEN 455 and 458 (others by petition).
5. To be selected from ECEN 215, MEEN 221.

The Safety Engineering Certificate is available for students pursuing this degree. See page 364 for detailed information.



Scholastic Performance Requirements for Chemical Engineering Undergraduates

The Texas A&M University Student Rules stipulate that a student must achieve a minimum grade point ratio (GPR) of 2.0 both overall, as well as in those courses in the major, in order to graduate from the University. The University also classifies students with less than 30 credit hours as freshmen (U1), 30 to 60 hours as sophomores (U2), 60 to 94 hours as juniors (U3), and 95 hours or more as seniors (U4). The Department of Chemical Engineering imposes additional requirements for students to be accepted into, and progress through, the Chemical Engineering curriculum, based upon classification with regard to the courses which have been completed in the Chemical Engineering curriculum, as follows.

Freshmen. All students who are classified as lower level (CHEL) are considered to be freshmen with regard to the Chemical Engineering curriculum, regardless of the total number of credit hours that they have earned. Students will not be permitted to enroll in any Chemical Engineering course until they have been admitted to upper-level (CHEN) status. Automatic admission to upper-level status will be granted to students who complete the Common Body of Knowledge (CBK) courses in the freshman year of the curriculum (e.g., all of the required first year English, chemistry, physics, math and engineering courses), with no grade below a C and a minimum cumulative GPR of 2.75 in these courses, as well as an overall GPR of 2.75 or higher. Additional admissions to upper level may be made for students with a GPR below 2.75 in the CBK courses, up to a maximum of 160 students per year.

Sophomores. Students who have been admitted to upper-level (CHEN) status, but who have not completed all 200-level CHEN courses, are classified as Chemical Engineering sophomores regardless of the total number of credit hours they have earned. All students are required to complete both CHEN 204 and CHEN 205, each with a grade of C or better, and earn an overall GPR of 2.5 or higher, before being allowed to enroll in junior CHEN (300-level) courses. Neither CHEN 204 nor CHEN 205 can be repeated more than once.

Juniors. Students who have successfully completed all 200-level CHEN courses, but have not completed all of the 300-level CHEN courses in the Chemical Engineering curriculum, are classified as Chemical Engineering juniors regardless of the total number of credit hours they have earned. Students must complete each 300-level CHEN course in the Chemical Engineering curriculum with a grade of C or better, and have a cumulative average GPR of 2.0 or better for all CHEN courses, before being permitted to enroll in 400-level CHEN courses.

Seniors. Students who have successfully completed all required 300-level CHEN courses are classified as Chemical Engineering seniors. All students must complete each of the 400-level required prerequisite CHEN courses with a grade of C or better, and have a cumulative average GPR of 2.0 for all CHEN courses, as well as an overall GPR of 2.0, in order to qualify for graduation with a B.S. degree in Chemical Engineering. Graduating seniors in their final semester should see the assistant department head—advising for their final degree checks.

Curriculum in Civil Engineering

Civil engineers plan, design, supervise the construction, operate, maintain, inspect, retrofit, and manage many of the facilities and systems in both public and private sectors that are essential to modern life. The civil engineering profession is one of the most stable and most diverse of the engineering disciplines. Civil engineers are employed by consulting firms, public agencies, and start and run their own business. Workplaces range from construction sites to design offices. Most civil engineers work with some engineering or construction aspect of private and/or public facilities, such as airports, bridges, buildings, coastal structures, dams, environmental remediation of contaminated sites, harbors, highways, offshore structures, pipelines, railroads, transportation systems, tunnels, water collection systems, water distribution systems, water and wastewater treatment facilities, and waterways. Civil engineers are in the forefront of applying the newest high technology innovations in engineering and construction.

Civil engineering projects are unique because they require individual planning, analysis, design, construction supervision, performance monitoring, management and retrofitting. Civil engineering projects often require technical, governmental, legal, financial, and social evaluations. The primary objective is to provide the best service for the users while minimizing costs and other undesirable impacts.

The mission of the Zachry Department of Civil Engineering at Texas A&M University is to prepare our graduates to become professional engineers and leaders in the civil and ocean engineering profession by providing our students with a solid education that will enable them to integrate fundamental scientific engineering principles and that will couple with the latest technological advances to facilitate the development of their problem solving skills. Additionally, the department provides opportunities for enhancement of the students' educational experience through meaningful interactions with the profession, professionally-centered student activities and exposure to the broad field of civil engineering through seminars, practitioner visits, and Professional Day activities.

The faculty of the Zachry Department of Civil Engineering strives to ensure that our ever-evolving educational programs accomplish several objectives. First, our faculty must prepare the students to address the current and future civil and/or ocean engineering needs of the State of Texas, the nation and the world by being able to recognize the important geopolitical and public policy needs; and solve technical problems. In addition, the Department provides a curriculum that integrates scientific and technical knowledge with an appreciation for social, economic and political concerns. The curriculum and programs provide opportunities for our students to:

1. build leadership skills,
2. learn professionalism and ethical responsibility, and
3. develop and understanding of the need to engage in lifelong learning.

Finally, the faculty of the Zachry Department of Civil Engineering at Texas A&M University promotes the highest academic standards of excellence, quality, and ethics in both our undergraduate and graduate programs, and in doing so create both a culture of excellence and a community of scholars. Through our programs, our faculty and graduates provide local, state, national, and international leadership to a profession that must solve the civil and/or ocean engineering problems facing an increasingly complex society.

The program educational objectives for the undergraduate civil engineering program within the Department of Civil Engineering at Texas A&M University are to produce graduates:

1. who are prepared to enter civil engineering practice and/or continue their education in graduate and professional programs,
2. most will become practicing civil engineers with most of these becoming registered professional engineers, and
3. many of whom will pursue advanced studies.

The first two years of the civil engineering curriculum build a solid foundation in mathematics, science and engineering science which are the necessary building blocks for a successful career in engineering. The third year provides an introduction to the various civil engineering disciplines and engineering principles, methods of analysis, and design. The fourth year provides the opportunity to pursue either a broad based program in general civil engineering or pursue more depth in one of the following areas of specialization: coastal/ocean, construction and management, environmental, geotechnical, structural, transportation, or water resources. The curriculum also includes courses in history, political science, social sciences and humanities that help students: 1) understand the need for considering the global and societal context in which engineering solutions are completed, 2) understand professional and ethical responsibility, and 3) be knowledgeable of contemporary issues.

Students are encouraged to participate in cooperative education or to intern with civil engineering agencies during their undergraduate education.

The Bachelor of Science degree in civil engineering is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology. Graduate programs in civil engineering are also available. These programs allow further specialization and offer more in-depth study to address more complex technical and management issues. Graduate degrees also offer additional employment opportunities.

(See Freshman Year)

For admission to the upper division, a grade of C or better in the Common Body of Knowledge (CBK) courses (CHEM 107; ENGL 104; ENGR 111 and 112; MATH 151 and 152; and PHYS 208 and 218) and a GPR in these courses which meets departmental standards is required.

SOPHOMORE YEAR¹

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
CVEN 207 Intro. to Civil Engineering			CVEN 302 Computer Applications	(3-0)	3
Profession	(1-0)	1	CVEN 305 Engineering Mech. of Materials...	(3-0)	3
CVEN 221 Engr. Mech: Statics	(2-2)	3	CVEN 306 Materials for Civil Engineers.....	(2-2)	3
MATH 251 Engineering Mathematics III.....	(3-0)	3	MATH 308 Differential Equations.....	(3-0)	3
STAT 211 Principles of Statistics I.....	(3-0)	3	Directed elective ¹		<u>3</u>
Directed elective ¹		3			15
Writing skills elective ²		<u>3</u>			
		16			



JUNIOR YEAR⁵

CVEN 311 Fluid Dynamics.....	(3-0)	3	MEEN 315 Principles of Thermodynamics		
CVEN 322 Civil Engineering Systems.....	(3-0)	3	or		
CVEN 345 Theory of Structures	(3-0)	3	ECEN 215 Principles of Electrical Engr.	(2-2)	3
CVEN 363 Engr. Mech: Dynamics.....	(2-2)	3	Technical electives ³		11
Mathematics/science elective ⁴		<u>3</u>	Directed elective ¹		<u>3</u>
		15			17

SENIOR YEAR⁵

Technical electives ³		12	ENGR 482 Ethics and Engineering.....	(2-2)	3
Directed elective ¹		<u>3</u>	Technical electives ³		<u>12</u>
		15			15

NOTES: 1. Of the 18 hours shown as directed electives, 3 must be from visual and performing arts, 3 from social and behavioral sciences, 6 from U.S. history, and 6 from POLS 206 and 207. The required 6 hours from international and cultural diversity may be met by courses satisfying the visual and performing arts, social and behavioral sciences, and the political science and history requirements if they are also on the approved list of international and cultural diversity courses (see page 20).

2. This elective is to be selected from ENGL 203, 210, 241 and 301.

3. A total of 35 hours of technical electives is required. Technical electives are divided into two categories: breadth courses and focus courses. The choice of courses to be taken in each of the two categories depends on the specialty area chosen and must be made in consultation with the student's advisor and/or the Civil Engineering Student Services Office.

4. Math/science electives to be selected from an approved list and with approval of advisor.

5. Civil Engineering students are required to earn a grade of C or better in all basic science, mathematics and engineering courses taken to satisfy degree requirements.

6. Civil engineering students should note that this curriculum specifies the minimum number of credits required for graduation. Additional hours may be taken.

Civil engineering students should note that this curriculum specifies the minimum number of credits required for graduation. Additional courses may be taken.

The Safety Engineering Certificate is available for students pursuing this degree. See page 364 for detailed information.

Curriculum in Computer Science

The curriculum in computer science is designed to prepare students to enter the rapidly expanding computer field. Curricula and courses are based upon recommendations by the Institute of Electrical and Electronic Engineer Computer Society and the Association for Computing Machinery.

Program Mission

The mission of the computer science program at Texas A&M University is to prepare intellectual, professional, and ethical graduates, capable of meeting challenges in the field of Computer Science; and to coordinate with other parts of the university to facilitate the effective use of educational resources by sharing cross-disciplinary courses.

Program Objectives

1. Graduates of the Computer Science Program will have the technical knowledge and skills both in breadth and depth, to pursue the practice or advanced study of computer science.
2. Graduates of the Computer Science Program will understand the importance of life-long learning; and be prepared to understand and apply new technological developments in their field.
3. Graduates of the Computer Science Program will understand the technical, social and ethical context and obligations of their computer science contributions.
4. Graduates of the Computer Science Program will continue to develop the communication, teamwork, and leadership skills necessary to function productively and professionally.

The four-year undergraduate curriculum in computer science at Texas A&M provides a sound preparation in computing, as well as in science, mathematics, English, and statistics. Students take a broad set of core computer science courses in the first two years, which exposes them to the main concepts in computing. During the last two years, students take elective computer science courses drawn from four tracks (algorithms and theory, computer systems, software, and information and intelligent systems) to provide both breadth and depth. The electives can be used to tailor the curriculum to match the student's interests. Graduate courses may be taken by qualified students for some of the electives.

A major in computer science includes a 12-hour area of concentration. This allows students to design a course of study which complements their computer science coursework and takes advantage of opportunities offered by other departments across the University.

The Department of Computer Science has significant computer resources of its own, shares resources with other departments and makes use of University systems. Departmental resources for students include modern workstations; large computer servers; disk servers; and massively parallel systems as well as network access to the University supercomputers.

Freshmen must submit a formal degree plan to the department during their third semester. Transfer students must submit one during the first semester in the department. Departmental advisors are available for assistance.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
CPSC 121 Intro. Pgm. Design and Concepts..	(3-2)	4	CPSC 221 Data Struct. and Algorithms.....	(3-2)	4
CPSC 181 Intro. to Computing.....	(1-0)	1	MATH 152 Engineering Mathematics II	(3-2)	4
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	MATH 302 Discrete Mathematics.....	(3-0)	3
MATH 151 Engineering Mathematics I.....	(3-2)	4	Science elective ¹		4
Science elective ¹		<u>4</u>	* KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>
		16			16

SOPHOMORE YEAR

CPSC 312 Computer Organization	(3-2)	4	CPSC 313 Intro. to Computer Systems.....	(3-2)	4
CPSC 314 Programming Languages	(3-0)	3	CPSC 315 Programming Studio.....	(2-2)	3
MATH 251 Engineering Mathematics III.....	(3-0)	3	STAT 211 Principles of Statistics I.....	(3-0)	3
Concentration area elective ⁴		3	Speech and writing skills elective ⁶		3
Elective ²		<u>3</u>	Elective ²		<u>3</u>
		16			16

JUNIOR YEAR

CPSC 481 Seminar	(0-2)	1	Computer science electives ⁷		6
Computer science electives ⁷		6	Concentration area elective ⁴		3
Concentration area elective ⁴		3	Science elective ¹		4
Mathematics elective ⁵		3	Elective ³		<u>3</u>
Science elective ¹		<u>4</u>			16
		17			

SENIOR YEAR

Computer science electives ⁷		6	CPSC 482 Senior Capstone	(1-6)	3
Concentration area elective ⁴		3	ENGR 482 Ethics and Engineering	(2-2)	3
Electives ²		6	Computer science elective ⁷		3
*KINE 199 Health and Fitness Activity	(0-2)	<u>1</u>	Electives ²		<u>6</u>
		16			15

NOTES: Grade Requirements: A grade of C or better will be required for all courses.

1. Science courses must be taken from two areas. See advisor for list of acceptable courses.
2. To be selected from the University Core Curriculum. Of the 18 hours shown as University Core Curriculum electives, 3 must be from visual and performing arts, 3 from social and behavioral sciences, 6 from U.S. history, and 6 from POLS 206 and 207. The required 6 hours from international and cultural diversity may be met by courses satisfying the visual and performing arts, social and behavioral sciences, and the history requirements if they are also on the approved list of international and cultural diversity courses (see page 20).
3. Three hours of course work to be approved by student's advisor.
4. The concentration area should be chosen only after consultation with a departmental advisor who will help the student arrange a program appropriate to his or her plans following graduation. Students should file a degree plan before taking minor courses to ensure their use in the degree plan.
5. Mathematics elective must be selected from MATH 304 or 308.
6. Select from ENGL 301 or 210 or COMM 203.
7. Computer science electives are to be selected from tracks. See advisor for list of acceptable course choices.

The Safety Engineering Certificate is available for students pursuing this degree. See page 364 for detailed information.

* See page 21.

Curricula in Computer Engineering

The Computer Engineering curricula provide a balanced view of hardware, software, hardware-software trade-offs, analysis, design, and implementation techniques. It is a dynamic and broadly interdisciplinary field that continues to experience rapid professional growth that impacts every area of human endeavor.

Program Mission

The mission of the Computer Engineering program is to provide students with an education that ensures an excellent understanding of hardware and software systems and the necessary system design and development skills, and that fosters professional curiosity and imagination that drives them throughout their career.

The program will stimulate and challenge the students with an exceptional, highly motivated faculty that shares its knowledge and excitement about Computer Engineering, well designed undergraduate and graduate curricula, research opportunities at all levels, and a first-class educational infrastructure.

The program strives to produce graduates who are well prepared to excel in industry, academia and government, and who will take on leadership roles in shaping the technological landscape of the future.

Education Program Objectives

In support of this mission, the Computer Engineering program has defined the following educational objectives:

1. Graduates of the program will have the necessary knowledge, both in breadth and depth, to pursue the practice, or advanced study, of Computer Engineering.
2. Graduates of the program will understand the importance of life-long learning, and be prepared to learn and understand new technological developments in their field.
3. Graduates of the program will understand the technical, social and ethical context of their engineering contributions.
4. Graduates of the program will develop the communication, teamwork, and leadership skills necessary to carry on the legacy of excellence of an Aggie Engineer.

The program periodically evaluates these objectives and assesses the level at which they are met. Input in this ongoing effort is provided by alumni, employers and recruiters, the faculty, and by external advisors to the program. This feedback drives the continuous improvement both of individual courses and of the overall curriculum. For more information on this process contact the Computer Engineering Program Web site at ce.tamu.edu.

Details of the Curriculum

The curriculum is designed to cover the engineering aspects of both hardware and software—a total computer systems perspective. All computer engineering students take courses in the following areas: electrical circuits, electronics, digital circuits, computer architecture ranging from microcomputers to mainframes, interfacing, programming languages ranging from assembler to high level, data structures, analysis of algorithms, operating systems, software engineering and microcomputer systems. A solid foundation in the basic sciences of physics, chemistry and mathematics is used to support these courses.

There are two distinct tracks in this curriculum, the **Electrical Engineering Track** and the **Computer Science Track**, both culminating in the same Computer Engineering degree. The tracks are substantially similar, each providing a broad coverage of the computer engineering discipline, but each has a slightly different emphasis. Note that students in either track can take courses from the other as electives, or they can use their electives to further specialize within their own track. Although students are required to select a track immediately upon entering the Computer Engineering program, it is usually possible to change tracks as late as the junior year.

The Electrical Engineering track of the Computer Engineering degree places stronger emphasis on digital Very Large Scale Integrated (VLSI) circuits and systems, microprocessor interfacing and system design, and computer system architecture and design. The track is primarily administered by the Department of Electrical and Computer Engineering and is designed to encompass nearly all of the core material of the Electrical Engineering degree but provides much more depth in computing than is possible within the context of an Electrical Engineering degree.

The Computer Science track of the Computer Engineering degree provides students the freedom to enhance their knowledge in the broad range of topics comprising Computer Engineering: computer networks, computer architecture, artificial intelligence, computer graphics, robotics, real-time computing, computer languages, microcomputers, VLSI, and large-scale hardware and software systems. The track is primarily administered by the Department of Computer Science and encompasses nearly all of the core material of the Computer Science degree, but its greater emphasis on design and engineering fundamentals prepares the student for registration as a professional engineer.

Throughout this program, the student works with state-of-the-art computers and laboratory equipment and is exposed to the most recent analytical techniques and technological developments. Significant association with the program's faculty, who are actively engaged in research and professional consulting activities, serves to acquaint the student with the opportunities and rewards available to the practicing Computer Engineering professional.

Computer Engineering Computer Science Track

(See Freshman Year)

SOPHOMORE YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
CPSC 113 Integrated Prog. and Design.....	(1-3)	2	CPSC 221 Data Struct. and Algo.	(3-2)	4
ECEN 248 Digital Sys. Design	(3-3)	4	ECEN 214 Electrical Circuit Theory.....	(3-3)	4
ENGL 210 Scientific and Tech. Writing			MATH 308 Differential Equations.....	(3-0)	3
or			POLS 206 American Government	(3-0)	3
ENGL 301 Technical Writing	(3-0)	3	STAT 211 Principles of Statistics I.....	(3-0)	<u>3</u>
MATH 251 Engineering Mathematics III.....	(3-0)	3			17
MATH 302 Discrete Math	(3-0)	<u>3</u>			
		15			

JUNIOR YEAR

CPSC 313 Intro. to Computer Systems.....	(3-2)	4	CPSC 315 Programming Studio.....	(2-2)	3
CPSC 350 Comp. Arch and Design.....	(3-3)	4	CPSC 462 Microcomputer Sys.	(2-2)	3
CPSC 481 Seminar	(0-2)	1	ECEN 325 Electronics	(3-3)	4
ECEN 314 Signals and Systems.....	(3-1)	3	ECEN 454 Digital Int. Circuit Des.....	(2-2)	3
POLS 207 State and Local Govt.....		<u>3</u>	MATH 311 Topics in Applied Math I.....	(3-0)	<u>3</u>
		15			16

SENIOR YEAR

ENGR 482 Ethics and Engineering	(2-2)	3	CPSC 483 Computer Sys. Design.....	(1-6)	3
ENGR elective ³		3	Area elective ²		3
Area elective ²		3	Area elective ²		3
Area elective ²		3	Social Science elective ¹		3
Area elective ²		<u>3</u>	Visual and Performing Arts elective ¹		<u>3</u>
		15			15

- NOTES:**
1. To be selected from the University Core Curriculum. Of the 18 hours shown as University Core Curriculum electives, 3 must be from visual and performing arts, 3 from social and behavioral sciences, 6 from U.S. history, and 6 from POLS 206 and 207. The required 6 hours from international and cultural diversity may be met by courses satisfying the visual and performing arts, social and behavioral sciences, and the history requirements if they are also on the approved list of international and cultural diversity courses (see page 20).
 2. 15 hours of area electives chosen in consultation with academic advisor.
 3. Three hours of course work to be approved by student's advisor.
 4. Grade Requirements: A grade of C or better is required for each of the following courses: CPSC 113, 221, 313, 315, 462, 481, 483; ENGR 111, 112; ECEN 214, 248, 314, 325, 454; MATH 151, 152, 251, 302, 308, 311; CHEM 107, PHYS 218, 208; ENGL 104.

The Safety Engineering Certificate is available for students pursuing this degree. See page 364 for detailed information.

Computer Engineering Electrical Engineering Track

(See Freshman Year)

SOPHOMORE YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
CPSC 113 Integrated Prog. and Design.....	(1-3)	2	CPSC 221 Data Struct. and Algo.	(3-2)	4
ECEN 248 Digital Sys. Design.....	(3-3)	4	ECEN 214 Electrical Circuit Theory.....	(3-3)	4
ENGL 210 Scientific and Tech. Writing or			MATH 308 Differential Equations.....	(3-0)	3
ENGL 301 Technical Writing	(3-0)	3	POLS 206 American Government	(3-0)	3
MATH 251 Engineering Mathematics III.....	(3-0)	3	STAT 211 Principles of Statistics I.....	(3-0)	<u>3</u>
MATH 302 Discrete Math	(3-0)	<u>3</u>			<u>17</u>
		15			

JUNIOR YEAR

CPSC 313 Intro. to Computer Systems.....	(3-2)	4	CPSC 315 Programming Studio.....	(2-2)	3
CPSC 481 Seminar	(0-2)	1	ECEN 325 Electronics	(3-3)	4
ECEN 314 Signals and Systems.....	(3-1)	3	ECEN 449 Microprocessor Sys. Des.....	(2-2)	3
ECEN 350 Comp. Arch and Design.....	(3-3)	4	ECEN 454 Digital Int. Circuit Des.....	(2-2)	3
POLS 207 State and Local Govt.....		<u>3</u>	MATH 311 Topics in Applied Math I.....	(3-0)	<u>3</u>
		15			<u>16</u>

SENIOR YEAR

ENGR 482 Ethics and Engineering	(2-2)	3	ECEN 405 Electrical Design Lab.....	(1-6)	3
ENGR elective		3	Area elective.....		3
Area elective.....		3	Area elective.....		3
Area elective.....		3	Social Science elective		3
Area elective.....		<u>3</u>	Visual and Performing Arts elective		<u>3</u>
		15			<u>15</u>

- NOTES: 1. Required to take 15 hours to fulfill the depth requirements.
 2. Students take at least 2 depth sequences with each sequence requiring at least 2 courses.
 3. Remaining courses from the sequence list or any approved 300/400 level course in CPSC or ECEN.

Track elective lists are available in the undergraduate advisor's office.

The Safety Engineering Certificate is available for students pursuing this degree. See page 364 for detailed information.

Curriculum in Electrical Engineering

Electrical engineers develop and apply the theories of electricity, electronics and electromagnetics to analyze and design systems which generate or use electricity. Examples of such systems are those for power generation and transmission, computation, communication, automatic control and instrumentation. The devices that practicing engineers work with and design include integrated circuits (VLSI), waveguides, antennas, computers and other digital systems, rotating machines and motor drives, lasers and optical fibers.

The curriculum is designed to prepare the undergraduate for work in the highly diverse electrical engineering profession. A solid foundation in physics, chemistry and mathematics is used to support courses in the fundamentals of electrical engineering. The use of computers is integrated throughout the curriculum, and basic studies in circuits, electronics, electromagnetic fields and digital logic lead to a flexible program of electives in the junior and senior year. Electives may be chosen from the broad categories of controls and communications, microelectronic circuit design, computer engineering, power systems and electromagnetics/electro-optics. Laboratory work is structured to first familiarize the student with the basic concepts and then to apply these concepts to engineering problems.

Students who expect to enroll in electrical engineering after attending another college or university should note that there is a five-semester sequence of electrical engineering courses in the curriculum. If the prerequisites are satisfied, transfer students may complete this sequence in two years and one summer session.

Educational Program Objectives

Activities of the Electrical and Computer Engineering Department including research, teaching, and professional and community service revolve around the threefold mission of the department:

- To create new knowledge and challenge young minds by participation in the process of discovery and invention;
- To educate electrical and computer engineers with a solid background of fundamentals, stretching their imagination and preparing them for an exciting future;
- To serve the society through research, education and outreach activities.

Undergraduate education plays a major part in helping the department to achieve its mission. As such, the department has established a set of undergraduate educational program objectives which will help to insure that the mission of the department is upheld. These program objectives represent a concise, measurable set of descriptions of what the department is trying to accomplish through its undergraduate program. Furthermore, these objectives are designed to be observable in our graduates in a time window of two to five years after graduation from the program.

The Department of Electrical and Computer Engineering's three Undergraduate Educational Program Objectives are as follows:

Objective 1—Graduates who choose to pursue a career in industry or government will become productive and valuable engineers.

Objective 2—Graduates who choose to pursue advanced degrees will be able to gain admission to graduate programs and will become successful graduate students.

Objective 3—In keeping with the legacy of an Aggie Engineer, graduates will be successful in attaining positions of leadership in their professional careers.

The extent to which the department is meeting these objectives is periodically assessed through such instruments as alumni surveys, employer/recruiter surveys and EIT exam results. Our goal is to continually improve the program's ability to meet these educational objectives. The electrical engineering curriculum and individual course contents are periodically evaluated and adjusted in order to further support our ability to achieve the program objectives. More information on these efforts can be found at the Electrical and Computer Engineering departmental Web site ee.tamu.edu by clicking on the links for "Academics," "Undergraduate," and "Accreditation." The department welcomes comments and suggestions from any interested individuals regarding the above program objectives and/or how the department can better meet these objectives.

(See Freshman Year)

SOPHOMORE YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ECEN 248 Intro. to Dig. Sys. Design.....	(3-3)	4	ECEN 214 Electrical Circuit Theory.....	(3-3)	4
ENGL 210 Scientific and Tech. Writing			ECEN 303 Random Signals and Systems.....	(3-0)	3
or			MATH 308 Differential Equations.....	(3-0)	3
ENGL 301 Technical Writing	(3-0)	3	PHYS 222 Mod. Physics for Engineers	(3-0)	3
MATH 251 Engineering Mathematics III.....	(3-0)	3	UCC Elective ²		<u>3</u>
UCC Elective ²	(3-0)	<u>3</u>			16
		13			

JUNIOR YEAR

ECEN 314 Signals and Systems.....	(3-1)	3	ECEN 350 Comp. Arch. and Design.....	(3-3)	4
ECEN 322 Elec. and Magnetic Fields.....	(3-0)	3	ECEN elective		3
ECEN 325 Electronics	(3-3)	4	UCC Elective ²		3
ECEN 370 Elec. Props. of Matls.	(3-0)	3	Technical electives ¹		<u>6</u>
MATH 311 Topics in Applied Math I.....	(3-0)	<u>3</u>			15
		16			

SENIOR YEAR

ISEN 302 Econ. Analysis of Engr. Projects	(2-0)	2	ECEN 405 Electrical Design Lab.....	(1-6)	3
ECEN electives.....		12	ENGR/PHIL 482 Ethics and Engineering	(2-2)	3
UCC Elective ²		<u>3</u>	ECEN electives.....		9
		17	Free elective.....		<u>2</u>
					17

NOTES: 1. Technical electives are to be chosen from a list available from the department.

2. UCC elective: To be selected from the University Core Curriculum (UCC). Of the 18 hours shown as University Core Curriculum electives, 3 must be from the Visual and Performing Arts, 3 from Social and Behavioral Sciences, 6 from U.S. History, 6 from POLS 206 and POLS 207 and 6 from International and Cultural Diversity. The International and Cultural Diversity requirement may be met by courses satisfying the Visual and Performing Arts, Social and Behavioral Sciences, and the History requirements if they are also on the approved list of International and Cultural Diversity courses.

The Safety Engineering Certificate is available for students pursuing this degree. See page 364 for detailed information.

Curricula in Engineering Technology and Industrial Distribution

The Department of Engineering Technology and Industrial Distribution offers two baccalaureate curricula, engineering technology and industrial distribution. These curricula are distinct from engineering and each other, but they share the features of building on a sound foundation of mathematics and basic sciences, including a strong core of technical courses, emphasizing written and oral communications and containing a significant education in the social sciences and the humanities. The curricula emphasize the latest state-of-the-art technologies, creativity and entrepreneurship. Established procedures for the development, production, installation, service and sales of technological products and systems are treated. Because these programs are highly applied and equipment/hardware oriented, most of the department's courses have hands-on laboratories to provide in-depth experience with equipment.

The mission of the Department of Engineering Technology and Industrial Distribution is to: 1) maintain nationally recognized programs in engineering technology and industrial distribution; 2) focus on educating highly-qualified students with hands-on skills, providing them with experiences in advanced integration of both conventional and emerging technologies, a unique understanding of management and business practices, and an entrepreneurial point of view; 3) provide leadership within the COE and university in interdisciplinary applied research, to include the development and deployment of new technology; and 4) promote and develop long term partnerships with industry and government that foster enhancements and interactions in education, research, and professional development.



Curricula in Engineering Technology

As defined by the Technology Accreditation Commission (TAC) of ABET, engineering technology is that part of the technological field which requires the application of scientific and engineering knowledge and methods combined with technical skills in support of engineering activities. It lies in the occupational spectrum between the craftsman and the engineer at the end of the spectrum closest to the engineer.

The engineering technology specialties offered at Texas A&M University focus on the latest technologies and make special efforts to infuse creativity and innovation. While directly related, these curricula are distinct from engineering by virtue of the greater focus on hardware, laboratory procedures and instrumentation and the development of technological skills. Due to the greater emphasis on hands-on laboratory experience and the development of technological skills, there is less theoretical analysis required than in the typical engineering curricula.

Engineering technology graduates fulfill vital roles in industry as members of technological teams that work closely with engineers as well as with technicians and craftsmen. They fulfill such tasks as improving product design and development, material and product testing for assurance of quality, production management and operation/service of complex technological systems.

Specialty areas are offered in electronics, telecommunications and manufacturing and mechanical engineering technology. Graduates are awarded Bachelor of Science degrees in engineering technology.

The curricula in the Electronics Engineering Technology, Telecommunications Engineering Technology, and Manufacturing and Mechanical Engineering Technology specialty areas are accredited by the Technology Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202, (410) 347-7700.

Engineering Technology Academic Policies

The Department of Engineering Technology and Industrial Distribution (ETID) imposes the following academic requirements in addition to those imposed by the University (Texas A&M University Student Rules) and college. For complete details concerning these and other ENTC academic policies, students should contact the ETID Undergraduate Advising Office and are referred to the ETID Web site (etidweb.tamu.edu). The academic policies apply to any student who is identified as an Engineering Technology (ET) major in one of the three ET programs—Electronics (EET), Telecommunications (TET) or Manufacturing and Mechanical (MMET)—and to any student who seeks admission to one of the three ET programs.

Students are encouraged to use these academic policies, along with other important information sources, for guidance in their undergraduate programs. Official information sources include the *Texas A&M University Undergraduate Catalog*, the Texas A&M University Student Rules, the Texas A&M University online course schedule, myrecord.tamu.edu system, departmental academic policies, academic advisors, program coordinators, faculty advisors, the ETID Web site, and University and departmental distribution lists.

Students who meet the entrance requirements for the University and college enter with a lower-level classification in engineering technology (ENTL). The lower level consists of University Core Curriculum requirements and introductory engineering technology courses.

Enrollment in junior- and senior-level engineering technology courses (300- and 400-level courses) will be restricted to those students who have been moved from the lower-level classification to the major degree sequence (ENTC). To be considered for admission to the major degree sequence a student must be in good academic standing and have received credit for specific courses referred to as the Common Body of Knowledge (CBK) courses. Students seeking admission to the major degree sequence in Engineering Technology, Electronics or Telecommunications ET option, must have credit for CHEM 107; CPSC 206; ENGL 104; ENTC 210, 219 and 250; MATH 151 and 152; and PHYS 218 and 208 or equivalent. Students seeking admission to the major degree sequence in Engineering Technology, Manufacturing and Mechanical ET option, must have credit for CHEM 107; ENGL 104; ENGR 111 and 112; ENTC 181; ENTC 206 or 207; MATH 151 and 152; and PHYS 218. Acceptance into the major degree sequence depends on 1) completing all CBK courses with a grade of C or better; 2) achieving the program's desired grade point ratio (GPR) for the CBK courses; and 3) achieving the program's desired cumulative grade point ratio for courses taken at Texas A&M University. These GPR requirements are set by a particular program to manage the number of students in the major degree sequence consistent with the program's resources. Admission to the major degree sequence may be restricted by the availability of instructional resources. Students apply for admission to the major degree sequence in the semester in which all of the criteria will be met.

Students will be allowed to remain as a lower-level student up to 60 hours (provided they are in good standing and making progress). At the 60-hour limit, students may be blocked from further registration in the department if the CBK and overall GPR requirement for upper division have not been achieved. Transfer students will be handled on an individual basis.

Transfer students, regardless of transfer hours, also are admitted with a lower-level classification and must meet the same standards and criteria for admission to a major degree sequence as shown above. Transfer students who meet the admission criteria may apply for admission to the major degree sequence after at least one semester at Texas A&M University.

Students currently enrolled in another major at Texas A&M University who desire to change their major field of study to engineering technology must fill out a Change of Curriculum application. The programs will admit the best-qualified applicants based on the number of spaces available in each program. Applicants will be evaluated on the basis of academic achievement and potential. Change of curriculum students who meet the major degree sequence admission criteria may apply for admission to the major degree sequence after at least one semester in the department.

Students must earn grades of C or better in major (ENTC) courses, required and elective technical courses, Common Body of Knowledge (CBK) courses, and any prerequisites for these courses. If a student earns a grade of D or F in any of these courses, the student is required to repeat the course before enrolling in a more advanced course that has the D/F course as a prerequisite.

A student may attempt a course no more than three times, including courses graded Q or W but excluding those graded NG, unless approval has been received from the department. A student who has not successfully completed a course after attempting it three times will be blocked from further enrollment in engineering technology.

The prerequisites for courses are identified in the course descriptions in the current Texas A&M University Undergraduate Catalog and/or the Texas A&M University Online Schedule of Classes. A student is required to follow the prerequisite requirements as defined in the

current catalog regardless of the catalog to which the student is assigned. A student must complete all prerequisites for a course with a grade of C or better by the start of the semester in which the student plans to enroll in the course.

A student is responsible for checking the prerequisites for each course to insure the prerequisite requirements have been satisfied. A student who registers for a course for which he/she lacks the necessary prerequisite course(s) and/or the prerequisite grade requirement will be required to drop the course. A student who is told to drop a course and is still enrolled by the deadline set each semester will be administratively dropped by the department. If a student is administratively dropped from a course, the student is responsible for all financial obligations associated with the drop. An administrative drop may adversely impact (including, but not limited to): health insurance benefits, financial aid, athletic eligibility, INS status, veterans' benefits, and eligibility to participate in extracurricular activities.

The department encourages students to participate in industrial internships or the Cooperative Education Program to acquire practical experience to complement their engineering technology education.

Electronics Engineering Technology Option

Electronics engineering technology prepares students for careers in industries that depend upon electronics for control, computation and communications. While graduates of the program receive a rigorous laboratory-oriented technical education, they are also well prepared for positions in technical sales and project management.

The EET curriculum is based on a strong underpinning of engineering math and science courses followed by an electronics core sequence. The core courses include analog circuits, electronics devices, semiconductor testing, digital electronics, digital design, microprocessors, real-time software development using C and assembly languages, applied electromagnetics, data communications, local/municipal area networks, and control systems. Students work independently and in groups to design, implement, test, and evaluate hardware and software systems.

One of the most unique aspects of the electronics engineering technology program is that almost every technical course provides a hands-on laboratory experience using facilities equipped with state-of-the-art computer systems, test equipment, and industry-standard software design and analytical packages.

The technical curriculum is augmented with course work in speech communications, technical writing, engineering economics and technical project management. A team-based project management/ sponsored senior design sequence provides a challenging opportunity to apply technical, managerial, and communications skills to solving a real-world problem.

Program Mission

The Electronics Engineering Technology Program at Texas A&M University has as its mission to:

- provide a recognized undergraduate educational program with an emphasis in electronics technology;
- perform applied research for educational, government and industrial entities in the state and nation;
- conduct professional development and other activities to meet the needs of the private and public sectors.

Program Educational Objectives

The Electronics Engineering Technology Program at Texas A&M has as its primary educational objectives to produce graduates who, after three to five years:

- possess the technical skills to be immediately productive and have successful careers in regional, state or national electronics, test, and systems integration industries.
- demonstrate increasing levels of leadership and responsibility during their careers.
- exhibit a commitment to professional ethics in their professional career.
- display a desire for life-long learning through continued education, technical training, and/or professional development.

A continuous cycle of assessment and program improvement is used to ensure that these objectives are being met. Through interactions with industry and academic partners, the Electronics program continues to offer a state-of-the-art curricula that produces successful graduates.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
CHEM 107 Gen. Chem. for Engr. Students ^{4,5}	(3-3)	4	MATH 152 Engineering Mathematics II ^{4,5}	(3-2)	4
ENGL 104 Composition and Rhetoric ^{4,5}	(3-0)	3	PHYS 218 Mechanics ^{4,5}	(3-3)	4
MATH 151 Engineering Mathematics I ^{4,5}	(3-2)	4	University Core Curriculum electives ²		6
University Core Curriculum elective ²		3	* KINE 199 Required Physical Activity	(0-2)	<u>1</u>
* KINE 198 Health and Fitness Activity	(0-2)	<u>1</u>			15
		15			

SOPHOMORE YEAR

ENTC 210 Circuit Analysis I ^{4,5}	(3-2)	4	CPSC 206 Structured Programming in C ^{4,5} ...	(3-2)	4
ENTC 219 Digital Electronics ^{4,5}	(2-2)	3	ENTC 211 Circuit Analysis II ⁵	(3-2)	4
ENTC 250 Intro. to Electronics Tech. ^{4,5}	(2-2)	3	ENTC 215 Intro. to Telecommunications ⁵	(3-2)	4
PHYS 208 Electricity and Optics ^{4,5}	(3-3)	4	ENTC 249 Advanced Digital Electronics ⁵	(3-2)	<u>4</u>
STAT 211 Principles of Statistics I ⁵	(3-0)	<u>3</u>			16
		17			

JUNIOR YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
COMM 203 Public Speaking	(3-0)	3	ENTC 352 Intro. to Mixed-Signal Test and Measurement ⁵	(3-2)	4
ENGL 210 Scientific and Tech. Writing	(3-0)	3	ENTC 355 Electro. and High Freq. Systems ⁵	(3-2)	4
ENTC 315 Local and Metropolitan Area Networks ⁵	(3-2)	4	ENTC 359 Digital Instrum. and Control ⁵	(3-2)	4
ENTC 349 Microprocessors ⁵	(3-2)	4	ENTC 369 Software Systems Tech. ⁵	(3-2)	4
ENTC 350 Electronic Devices ⁵	(3-2)	<u>4</u>	ISEN 302 Econ. Analysis of Engr. Projects ⁵ ...	(2-0)	<u>2</u>
		18			18

SENIOR YEAR

ENGR 482 Ethics and Engineering ⁵	(3-0)	3	ENTC 420 Engineering Tech. Projects ⁵	(2-4)	3
ENTC 419 Technical Project Management ⁵ ...	(3-0)	3	ENTC 435 Data Communications ⁵	(3-2)	4
ENTC 462 Control Systems ⁵	(3-2)	4	Technical elective ^{3,5}		3
ENTC 452 Adv. Semiconductor Test and Measurement ⁵	(3-2)	4	University Core Curriculum electives ²		<u>6</u>
University Core Curriculum elective ²		<u>3</u>			<u>16</u>
		17			

- NOTES: 1. Entering students will be given a placement test in mathematics. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.
2. To be selected from the University Core Curriculum. Of the 18 hours shown as University Core Curriculum electives, 3 must be from visual and performing arts, 3 from social and behavioral sciences, 6 from U.S. history, and 6 from POLS 206 and 207. The required 6 hours from international and cultural diversity may be met by courses satisfying the visual and performing arts, social and behavioral sciences, and the political science and history requirements if they are also on the approved list of international and cultural diversity courses (see page 20).
3. Must be a junior/senior-level technical elective and must be approved by advisor and program coordinator. Students interested in Co-Op may use ENGR 385 for up to 3 credit hours. ENTC 485 Directed Studies is not for general use as a technical elective.
4. Common Body of Knowledge (CBK) courses required for admission to degree sequence.
5. Courses used to calculate in-major GPR. Grade of C or better is required for each of the courses. Exception: ENTC 420.

This curriculum lists the minimum number of classes required for graduation. Additional courses may be taken.

The Systems Safety Engineering Specialty is available for students pursuing this degree. See page 364 for detailed information.

* See page 21.

Telecommunications Engineering Technology Option

Telecommunications engineering technology prepares students for careers in organizations that use telecommunications networks to communicate within the enterprise, with suppliers, and with customers. These organizations include local-exchange and inter-exchange carriers, corporations which operate in-house communications networks, and vendors of telecommunications equipment. Students are also prepared to function effectively in companies that supply the equipment and services necessary to create and operate such networks. While graduates of the program receive a rigorous laboratory-oriented technical education, they are also well prepared for positions in technical sales and project management.

The TET curriculum combines mathematics and science courses, an electronics core sequence, and specialized courses in telecommunications management, regulation, networking, network testing, digital transmission and switching, and telecommunication network design to prepare students for jobs in the modern telecommunications industry. Most TET courses provide a hands-on laboratory experience using facilities equipped with state-of-the-art computer systems, test equipment, and industry-standard software design and analytical packages. The technical curriculum is augmented with course work in speech communications, technical writing, engineering economics, technical project management, and quality control. A team-based project management/ sponsored senior design sequence provides a challenging opportunity to apply technical, managerial, and communications skills to problem solving in a real-world problem environment.

Program Mission

The Telecommunications Engineering Technology Program at Texas A&M University has as its mission to:

- provide a recognized undergraduate educational program with an emphasis in telecommunications and networking technology;
- perform applied research for educational, government and industrial entities in the state and nation;
- conduct professional development and other activities to meet the needs of the private and public sectors.

Program Educational Objectives

The Telecommunications Engineering Technology Program at Texas A&M has as its primary educational objectives to produce graduates:

- with the technical skills to have successful careers in carrier, equipment manufacturing, consulting, or corporate user organizations.
- with the ability to work effectively in a team environment.
- who can apply project management skills appropriate to their job description.
- who demonstrate a commitment to professional ethics and social awareness in their professional career.
- that demonstrate a desire for life-long learning through continued education, technical training, and/or professional development.

To ensure that these objectives are met, a continuous cycle of assessment and program improvement has been put in place. Through interactions with industry and academic partners, the TET program continues to offer a state-of-the-art curriculum that produces successful graduates.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
CHEM 107 Gen. Chem. for Engr. Students ^{3,4} .	(3-3)	4	MATH 152 Engineering Mathematics II ^{3,4}	(3-2)	4
ENGL 104 Composition and Rhetoric ^{3,4}	(3-0)	3	PHYS 218 Mechanics ^{3,4}	(3-3)	4
MATH 151 Engineering Mathematics I ^{3,4}	(3-2)	4	University Core Curriculum electives ²		6
University Core Curriculum elective ²		3	* KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>
* KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>			15
		15			

SOPHOMORE YEAR

ENTC 210 Circuit Analysis I ^{3,4}	(3-2)	4	CPSC 206 Structured Programming in C ^{3,4} ...	(3-2)	4
ENTC 219 Digital Electronics ^{3,4}	(2-2)	3	ENTC 211 Circuit Analysis II ⁴	(3-2)	4
ENTC 250 Intro. to Electronics Tech. ^{3,4}	(2-2)	3	ENTC 215 Intro. to Telecommunications ⁴	(3-2)	4
PHYS 208 Electricity and Optics ^{3,4}	(3-3)	4	ENTC 249 Advanced Digital Electronics ⁴	(3-2)	<u>4</u>
STAT 211 Principles of Statistics I ⁴	(3-0)	<u>3</u>			16
		17			

JUNIOR YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
COMM 203 Public Speaking.....	(3-0)	3	ENTC 315 Local and Metropolitan Area Networks ⁴	(3-2)	4
ENGL 210 Scientific and Tech. Writing.....	(3-0)	3	ENTC 355 Electro. and High Freq. Systems ⁴ ..	(3-2)	4
ENTC 325 Telecom Services ⁴	(3-0)	3	ENTC 369 Software Systems Tech ⁴	(3-2)	4
ENTC 349 Microprocessors ⁴	(3-2)	4	ISEN 302 Econ. Analysis of Engr. Projects ⁴ ...	(2-0)	2
ENTC 350 Electronic Devices ⁴	(3-2)	4	University Core Curriculum elective ²		3
		<u>17</u>			<u>17</u>

SENIOR YEAR

ENGR 482 Ethics and Engineering ⁴	(3-0)	3	ENTC 420 Engineering Tech. Projects ⁴	(2-4)	3
ENGR 345 Telecom Testing Tech. ³	(3-2)	4	ENTC 455 Wireless Transmission Systems ⁴ ...	(3-2)	4
ENTC 415 Digital Transmission and Switch. ⁴	(3-2)	4	ENTC 465 Private Networks ⁴	(3-0)	3
ENTC 419 Technical Project Mgmt. ⁴	(3-0)	3	University Core Curriculum electives ²		6
ENTC 435 Data Communications ⁴	(3-2)	4			<u>16</u>
		<u>18</u>			

- NOTES:**
1. Entering students will be given a placement test in mathematics. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.
 2. To be selected from the University Core Curriculum. Of the 18 hours shown as University Core Curriculum electives, 3 must be from visual and performing arts, 3 from social and behavioral sciences, 6 from U.S. history, and 6 from POLS 206 and 207. The required 6 hours from international and cultural diversity may be met by courses satisfying the visual and performing arts, social and behavioral sciences, and the political science and history requirements if they are also on the approved list of international and cultural diversity courses (see page 20).
 3. Common Body of Knowledge (CBK) courses required for admission to degree sequence.
 4. Courses used to calculate in-major GPR. Grade of C or better is required for each of the courses. Exception: ENTC 420.

The curriculum lists the minimum number of classes required for graduation. Additional courses may be taken.

The Systems Safety Engineering Specialty is available for students pursuing this degree. See page 364 for detailed information.

* See page 21.



Manufacturing and Mechanical Engineering Technology Option⁷

Manufacturing and mechanical engineering technology prepares students for dynamic careers in industry. Graduates are versatile and effective in diverse areas that require understanding of the dependencies among material properties, product design, costs, manufacturing systems, and process technologies. The student views manufacturing from an enterprise and system perspective, recognizing the importance of customer and supplier interactions. To meet these diverse needs, this specialty provides a foundation of mathematics, science, and specialized technical courses, as well as preparation in oral and written communication. The three main areas of concentration are product design, manufacturing systems integration and automation, and manufacturing competitiveness. Studies in these areas are supported by a solid foundation in materials and manufacturing processes.

Program Mission

The mission of the Manufacturing and Mechanical Engineering Technology (MMET) program at Texas A&M University is to provide a high-quality, application-oriented education producing professionals who can effectively contribute to leadership, the advancement of manufacturing and mechanical engineering technology, and improved performance of industrial endeavors. The educational mission is complemented by applied research and the development of new interdisciplinary technology that mutually benefits the university and its industrial, governmental, and academic collaborators. The people in the program are committed to providing service and leadership in the promotion and advancement of the University and the profession.

Program Educational Objectives

The MMET program prepares students who after a few years after graduation:

1. Demonstrate manufacturing and mechanical technical knowledge, problem solving skills, and implementation skills for careers in design, installation, operations, technical sales, or service functions in industry;
2. Demonstrate increasing level of leadership and responsibility;
3. Exhibit both immediate and sustainable productivity in a dynamic work environment.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
CHEM 107 Gen. Chem. for Engr. Students ^{5,6}	(3-3)	4	ENGL 210 Sci. and Tech. Writing	(3-0)	3
ENGL 104 Composition and Rhetoric ^{3,6}	(3-0)	3	ENGR 112 Foundations of Engr. II ^{5,6}	(1-3)	2
ENGR 111 Foundations of Engr. I ^{5,6}	(1-3)	2	ENTC 181 Mfg. and Assembly Proc. I ^{5,6}	(2-3)	3
MATH 151 Engineering Mathematics I ^{5,6} ...	(3-2)	4	MATH 152 Engineering Mathematics II ^{5,6}	(3-2)	4
University Core Curriculum elective ²		3	University Core Curriculum elective ²		3
*KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>	*KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>
		17			16

SOPHOMORE YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
COMM 203 Public Speaking.....	(3-0)	3	ENTC 207 Metallic Materials ^{5,6}	(2-3)	3
ENTC 206 Nonmetallic Materials ^{5,6}	(2-3)	3	ENTC 275 Mechanics for Tech. ⁶	(4-0)	4
ISEN 302 Econ. Analysis of Engr. Projects ⁶ ...	(2-0)	2	ENTC 281 Mfg. and Assembly Proc. II ⁶	(2-3)	3
PHYS 218 Mechanics ^{5,6}	(3-3)	4	PHYS 208 Electricity and Optics ⁶	(3-3)	4
STAT 211 Principles of Statistics I ⁶	(3-0)	3	University Core Curriculum elective ²		<u>3</u>
University Core Curriculum elective ²		<u>3</u>			<u>17</u>
		18			

JUNIOR YEAR

ENGR 482 Ethics and Engineering ⁶	(3-0)	3	ENTC 320 Quality Assurance ⁶	(2-3)	3
ENTC 303 Fluid Mechanics and Power ⁶	(3-2)	4	ENTC 361 Solids Modeling and Analysis ⁶	(2-2)	3
ENTC 376 Strength of Materials ⁶	(3-2)	4	ENTC 363 Mech. Design App. I ⁶	(3-0)	3
ENTC 380 Computer-Aided Mfg. ⁶	(2-3)	3	ENTC 383 Mfg. Information Systems ⁶	(3-3)	4
IDIS 300 Industrial Electricity ⁶	(3-3)	<u>4</u>	Manufacturing processes elective ^{1,6}		<u>3</u>
		18			16

SENIOR YEAR

ENTC 370 Thermodynamics for Tech. ⁶	(3-2)	4	ENTC 412 Product and Inventory Plan. ⁶	(2-2)	3
ENTC 402 Inspection Methods and Proc. ⁶	(2-2)	3	ENTC 422 Mfg. Tech. Projects ⁶	(1-3)	2
ENTC 410 Mfg. Automation and Robotics ⁶	(2-3)	3	Technical elective ^{3,6}		3
ENTC 429 Managing People and Projects ⁶	(3-0)	3	University Core Curriculum electives ²		<u>6</u>
ENTC 463 Mech. Design App. II ⁶	(3-0)	<u>3</u>			<u>14</u>
		16			

- NOTES:**
1. Entering students will be given a placement test in mathematics. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.
 2. To be selected from the University Core Curriculum. Of the 18 hours shown as University Core Curriculum electives, 3 must be from visual and performing arts, 3 from social and behavioral sciences, 6 from U.S. history, and 6 from POLS 206 and 207. The required 6 hours from international and cultural diversity may be met by courses satisfying the visual and performing arts, social and behavioral sciences, and the political science and history requirements if they are also on the approved list of international and cultural diversity courses (see page 20).
 3. Must be approved by an advisor. Students interested in Co-op may use ENGR 385 for up to 3 credit hours. ENTC 485 Directed Studies is not for general use as a technical elective.
 4. Must be selected from ENTC 313 or 414.
 5. Common Body of Knowledge (CBK) courses required for admission to degree sequence.
 6. Courses used to calculate in-major GPR. Grade of C or better is required for each of the courses.
 7. For students currently majoring in engineering technology, manufacturing engineering technology specialty or mechanical engineering technology specialty, please see academic advisor

The curriculum lists the minimum number of classes required for graduation. Additional courses may be taken.

The Systems Safety Engineering Specialty is available for students pursuing this degree. See page 364 for detailed information.

* See page 21.

Curriculum in Industrial Distribution

Industrial distribution prepares men and women for sales engineering, sales management and mid-management positions with manufacturers who sell through distributors and with wholesale distributors who purchase, warehouse, sell, distribute and service a wide variety of industrial products. Industry segments include: automation solutions; general line; building materials; chemical and petrochemical; electrical; electronics; semiconductor; fluid power; heating, ventilation and air conditioning; mechanical power; metals; plastics; plumbing; safety equipment; specialty tools; and welding.

The day-to-day challenges faced by the industrial distributor or the manufacturer's representative require the person to be a professional with many capabilities. To fulfill this demand, the curriculum provides study in business, communications, information technology, applied technology, engineering and human relations. This knowledge is applicable to the graduate in relationships with executives, managers, engineers, scientists and craftsmen while assisting them in their manufacturing, plant maintenance or construction operations. The industrial distribution graduate assists them by direct application of operations, business and product knowledge. Essentially the industrial distribution graduate becomes a special assistant in the other person's business—a challenging and rewarding profession. This program is ranked as the best industrial distribution program offered in the United States. Graduates receive the Bachelor of Science degree in Industrial Distribution.

Industrial Distribution Academic Policies

Students seeking major degree sequence admission in Industrial Distribution (ID) must earn a grade of C or better in each of the Common Body of Knowledge (CBK) courses and have a GPR in these courses, as well as overall, which meets or exceeds a standard set by the program to manage the number of students in the major degree sequence consistent with the program's resources. The CBK courses for ID are CHEM 107; ENGL 104; IDIS 240; MATH 141 and 151; and PHYS 201.

Students must earn grades of C or better in all engineering technology, industrial distribution courses and CBK courses. If a student earns a grade of D or F in any of these courses, the student is required to repeat the course before enrolling in a more advanced course that has the D/F course as a prerequisite.

Students may pursue an emphasis in either electronics distribution or manufacturing technology. Technical electives related to each area of emphasis will be determined and selected with approval from the industrial distribution advisor.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ENGL 104 Composition and Rhetoric ⁵	(3-0)	3	CHEM 107 Gen. Chem. for		
IDIS 240 Intro. to Industrial			Engr. Students ^{3,5}	(3-3)	4
Distribution ^{5,6}	(2-0)	2	ENTC 181 Mfg. and Assembly Proc. I ⁶	(2-3)	3
MATH 151 Engineering Mathematics I ^{1,5}	(3-2)	4	MATH 141 Business Mathematics I ¹	(3-0)	3
PHYS 201 College Physics ⁵	(3-3)	4	PHYS 202 College Physics	(3-3)	4
History elective ²		3	*KINE 199 Required Physical Activity	(0-2)	<u>1</u>
*KINE 198 Health and Fitness Activity	(0-2)	<u>1</u>			15

SOPHOMORE YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ACCT 209 Survey of Accounting Prin. ⁶	(3-0)	3	ACCT 210 Sur. of Mgrl. and Cost Acct. Prin. ⁶	(3-0)	3
ECON 202 Principles of Economics ^{2,6}	(3-0)	3	ECON 203 Principles of Economics ⁶	(3-0)	3
ENTC 206 Nonmetallic Materials ⁶	(2-3)	3	MGMT 212 Business Law ⁶	(3-0)	3
POLS 206 American Natl. Govt. ²	(3-0)	3	POLS 207 State and Local Govt. ²	(3-0)	3
STAT 201 Elementary Stat. Inference or			History elective ²		<u>3</u>
STAT 303 Statistical Methods ⁶	(3-0)	<u>3</u>			15
		15			

JUNIOR YEAR

ENGL 210 Scientific and Tech. Writing ⁶ or			IDIS 303 Mechanical Power Transmission ⁶	(2-2)	3
ENGL 301 Technical Writing ⁶	(3-0)	3	IDIS 344 Dist. Info. and Control Systems ⁶	(3-3)	4
IDIS 300 Industrial Electricity ⁶	(3-3)	4	IDIS 364 Dist. Fin. Mgmt. ⁶	(3-0)	3
IDIS 340 Mfg. Dist. Relations ⁶	(3-0)	3	MGMT 309 Survey of Management ⁶	(3-0)	3
IDIS 343 Distribution Logistics ⁶	(3-0)	3	Technical elective.....		<u>3</u>
Humanities elective.....		<u>3</u>			16
		16			

SENIOR YEAR

IDIS 400 Industrial Automation ⁶	(3-3)	4	IDIS 403 Mech. and Fluid Pwr. Tech. ⁶	(2-2)	3
IDIS 420 Electronic Dist. Networks ⁶	(3-0)	3	IDIS 434 Quality Process for Dist. ⁶	(3-0)	3
IDIS 424 Purchasing Appl. in Dist. ⁶	(3-0)	3	IDIS 444 Leadership in Technology ⁶	(2-3)	3
IDIS 430 Sales Engineering ⁶	(3-2)	4	Free elective.....		4
Free elective.....		<u>4</u>	Visual and performing arts elective ²		<u>3</u>
		18			16

- NOTES: 1. The appropriate starting math course may be at a lower level, depending on a transfer student's previous math experience or a freshman student's placement test in mathematics.
2. To be selected from the University Core Curriculum. Of the 18 hours shown as University Core Curriculum electives, 3 must be from visual and performing arts, 3 from humanities, 6 from U.S. history, and 6 from POLS 206 and 207. The required 6 hours from international and cultural diversity may be met by courses satisfying the visual and performing arts, humanities, and the political science and history requirements if they are also on the approved list of international and cultural diversity courses (see page 20).
3. If the credits for chemistry are from CHEM 101/111 and 102/112, students must have credit for CHEM 101/111 in order to register for CHEM 102/112. Credit may come from credit by examination or by taking the course at an accredited educational institution.
4. For a list of approved technical electives, see an industrial distribution advisor.
5. Common Body of Knowledge (CBK) courses required for admission to major degree sequence.
6. Courses used to calculate in-major GPR.

The curriculum lists the minimum number of classes required for graduation. Additional courses may be taken.

The Systems Safety Engineering Specialty is available for students pursuing this degree. See page 364 for detailed information.

* See page 21.

Curriculum in Industrial Engineering

Industrial engineering is an engineering discipline devoted to the design, installation, improvement and control of integrated systems of people, materials, and facilities in a wide range of organizations that produce goods or render services. Like other engineering fields, industrial engineering is concerned with solving problems through the application of specialized knowledge in mathematics and science, as well as the principles of engineering. An important characteristic of industrial engineering is its system approach to integrate the basic resources of production and service systems and other relevant resources, such as information and energy, in such a way as to create a smooth, efficient and competitive operation within an enterprise. Industrial and systems engineers are needed in virtually all types of enterprises, ranging from industries such as manufacturing, distribution, logistics, transportation, and construction; service sectors such as health care, retail, banking, and engineering consulting to government agencies, military, and non-profit organizations.

The mission of the Industrial Engineering program is to serve the state, nation, and global community by educating industrial engineering students to be well founded in engineering fundamentals and to have the knowledge and skills required to design, develop, improve, implement and control sophisticated production and service systems in an environment characterized by complex technical and social challenges. Throughout this educational process, students will be instilled with the highest standards of professional and ethical behavior. It is the intent of the undergraduate industrial engineering program to equip its graduates to achieve the following accomplishments a few years after graduation:

1. Graduates will be successful in improving operations by solving complex industrial engineering problems.
2. Graduates will demonstrate professional leadership.
3. Graduates will be instilled with the motivation and ability to accomplish professional life-long learning.

The four-year curriculum in industrial engineering at Texas A&M is designed to provide students with a solid basis in mathematics and science, as well as in engineering economics, manufacturing systems, production and inventory control, operations research, quality engineering, reliability, facilities planning and materials handling. The program culminates with a senior design course in which students apply principles and knowledge acquired through the curriculum to an actual industrial problem.

Industrial Engineering students may participate in the Undergraduate Minor Program offered by Texas A&M. This program is usually comprised of 15 to 18 hours, some of which may be substituted as technical electives. The most common minors are math, business and economics. The department also has a Fast Track Program for academically qualified students who want to take selected graduate courses and receive both graduate and undergraduate credit by meeting specific requirements. The department encourages students to participate in industrial internships or the Cooperative Education Program to acquire practical experience to complement their industrial engineering education. Internships are generally encouraged during the summer months only. Students who participate in the Co-op program during three academic semesters may count the three credit hours as a technical elective in their curriculum.

Automatic admission to upper-level status will be granted to students who complete the Common Body of Knowledge (CBK) courses with no grade below a C and a minimum cumulative GPR of 2.5 in these courses. Also, the Bachelor of Science degree in Industrial Engineering requires a grade of C or better among the required industrial engineering courses. If a course is repeated, only the most recent grade is used in fulfilling this requirement.

Graduate degrees including the Master of Science (MS), Master of Engineering (M.Eng.), and Doctor of Philosophy (Ph.D.) are also offered by the department in addition to the Bachelor of Science in Industrial Engineering. For graduate degree information, please see the *Texas A&M University Graduate Catalog*.

(See Freshman Year)¹

SOPHOMORE YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
CPSC 206 Structured Programming in C.....	(3-2)	4	ECEN 215 Prin. of Elec. Engineering	(2-2)	3
MATH 251 Engineering Mathematics III.....	(3-0)	3	ENTC 181 Manuf. and Assem. Proc. I.....	(2-3)	3
MEEN 221 Statics and Particle Dynamics.....	(3-0)	3	ISEN 220 Intro. to Prod. Systems.....	(3-0)	3
MEEN 222 Materials Science	(2-2)	3	MATH 308 Differential Equations.....	(3-0)	3
Visual and performing arts elective ²		<u>3</u>	MEEN 315 Principles of Thermodynamics ...	(2-2)	3
		16	STAT 211 Prin. of Statistics I	(3-0)	<u>3</u>
					18

JUNIOR YEAR

ENGL 210 Science and Technical Writing or			ISEN 314 Statistical Control of Quality.....	(2-3)	3
ENGL 301 Technical Writing	(3-0)	3	ISEN 315 Prod. Systems Planning	(3-0)	3
ISEN 303 Engr. Economic Analysis.....	(3-0)	3	ISEN 420 Operations Research I.....	(3-0)	3
MATH 304 Linear Algebra	(3-0)	3	ISEN 424 Systems Simulation	(2-3)	3
POLS 207 State and local government	(3-0)	3	History elective ²		<u>3</u>
STAT 212 Prin. of Statistics II.....	(3-0)	3			15
Social science elective ²		<u>3</u>			
		18			

SENIOR YEAR

ISEN 316 Prod. Systems Operations	(3-0)	3	ENGR 482 Ethics and Engineering	(2-2)	3
ISEN 416 Facilities Location, Layout and Matl. Handling	(3-3)	4	ISEN 459 Mfg. Systems Design	(1-6)	3
Technical electives ³		<u>6</u>	Technical electives ³		<u>6</u>
		13			12

- NOTES: 1. ISEN 101 is also required during the first semester of the freshman year.
2. To be selected from the University Core Curriculum. Of the 18 hours shown as University Core Curriculum electives, 3 must be from visual and performing arts, 3 from social and behavioral sciences, 6 from U.S. history, and 6 from POLS 206 and 207. The required 6 hours from international and cultural diversity may be met by courses satisfying the visual and performing arts, social and behavioral sciences, and the political science and history requirements if they are also on the approved list of international and cultural diversity courses (see page 20).
3. A total of 12 hours of technical electives is required, of which 9 hours must be industrial engineering courses. The choice of courses to be taken must be made in consultation with the student's advisor and/or the Industrial Engineering Advising Office.

The following certificates from the Dwight Look College of Engineering are available for students pursuing this degree: Engineering Scholars Program Honors Certificate, International Engineering Certificate, Engineering Project Management Certificate, Safety Engineering Certificate. See page 361 for detailed information.

Curriculum in Mechanical Engineering

Mechanical engineering is a highly diversified profession. The mechanical engineer designs machines, devices, various products and control systems, and works with the generation, conversion, transmission, and utilization of mechanical and thermal power. Assignments often include analysis and synthesis of mechanical, thermal, and fluid systems. Mechanical engineers are also responsible for characterization, specification, and analysis of materials used in design and manufacturing. Manufacturing systems, robotics, electromechanical devices, and control systems are also the purview of the mechanical engineer. Graduates in mechanical engineering are among the most versatile engineers and enjoy professional employment in industry, government, consulting, and research organizations.

The work of mechanical engineers varies from general engineering to numerous, narrow specialties, as required by the wide variety of employers. A general list, though not in any way exhaustive, of the areas of professional employment opportunities available to mechanical engineers includes: design, construction, controls, materials specification and evaluation, analysis of thermal systems, fluid and solid mechanics, manufacturing, plant engineering, research and development, and technical sales. Many mechanical engineers are promoted to management and administrative positions as well.

The mission of the Department of Mechanical Engineering is to serve the students of Texas A&M University, the State of Texas, and the nation by:

- providing quality education, well grounded in the fundamental principles of engineering, to prepare students for leadership positions and successful careers in industry, government, and academia;
- extending the knowledge base of mechanical engineering to support the competitiveness of existing industry and to spawn new economic development in Texas and the nation through active involvement in basic and applied research; and
- providing professional development opportunities for practicing engineers through continuing education, service, and outreach activities.

The objectives of the Mechanical Engineering program are to produce graduates who will:

1. have successful careers, and become leaders, in industry and the public sector;
2. appropriately apply acquired knowledge, work well with other people, effectively communicate ideas and technical information, and continue to learn and improve; and
3. successfully pursue advanced studies, if they so choose, and subsequently contribute to the development of advanced concepts and leading edge technologies.

The educational outcomes for the Mechanical Engineering program are that students will attain:

- a. An ability to apply knowledge of mathematics, science and engineering
- b. An ability to design and construct experiments, as well as to analyze and interpret data
- c. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- d. An ability to function on multi-disciplinary teams
- e. An ability to identify, formulate and solve engineering problems
- f. An understanding of professional and ethical responsibility
- g. An ability to communicate effectively
- h. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- i. A recognition of the need for, and an ability to engage in life-long learning
- j. A knowledge of contemporary issues
- k. An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

Mechanical engineers should possess a thorough understanding of engineering science as well as analytical and practical skills in one of many basic mechanical engineering specialties. The mechanical engineering curriculum at Texas A&M requires students to develop and apply logical thinking, innovative approaches, and ethical standards as a prerequisite for professional competence. The curriculum consists of basic theory courses complemented by laboratory experiences in dynamic systems and controls, design, experimentation, fluid mechanics, heat transfer, manufacturing, and materials. Elective courses are offered in numerous areas including air conditioning, automotive engineering, computer-aided design, control systems, corrosion, energy conversion, internal combustion engines, manufacturing, materials, mechanical design, polymers, mechatronics, metallurgy, power generation, robotics, stress analysis, fluid mechanics, turbomachinery, and others. The selection of elective courses is dictated by the interests and goals of the student, working with departmental advisors and within the curriculum guidelines.

Many students enhance their education by participating in cooperative education and/or professional internships, which offer opportunities for employment in engineering positions while working toward a degree. Numerous study abroad programs are also available for gaining experience and perspectives in the international arena. Participation in student chapters of professional and honor societies provides leadership opportunities, collegial activities, and learning experiences outside the classroom. Many students also participate in research projects through individual directed studies courses with a professor. The mechanical engineering program culminates with a senior capstone design course sequence highlighted by real-life projects sponsored by various industries. Students benefit from the challenges and gratification that come through direct interaction with practicing engineers.

(See Freshman Year)

A grade of C or better is required for all of the Common Body of Knowledge (CBK) courses (MATH 151 and 152; PHYS 208 and 218; CHEM 107; ENGL 104; ENGR 111 and 112). Prerequisites for the CBK courses will not be included in the calculations.

SOPHOMORE YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
MATH 251 Engineering Mathematics III ¹	(3-0)	3	CVEN 305 Mechanics of Materials ¹	(3-0)	3
MEEN 221 Statics and Particle Dynamics ¹	(2-2)	3	ECEN 215 Prin. of Electrical Engr. ¹	(2-2)	3
MEEN 222 Materials Science ¹	(3-0)	3	MATH 308 Differential Equations ¹	(3-0)	3
University Core Curriculum electives ²		6	MEEN 315 Prin. of Thermodynamics ¹	(2-2)	3
		<u>15</u>	MEEN 260 Mechanical Measurements ¹	(2-3)	<u>3</u>
					15

JUNIOR YEAR

ENGL 210 Scientific and Technical Writing ⁴	(3-0)	3	ISEN 302 Economic Analysis of Engineering Projects.....	(2-0)	2
MEEN 344 Fluid Mechanics ¹	(3-0)	3	MEEN 364 Dynamic Sys. and Controls ¹	(2-3)	3
MEEN 345 Fluid Mechanics Lab. ¹	(0-3)	1	MEEN 368 Solid Mechanics in Mechanical Design ¹	(2-2)	3
MEEN 357 Engineering Analysis for Mech Engineers ¹	(3-0)	3	MEEN 381 Seminar.....	(0-2)	1
MEEN 360 Mat. and Manuf. Sel. in Design ¹	(3-3)	4	MEEN 461 Heat Transfer.....	(3-0)	3
MEEN 363 Dynamics and Vibrations ¹	(2-2)	<u>3</u>	MEEN 464 Heat Transfer Lab.....	(0-3)	1
		17	University Core Curriculum elective ²		<u>3</u>
					16

SENIOR YEAR

ENGR 482 Ethics and Engineering.....	(2-2)	3	MEEN 402 Intermediate Design.....	(2-3)	3
MEEN 401 Intro. to Mech. Engr. Design ¹	(2-3)	3	Technical electives ³		9
MEEN 404 Engineering Laboratory.....	(2-3)	3	University Core Curriculum elective ²		<u>3</u>
Stem courses ³		<u>6</u>			15
		15			

NOTES: 1. Requires a grade of C or better.

2. To be selected from the University Core Curriculum. Of the 18 hours shown as University Core Curriculum electives, 3 must be from visual and performing arts, 3 from social and behavioral sciences, 6 from U.S. history, and 6 from POLS 206 and 207. The required 6 hours from international and cultural diversity may be met by courses satisfying the visual and performing arts, social and behavioral sciences, and the political science and history requirements if they are also on the approved list of international and cultural diversity courses (see page 20).

3. Stem courses and technical electives: See the Mechanical Engineering Academic Advisor's Office for a list of approved courses.

4. Students may take ENGL 210 or choose from the following list: COMM 205, ENGL 203, 235, 241, or 301.

This curriculum lists the minimum number of classes required for graduation. Additional courses may be taken.

The following certificates from the Dwight Look College of Engineering are available for students pursuing this degree: Energy Engineering Certificate, Engineering Project Management Certificate, Engineering Scholars Program Honors Certificate, International Engineering Certificate, Polymer Specialty Certificate, Safety Engineering Certificate (see pages 361 – 364).

Curriculum in Nuclear Engineering

Nuclear engineering deals with the application and utilization of nuclear processes and radiations. The use of nuclear energy for the production of electrical power is a mature industry. Nuclear engineers work on all aspects of the nuclear fuel cycle and for many different types of employers such as government and private labs, regulatory agencies, reactor vendors, utilities and architect engineers. In addition, nuclear energy for space applications is a rapidly expanding field. Radionuclide technology in industry and medicine requires a large number of well-trained radiological health engineers. To supply qualified engineers, the Department of Nuclear Engineering offers curricula leading to the Bachelor of Science degree in Nuclear Engineering and in Radiological Health Engineering (see page 410). Both degrees are accredited by the Engineering Accreditation Commission of ABET, Inc. (formerly Accreditation Board of Engineering and Technology (ABET)).

The missions of the Department of Nuclear Engineering are:

- to produce high quality graduates from the undergraduate through the doctoral levels to help meet the technical manpower needs of our state, region, nation and the international community;
- to conduct research, including collaboration with research in related fields, to advance the state of knowledge in these disciplines in support of the needs of society; and
- to perform service in these disciplines for many constituencies including our College and University, industry, government and national laboratories, professional organizations, and the public.

In fulfilling these missions, the objective of the undergraduate program is to prepare students for success in their professional endeavors following the baccalaureate degree. These endeavors may include direct employment in the private or public sectors, graduate studies in engineering or science, professional studies in medicine, business, law or public administration, service in the military, or entrepreneurial activities. To achieve this purpose, four principal educational objectives are identified. Graduates of our Bachelor of Science program in Nuclear Engineering:

1. will work on the challenges of maintenance, improvement, innovation, education, and research in nuclear power and industrial utilization of nuclear radiation and radionuclides. In this work, they will fulfill independent assignments, engage in collaborations, and manage the work of others with effective communications characterizing all phases of their responsibilities;
2. will conduct their professional activities with full recognition of the choices and challenges implicit to their work, to its ethical dimensions, and to their implications for matters beyond their immediate tasks;
3. will take the local, global, historical, social, economic, and political settings into account in both their domestic and international endeavors; and
4. will recognize and utilize both the accumulated body of results from prior work and the continuing evolution of science and technology as essential resources for the effective conduct of their work.

The nuclear engineering baccalaureate degree programs stress engineering science fundamentals and mathematics. However, considerable numbers of elective hours are available in the curriculum to permit students to broaden their educations as desired.

Most of the facilities used in the M.S. and Ph.D. programs are also used in the undergraduate degree programs. These facilities make the Department of Nuclear Engineering one of the best equipped in the United States. Texas A&M is now the only University in the United States with two nuclear reactors on its campus.

(See Freshman Year¹)

SOPHOMORE YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
MEEN 221 Statics and Particle Dynamics	(2-2)	3	CVEN 305 Mechanics of Materials	(3-0)	3
MEEN 222 Materials Science	(2-2)	3	ECEN 215 Prin. of Electrical Engineering	(2-2)	3
MATH 251 Engineering Mathematics III.....	(3-0)	3	MATH 308 Differential Equations.....	(3-0)	3
NUEN 201 Intro. to Nuc. Engr. I	(3-0)	3	MEEN 315 Principles of Thermodynamics	(2-2)	3
University Core Curriculum elective ³		<u>3</u>	NUEN 302 Intro. to Nuc. Engr. II.....	(3-0)	<u>3</u>
		15			15

JUNIOR YEAR

ENGL 301 Technical Writing ⁵ or			ISEN 302 Econ. Analysis of Engr. Proj.	(2-0)	2
COMM 203 Public Speaking.....	(3-0)	3	MEEN 461 Heat Transfer.....	(3-0)	3
MATH 311 Topics in Appl. Mathematics I....	(3-0)	3	NUEN 303 Nuc. Detection and Isotopes	(2-3)	3
MEEN 344 Fluid Mechanics	(2-2)	3	NUEN 304 Nuclear Reactor Analysis	(3-0)	3
NUEN 301 Nuclear Reactor Theory	(3-0)	3	NUEN 329 Analytical and Num. Meth.	(4-0)	4
NUEN 309 Radiological Safety.....	(3-0)	<u>3</u>	University Core Curriculum elective ³		<u>3</u>
		15			18

SENIOR YEAR

NUEN 405 Nuc. Eng. Experiments	(2-3)	3	ENGR 482 Ethics and Engineering	(2-2)	3
NUEN 406 Nuc. Engr. Sys. and Design.....	(3-0)	3	NUEN 410 Design of Nuclear Reactors	(4-0)	4
NUEN 430 Comp. Appl. in Nuc. Engr.....	(3-0)	3	NUEN 481 Seminar.....	(1-0)	1
Technical elective ⁴		4	NUEN Technical elective ⁴		3
University Core Curriculum elective ³		<u>3</u>	Technical elective ⁴		3
		16	University Core Curriculum elective ³		<u>3</u>
					17

- NOTES: 1. NUEN 101 is also required during the first semester of the freshman year.
 2. Entering students will be given a placement test in mathematics. Test results will be used to select the appropriate starting course.
 3. To be selected from the University Core Curriculum. Of the 18 hours shown as University Core Curriculum electives, 3 must be from visual and performing arts, 3 from social and behavioral sciences, 6 from U.S. history (typically HIST 105 and 106), 6 from political science (POLS 206 and 207), and 6 from international and cultural diversity courses. The international and cultural diversity hours may be met by courses satisfying the visual and performing arts, social and behavioral sciences, and the political science and history requirements if they are also on the approved list for international and cultural diversity courses. In addition, ENGR 482 or PHIL 482 must be taken.
 4. As approved by departmental advisor.
 5. ENGL 210 is an acceptable substitute.
 6. NUEN 303; Writing Intensive Course.

Curriculum in Ocean Engineering

Ocean engineering is the application of basic engineering principles to the analysis, design, construction, and management of systems that operate in the ocean environment. Typical ocean engineering application areas include: beach protection and nourishment, coastal structures, coastal erosion, development of ocean energy resources, instrumentation for coastal and offshore measurements, marine dredging and dredged material placement, moored and towed systems, ocean mining, offshore petroleum recovery, offshore structures, ports and harbors, search and salvage, suspended and dissolved constituent transport, subsea pipelines and cables, submersible vehicles, and underwater acoustics. Employment opportunities exist with private industry, defense contractors, consulting firms, and government agencies. Ocean engineering students are encouraged to pursue summer internships and may participate in the University cooperative education program. The curriculum leading to a Bachelor of Science degree in ocean engineering is administered by the Coastal and Ocean Engineering Division of the Department of Civil Engineering and is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

The mission of the Ocean Engineering Program is to conduct research, serve the public, and educate students in a broad program of instruction encompassing traditional and emerging areas of ocean engineering. Graduates are prepared for entering engineering practice, continuing onto graduate study, life-long learning and professional development. Students develop a sense of professionalism and an appreciation for the obligations of a professional engineer. The Program offers ocean engineering continuing education activities for the people and marine industry of the state, nation and international community. The Program serves the public and engineering profession in Texas and the nation through participation of faculty and students in public and professional activities. Applied and fundamental research is conducted that contributes to the better understanding of ocean engineering and supports student educational development.

The objectives of the Ocean Engineering Program are to graduate students that are qualified to contribute to the ocean engineering profession and society, gain employment in ocean engineering and related engineering fields with private and government organizations, and advance to positions of increased responsibility. Some graduates become professional engineers and members of ocean engineering related professional societies, pursue company training and continuing education activities, and attend technical conferences. Some graduates pursue graduate studies in ocean engineering and related fields and receive post baccalaureate degrees.

The ocean engineering curriculum includes courses in written communication skills, humanities, social sciences and American heritage to ensure a well-rounded education. Courses that directly apply to ocean engineering include: coastal engineering, dynamics of ocean systems, engineering design of offshore and coastal systems, fluid mechanics, marine hydrodynamics, naval architecture, numerical methods, ocean engineering laboratory, ocean wave mechanics, oceanography, offshore and coastal structures, underwater acoustics, and underwater and moored system design.

The laboratory facilities for the Ocean Engineering Program are among the most comprehensive in the nation for testing offshore and coastal systems. The facilities are located in the Reta and Bill Haynes '46 Coastal Engineering Laboratory, Offshore Technology Research Center, Civil Engineering Laboratory Building, and the Hydromechanics Laboratory. These facilities include a large deep water wave basin, two towing tanks, three wave channels, a variable slope flume, dredge pump test loop, two shallow water wave basins, and data acquisition systems. Additional information is available on the Web site oceaneng.civil.tamu.edu.

(See Freshman Year)

SOPHOMORE YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
CVEN 221 Engr. Mech.: Statics.....	(2-2)	3	CVEN 305 Engr. Mech. of Materials.....	(3-0)	3
MATH 251 Engineering Mathematics III.....	(3-0)	3	CVEN 306 Materials for Civil Engineers.....	(2-2)	3
STAT 211 Prin. of Statistics I.....	(3-0)	3	MATH 308 Differential Equations.....	(3-0)	3
University Core Curriculum electives ¹		<u>6</u>	MEEN 315 Prin. of Thermodynamics.....	(3-0)	
		15	or		
			ECEN 215 Prin. of Electrical Engineering.....	(2-2)	3
			OCEN 201 Intro. to Ocean Engineering ⁴	(2-0)	2
			University Core Curriculum elective ¹		<u>3</u>
					17

JUNIOR YEAR

CVEN 302 Comp. Appl. in Engr. and Const.....	(3-0)	3	CVEN 363 Engr. Mech.: Dynamics.....	(2-2)	3
CVEN 311 Fluid Dynamics.....	(3-0)	3	CVEN 365 Intro. to Geotech. Engineering.....	(2-3)	3
CVEN 336 Fluid Dynamics Lab.....	(0-2)	1	OCEN 300 Ocean Engr. Wave Mech. ⁴	(3-0)	3
CVEN 345 Theory of Structures.....	(3-0)	3	OCNG 410 Intro. to Physical Oceanography.....	(3-0)	3
OCNG 401 Intro. to Oceanography.....	(3-0)	3	OCEN 462 Hydromechanics ⁴	(3-0)	<u>3</u>
Writing skills elective ²		<u>3</u>			15
		16			

SENIOR YEAR

OCEN 301 Dyn. of Offshore Structures ⁴	(3-0)	3	ENGR 482 Ethics and Engineering.....	(2-2)	3
OCEN 400 Basic Coastal Engineering ⁴	(3-0)	3	OCEN 407 Design of Ocean Engr. Facilities ⁴	(1-6)	4
OCEN 401 Underwater Acoustics for Ocean Engineers ⁴	(3-0)	3	OCEN 410 Ocean Engineering Lab. ⁴	(0-3)	1
OCEN 402 Naval Architecture ⁴	(3-0)	3	Technical electives ³		6
OCEN 481 Seminar.....	(1-0)	1	University Core Curriculum elective ¹		<u>3</u>
Technical elective ³		<u>3</u>			17
		16			

NOTES: 1. To be selected from the University Core Curriculum. Of the 18 hours shown as University Core Curriculum electives, 3 must be from visual and performing arts, 3 from social and behavioral sciences, 6 from U.S. history, and 6 from POLS 206 and 207. The required 6 hours from international and cultural diversity may be met by courses satisfying the visual and performing arts, social and behavioral sciences, and the political science and history requirements if they are also on the approved list of international and cultural diversity courses (see page 20).

2. This elective is to be selected from ENGL 210 or 301.

3. The technical elective program must be approved by the department head or the undergraduate advisor. Technical electives are chosen from the approved technical elective list, and at least 3 credit hours must be engineering design.

4. A grade of C or better is required for these ocean engineering courses.

The Safety Engineering Certificate is available for students pursuing this degree. See page 364 for detailed information.

Curriculum in Petroleum Engineering

Petroleum Engineering is primarily concerned with the economic extraction of oil, gas, and other natural resources from the earth. Producing oil and gas is accomplished through the design, drilling and operation of wells and well systems, and the integrated management of the underground reservoirs in which the resources are found.

The petroleum engineering program has three educational objectives:

- graduates will be competitive in the petroleum engineering job market or in continuing their education;
- graduates will be skilled practitioners of petroleum engineering as employees; and
- the program will be regarded as excellent.

In essence, the goal of the petroleum engineering curriculum is to provide a modern engineering education with proper balance between fundamentals and practice, and to graduate engineers prepared for life-long learning but capable of being productive contributors immediately. The curriculum includes study of:

- design and analysis of well systems and procedures for drilling and completing wells;
- characterization and evaluation of subsurface geological formations and their resources;
- design and analysis of systems for producing, injecting and handling fluids;
- application of reservoir engineering principles and practices for optimizing resource development and management; and
- use of project economics and resource valuation methods for design and decision making under conditions of risk and uncertainty.

There is a heavy emphasis on mathematics, computer applications, communication skills and interdisciplinary problem solving. As a result, Aggie petroleum engineers are in high demand in the industry, and their starting salaries are consistently among the top in the University and the nation.

The department is well-known for its curriculum, facilities and faculty, and its undergraduate program was recognized as the best in the nation by *US News and World Report* in 2003. The faculty comprises more than 20 professors and lecturers, many of them widely known and globally involved in the petroleum industry. Four of the faculty are members of the prestigious National Academy of Engineering, and 13 are Distinguished Members of the Society of Petroleum Engineers.

The department encourages its students to work as interns during the summer months. A minimum of six weeks of approved experience is required for graduation. The department also participates in the Cooperative Education Program.

In addition to the Bachelor of Science degree in Petroleum Engineering, the department also offers both master's and doctoral degrees, including the Master of Science and Master of Engineering, and the Doctor of Philosophy and Doctor of Engineering (see the *Texas A&M University Graduate Catalog*).

(See Freshman Year¹)**SOPHOMORE YEAR**

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
COMM 205 Comm. for Tech. Professionals ...	(3-0)	3	CVEN 305 Mechanics of Materials.....	(3-0)	3
GEOL 104 Physical Geology	(3-2)	4	MATH 308 Differential Equations.....	(3-0)	3
MATH 251 Engineering Mathematics III.....	(3-0)	3	MEEN 315 Prin. of Thermodynamics.....	(2-2)	3
MEEN 221 Statics and Particle Dynamics	(2-2)	3	PETE 311 Reservoir Petrophysics	(3-3)	4
PETE 225 Petroleum Drilling Systems.....	(1-3)	2	University Core Curriculum elective ²		<u>3</u>
University Core Curriculum elective ²		<u>3</u>			<u>16</u>
		18			

JUNIOR YEAR

GEOL 404 Geology of Petroleum.....	(2-3)	3	PETE 321 Formation Evaluation.....	(3-3)	4
PETE 301 Petr. Engr. Numerical Methods ...	(2-3)	3	PETE 323 Reservoir Models	(3-0)	3
PETE 310 Reservoir Fluids.....	(3-3)	4	PETE 324 Well Performance	(3-0)	3
PETE 314 Transport. Processes in Petroleum Production.....	(3-0)	3	PETE 325 Petroleum Productions Systems	(1-3)	2
PETE 355 Technical Presentations I ³	(1-0)	<u>1</u>	PETE 403 Petroleum Project Evaluation	(3-0)	<u>3</u>
		14			15

SUMMER

PETE 300 Summer Practice

SENIOR YEAR

ECEN 215 Principles of Electrical Engineering.....	(2-2)	3	ENGR 482 Ethics and Engineering	(3-0)	3
PETE 401 Reservoir Development.....	(2-3)	3	PETE 322 Geostatistics	(3-0)	3
PETE 405 Drilling Engineering	(3-0)	3	PETE 400 Reservoir Description	(2-3)	3
PETE 410 Production Engineering	(3-0)	3	Technical elective ⁴		3
PETE 435 Technical Presentations II ³	(1-0)	1	University Core Curriculum elective ²		<u>3</u>
University Core Curriculum elective ²		<u>3</u>			<u>15</u>
		16			

- NOTES: 1. PETE 201 is also required during the first semester of the freshman year.
2. To be selected from the University Core Curriculum. Of the 18 hours shown as University Core Curriculum electives, 3 must be from visual and performing arts, 3 from social and behavioral sciences, 6 from U.S. history, and 6 from POLS 206 and 207. The required 6 hours from international and cultural diversity may be met by courses satisfying the visual and performing arts, social and behavioral sciences, and/or U.S. history requirements if they are also on the approved list of international and cultural diversity courses (see page 20). In addition, ENGR 482/PHIL 482 must be taken.
3. Independent study of a petroleum engineering problem, the solution of which will be documented by a technical paper and an oral presentation at the departmental student paper contest held during the same academic year.
4. Select from GEOL 312, GEOP 421, PETE 406 or 416, or other as approved by the department head.

The following certificates from the Dwight Look College of Engineering are available for students pursuing this degree: Engineering Scholars Program Honors Certificate, Energy Engineering Certificate, Engineering Project Management Certificate, International Engineering Certificate, and Safety Engineering Certificate. See page 361 for detailed information.



Curriculum in Radiological Health Engineering

The large number of operating nuclear power plants has created a strong demand for specialists in radiological health engineering. Well-educated individuals are, and will be, required in all aspects of the nuclear power industry from mining all the way to disposal of wastes from spent fuel. There are needs for radiological health specialists in government, hospitals, educational institutions and in private industry. This program at Texas A&M is designed to give students a broad background so they will be able to assume positions in any area of the nuclear industry. The Texas A&M Radiological Health Engineering degree is the only one that is accredited by the Engineering Accreditation of ABET, Inc. (formerly Accreditation Board for Engineering (ABET)) in the United States.

The missions of the Nuclear Engineering Department are:

- to produce high quality graduates from the undergraduate through the doctoral levels to help meet the technical manpower needs of our state, region, nation and the international community;

- to conduct research, including collaboration with research in related fields, to advance the state of knowledge in these disciplines in support of the needs of society; and
- to perform service in these disciplines for many constituencies including our College and University, industry, government and national laboratories, professional organizations, and the public.

In fulfilling these missions, the objective of the undergraduate program is to prepare students for success in their professional endeavors following the baccalaureate degree. These endeavors may include direct employment in the private or public sectors, graduate studies in engineering or science, professional studies in medicine, business, law or public administration, service in the military, or entrepreneurial activities. To achieve this purpose, four principal educational objectives are identified. Graduates of our Bachelor of Science program in Radiological Health Engineering

1. will work on the challenges of maintenance, improvement, innovation, education, and research in the safe and environmentally responsible utilization of nuclear resources including, but not limited to, their occurrence in power production, industrial, and medical applications. In this work, they will fulfill independent assignments, engage in collaborations, and manage the work of others with effective communications characterizing all phases of their responsibilities.
2. will conduct their professional activities with full recognition of the choices and challenges implicit to their work, to its ethical dimensions, and to their implications for matters beyond their immediate tasks.
3. will take the local, global, historical, social, economic and political settings into account in both their domestic and international endeavors.
4. will recognize and utilize both the accumulated body of results from prior work and the continuing evolution of science and technology as essential resources for the effective conduct of their work.

The radiological engineering baccalaureate degree programs stress engineering science fundamentals and mathematics. However, considerable numbers of elective hours are available in the curriculum to permit students to broaden their educations as desired.

The radiological health engineering program is administered by the Department of Nuclear Engineering and has the same objectives and facilities that are stated under the curriculum in Nuclear Engineering.

(See Freshman Year¹)

SOPHOMORE YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
MATH 251 Engineering Mathematics III.....	(3-0)	3	MATH 308 Differential Equations.....	(3-0)	3
MEEN 221 Statics and Particle Dynamics.....	(2-2)	3	MEEN 315 Principles of Thermodynamics ...	(2-2)	3
NUEN 201 Intro. Nuclear Engineering I.....	(3-0)	3	NUEN 302 Intro. Nuclear Engineering II.....	(3-0)	3
VTPP 434 Physiol. for Bioengineers I.....	(3-3)	4	STAT 211 Principles of Statistics I.....	(3-0)	3
University Core Curriculum elective ³		<u>3</u>	VTPP 435 Physiol. for Bioengineers II.....	(3-3)	<u>4</u>
		16			16

JUNIOR YEAR

ECEN 215 Prin. of Electrical Engineering	(2-2)	3	ENGL 301 Technical Writing ⁴		
GEOG 410 Hydrogeology	(3-0)	3	or		
MATH 311 Topics in Applied Math. I.....	(3-0)	3	COMM 203 Public Speaking.....	(3-0)	3
NUEN 301 Nuclear Reactor Theory	(3-0)	3	NUEN 303 Nucl. Detection and Isotopes	(2-3)	3
NUEN 309 Radiological Safety.....	(3-0)	<u>3</u>	NUEN 329 Analytical and Num. Meth.	(2-2)	4
		15	SENG 310 Industrial Hygiene Engr.....	(3-0)	3
			University Core Curriculum elective ³		<u>3</u>
					16

SENIOR YEAR

CHEM 227 Organic Chemistry I.....	(3-0)	3	CVEN 305 Mechanics of Materials.....	(3-0)	3
CHEM 237 Organic Chemistry Lab.....	(0-3)	1	ENGR 482 Ethics and Engineering	(2-2)	3
NUEN 405 Nuclear Engr. Experiments	(2-3)	3	ISEN 302 Econ. Anly. of Engr. Proj.	(2-0)	2
NUEN 475 Envir. Nuclear Engineering	(3-0)	3	NUEN 479 Rad. Protection Engineering	(2-3)	3
Technical elective ⁵		3	NUEN 481 Nuclear Engr. Seminar	(1-0)	1
University Core Curriculum elective ³		<u>3</u>	Technical elective ⁵		3
		16	Technical elective ⁵		<u>2</u>
					17

- NOTES: 1. NUEN 101 is also required during the first semester of the freshman year.
2. Entering students will be given a placement test in mathematics. Test results will be used to select the appropriate starting course.
3. To be selected from the University Core Curriculum. Of the 18 hours shown as University Core Curriculum electives, 3 must be from visual and performing arts, 3 from social and behavioral sciences, 6 from U.S. history (typically HIST 105 and 106), 6 from political science (POLS 206 and 207), and 6 from international and cultural diversity courses. The international and cultural diversity hours may be met by courses satisfying the visual and performing arts, social and behavioral sciences, and the political science and history requirements if they are also on the approved list for international and cultural diversity courses. In addition, ENGR 482 or PHIL 482 must be taken.
4. ENGL 210 is an acceptable substitute.
5. As approved by the departmental advisor.



TEXAS A&M
UNIVERSITY

A black and white photograph of a bronze statue of a man with a beard and mustache, wearing a suit and tie. The statue is positioned in the foreground, looking slightly to the left. In the background, there are trees and a large, domed building, likely the Texas State Capitol.

COLLEGE OF GEOSCIENCES

★ 2008–2009 UNDERGRADUATE CATALOG ★

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College of Geosciences

Administrative Officers

Dean	Björn Kjerfve, B.A., M.S., Ph.D.
Acting Executive Associate Dean and Associate Dean for Research	Ethan L. Grossman, B.S., Ph.D.
Associate Dean for Academic Affairs.....	Vatche P. Tchakerian, B.A., M.A., Ph.D.

General Statement

Planet Earth is our home. We humans live on the land which occupies 29 percent of the earth's surface. The remainder of the globe is covered by the oceans. An envelope of air surrounds the earth. These realms—the lithosphere, hydrosphere and atmosphere—form the environment for life on this planet.

The study of these realms and their interactions with each other, the biosphere and with humans, comprise the geosciences—atmospheric science, geography, geology and geophysics, and oceanography. The College of Geosciences has four academic departments corresponding to these disciplines.

Geography involves humans' interactions with the environments—physical, biological and cultural. As an interdisciplinary field, it requires knowledge from the other geosciences as well as from the social and biological sciences. Geology deals with the processes and forces acting at the surface and within the earth; with the materials of the earth, its forms and structures; and with the history of its development and the evolution of life on its surface and in its waters. Geophysics deals primarily with the physics of the solid earth from the measurement and understanding of its internal structure and physical properties, plate motions and their effect on continents and ocean basins, to the detection of its natural resources through remote sensing. Atmospheric Sciences are the sciences of the atmosphere, weather and climate which are so important to human activities and life on this planet. Oceanography is the study of the marine environment and its inhabitants. The distribution and nature of marine life, the development of ocean basins, the chemistry of ocean waters and the dynamics of the water masses of the sea are the major elements of oceanography. Degrees in oceanography are available only at the graduate level. Each of the other three departments offer B.S., M.S. and Ph.D. degrees, as well as a B.A. degree offered by the Department of Geology and Geophysics. The College offers three interdisciplinary B.S. degrees, Environmental Geoscience, Environmental Studies and Spatial Sciences. A non-thesis Master of Geoscience degree is also offered.

The geosciences faculty participates in research on a broad front of both basic and applied subjects. The College of Geosciences is the Science Operator for the Integrated Ocean Drilling Program, which explores the structure and history of sediments and crust beneath the sea floor. The college contributes scientific leadership to the Scientific Committee on Oceanic Research and the International and U.S. Global Ocean Observing System Steering Committees, participates in the programs of the Texas Institute of Oceanography, and is

home to the Texas Sea Grant Program. Other research programs in the college include atmospheric chemistry, Texas Center for Climate Studies, Climate System Research Program, Synoptic/Mesoscale Meteorology, Geochemical and Environmental Research, Tectonophysics, Paleocology, Petroleum Reservoir Studies and all phases of Oceanography. Research faculty participate in both undergraduate and graduate teaching. Consequently, the faculty bring to their classes the excitement of discovery, state-of-the-art scientific equipment, a knowledge of useful applications to human problems and good working relations with industry and government, all of which can help the undergraduate prepare for a rewarding career.

Career opportunities for graduates in the geosciences are expanding—in industry, commerce, education and government at all levels. Geoscience professionals search for energy resources, minerals and water, predict natural hazards, contribute to land use management, as well as teach about Planet Earth in high schools, colleges and universities.

Double Major

Students in the College of Geosciences may elect to have two major fields of study within the College, or they may elect to have a major in the College of Geosciences in conjunction with a major in another college, with the approval of both colleges involved, provided that both majors lead to the same baccalaureate degree. A student should be able to complete a double major for the baccalaureate degree by adding a modest number of credit hours more than required by a single major. The following requirements must be met by the student: 1) satisfy all University and college requirements, 2) successfully complete departmental requirements in each major, if both majors are in the College of Geosciences, and 3) in cases where one major is in the College of Geosciences and the other is in another college, the student must successfully meet the major field of study requirements for each area as determined by each college. Some departments may not permit double majors.

Minors

Students may choose to complete a minor in the College of Geosciences. All minors will require not less than 15 hours and not more than 18 hours in the discipline; at least 6 hours must be upper-division courses in the discipline. Each student choosing to complete a minor must contact the department offering the minor to determine if specific courses are required.

Curricula — College of Geosciences

Earth Sciences	Geology
Environmental Geoscience	Geophysics
Environmental Studies	Meteorology
Geography	Spatial Sciences

Honors Program

The College of Geosciences participates in the University Honors Program, which is described in detail on page 164.

International and Cultural Diversity Requirement

Texas A&M University requires its students to meet an International and Cultural Diversity requirement as part of the University's Core Curriculum. Meeting this requirement will require the careful selection of courses. The student is directed to page 20 of this catalog for detailed information regarding this requirement and also is encouraged to seek the advice of the student's academic advisor.

Curriculum in Environmental Geoscience

The increasing demands that population growth puts on the natural resources and the Earth's environment require greater numbers of trained professionals and an informed citizens. The B.S. degree in Environmental Geoscience embraces all the disciplines of geosciences to give the student a rigorous interdisciplinary education including issues associated with environmental policy. The degree technically trains students for employment by industry, environmental and engineering consulting firms, non-governmental organizations, and governmental regulatory agencies, among other entities. Students focus course work in a particular environmental theme: coastal studies, water in the environment, human interaction with the land or climate change.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ENGL 104 Composition and Rhetoric	(3-0)	3	HIST 105 History of U.S. I	(3-0)	3
GEOG 203 Planet Earth System Science			MATH 152 Engineering Math. II.....	(3-2)	4
or			OCNG 251 Oceanography.....	(3-0)	3
GEOL 101 Principles of Geology	(3-3)	4	OCNG 252 Oceanography Laboratory.....	(0-2)	1
GEOS 105 Intro. to Environ. Geoscience	(3-0)	3	POLS 206 American Natl. Govt.....	(3-0)	3
MATH 151 Engineering Math. I.....	(3-2)	<u>4</u>	* KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>
		14			15

SOPHOMORE YEAR

CHEM 101 Fund. of Chemistry I.....	(3-0)	3	ATMO 201 Atmospheric Science.....	(3-0)	3
CHEM 111 Fund. of Chemistry I Lab.....	(0-3)	1	ATMO 202 Atmospheric Science Laboratory .	(0-2)	1
GEOG 201 Intro. to Human Geography	(3-0)	3	CHEM 102 Fund. of Chemistry II.....	(3-0)	3
HIST 106 History of U.S. II	(3-0)	3	CHEM 112 Fund. of Chemistry II Lab.....	(0-3)	1
Science elective ⁵		4	POLS 207 State and Local Govt.....	(3-0)	3
* KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>	Science elective ⁶		<u>4</u>
		15			15

JUNIOR YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
GEOG 330 Resources and the Environment	(3-0)	3	GEOL 420 Environmental Geology.....	(2-2)	3
GEOS 481 Seminar ¹	(1-0)	1	Communication elective ⁶		3
STAT 303 Statistical Methods	(3-0)	3	Environmental policy elective ²		3
Environmental theme elective ³		3	Environmental theme elective ³		3
Technical elective ⁴		3	Technical elective ⁴		3
Visual and performing arts elective ⁷		3			15
		<u>16</u>			

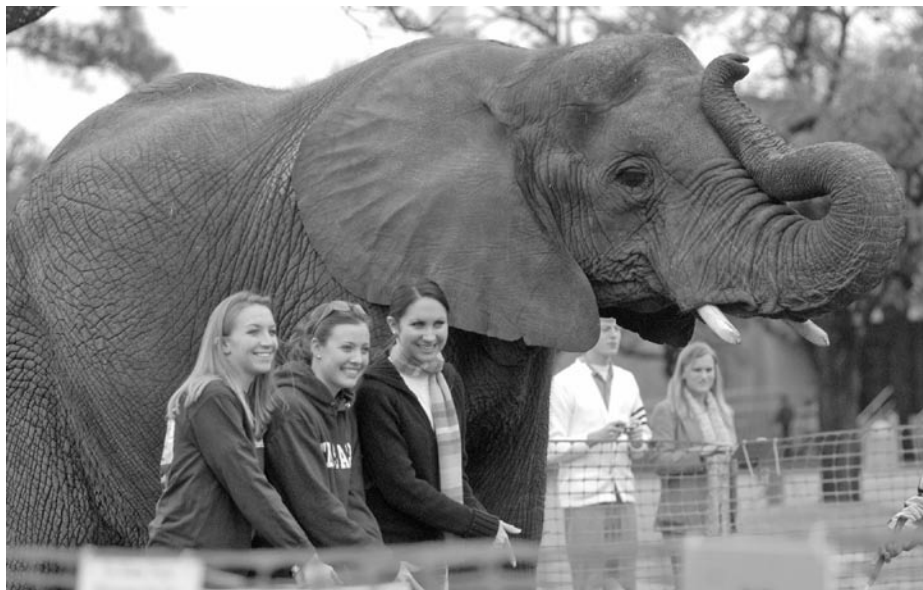
SENIOR YEAR

Environmental policy elective ²	3	GEOS 405 Environmental Geosciences.....	(2-2)	3
Environmental theme elective ³	3	Environmental policy elective ²		3
Humanities elective ⁸	3	Environmental theme elective ³		6
Technical elective ⁴	6	Technical electives ⁴		3
	<u>15</u>			15

total hours 120

- NOTES:**
1. GEOS 481 can be repeated up to four times in this degree plan. Ideally, it should be taken in your junior and senior years, but can also be taken in your sophomore year.
 2. To be selected in consultation with faculty academic advisor from AGEC 350; ECON 203, 323, 412, 435; GEOG 309, 360, 406, 430; PLAN 365, 414; POLS 329, 331, 340, 342, 347, 440; RENR 420; SOCI 312, 328. (GEOS 444 can either be taken as an environmental policy elective or an environmental theme elective, but not both.)
 3. Environmental theme electives: 15 hours of course work are taken in one of the thematic areas. Select from list in consultation with faculty academic advisor. Environmental themes include: coastal studies (ATMO 463; GEOG 331, 370; GEOL 440; OCNG 410, 451), water in the environment (ATMO 463, 475; GEOG 324, 400, 434; GEOL 410, 451; GEOP 413; OCNG 410, 420), human interaction with the land (ATMO 463; GEOG 301, 305, 311, 320, 321, 323, 325, 326, 330, 331, 360, 400, 430; GEOL 320, 321, 400), and climate change (ATMO 324, 363, 463; GEOG 324; GEOS 410, 411; OCNG 410, 451).
 4. Select in consultation with faculty academic advisor and see environmental programs Web site for guidance.
 5. Select either PHYS 201 and 202 or BIOL 111/123 and BOTN 101. PHYS 201 and 202 are the appropriate science electives for the climate change theme.
 6. Communication elective to be selected from the University Core Curriculum.
 7. Visual and performing arts electives to be selected from the University Core Curriculum.
 8. Humanities electives to be selected from the University Core Curriculum.

* See page 21.



Curriculum in Environmental Studies

The B.S. degree in Environmental Studies is a blended degree of science and policy with an interdisciplinary understanding of Earth's processes and policy aspects of human interactions with the environment. The degree is designed to educate students about our planet to enable them to be knowledgeable about the scientific, human-dimension and policy aspects of environmental issues facing our nation.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
GEOL 101 Principles of Geology	(3-3)	4	ENGL 104 Composition and Rhetoric	(3-0)	3
GEOS 105 Intro. to Environ. Geoscience	(3-0)	3	GEOG 201 Intro. to Human Geography	(3-0)	3
MATH 141 Business Math. I	(3-0)	3	MATH 142 Business Math. II	(3-0)	3
POLS 206 American Natl. Govt.	(3-0)	3	OCNG 251 Oceanography	(3-0)	3
* KINE 198 Health and Fitness Activity	(0-2)	<u>1</u>	OCNG 252 Oceanography Laboratory	(0-2)	1
		14	* KINE 199 Required Physical Activity	(0-2)	<u>1</u>
					14

SOPHOMORE YEAR

BIOL 111 Introductory Biology I			ATMO 201 Atmospheric Science	(3-0)	3
or			ATMO 202 Atmospheric Science Laboratory	(0-2)	1
BIOL 101 Botany	(3-3)	4	GEOG 304 Economic Geography	(3-0)	3
ECON 202 Principles of Economics	(3-0)	3	POLS 207 State and Local Govt.	(3-0)	3
GEOG 203 Planet Earth System Science	(3-3)	4	Communication elective ²		3
Visual and performing arts elective ¹		3	Free elective		<u>3</u>
Free elective		<u>3</u>			16
		17			

JUNIOR YEAR

GEOG 335 Pattern and Process in Biogeography	(3-0)	3	GEOG 330 Resources and the Environment ..	(3-0)	3
GEOG 390 Principles of GIS	(2-2)	3	GEOL 420 Environmental Geology	(2-2)	3
STAT 303 Statistical Methods	(3-0)	3	Environmental policy elective ³		3
Environmental policy electives ³		6	History elective ⁴		3
History elective ⁴		<u>3</u>	Philosophy elective ⁵		<u>3</u>
		18			15

SENIOR YEAR

Environmental policy electives ³		6	GEOS 405 Environmental Geosciences	(2-2)	3
Geoscience electives ⁶		6	GEOG 475 Adv. Topics in GIS		
Free electives		<u>6</u>	or		
		18	GEOG 361 Remote Sensing Geos.	(3-2)	4
			Environmental policy electives ³		6
			Free elective		<u>3</u>
					16

total hours 128

- NOTES: 1. Visual and performing arts electives to be selected from the University Core Curriculum.
 2. Communication electives to be selected from the University Core Curriculum.
 3. To be selected in consultation with faculty academic advisor from AGEC 350, ECON 203, 323, 412, 435; GEOG 406; PLAN 365, 414; POLS 329, 331, 340, 342, 347, 440, 456; RENR 420, 470; RPTS 420; SOCI 312, 328.
 4. Select from HIST 359, 360, 363, 364.
 5. Select from PHIL 205, 314.
 6. Select geoscience electives from ATMO, GEOG, GEOL, GEOP, GEOS, OCNG courses in consultation with faculty academic advisor.

Curriculum in Spatial Sciences

A degree in Spatial Sciences offers students the opportunity to obtain a career in a cutting-edge discipline at the intersection of environmental and spatial sciences. The spatial sciences combine multidisciplinary fields of scientific study with geospatial technologies including Geographic Information Systems (GIS), Global Positioning Systems (GPS), and Remote Sensing. A student armed with this degree will possess an advanced knowledge of these technologies, experience in interpretation of aerial photographs and satellite images, as well as a broad understanding of computer applications and database management. Graduates are capable of working as environmental and natural resource managers; yet they also possess the necessary skills to map geographical features, patterns, changes; further, they should be able to lead and conduct modern environmental decision-making, planning, and problem solving activities.

Texas A&M University, through a joint program between the College of Agriculture and Life Sciences (lead by the Department of Ecosystem Science and Management and Spatial Sciences Laboratory) and the College of Geosciences (lead by the Department of Geography), offer this degree as the first of its kind in the nation. Through core course work in spatial sciences and supporting courses students will learn to utilize the full potential of the spatial sciences in real-world problem solving. From real-time wildfire risk assessment to crime analysis, from mapping habitats for endangered species to mapping tsunami damage with satellite photography, from collecting GPS data on trees in rainforests to building a database in a computer, the spatial sciences are fast becoming an integral part of modern resource management.

Students in this degree program receive help from faculty advisors in their areas of interest. Faculty advisors meet regularly with students to discuss courses and career opportunities. The total number of credit hours required for a degree is 131.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
CHEM 101 Fundamentals of Chemistry I.....	(3-0)	3	CHEM 102 Fundamentals of Chemistry II....	(3-0)	3
CHEM 111 Fund. of Chemistry I Lab.....	(0-3)	1	CHEM 112 Fund. of Chemistry II Lab.....	(0-3)	1
ENGL 104 Composition and Rhetoric.....	(3-0)	3	CPSC 110 Programming I.....	(3-2)	4
MATH 141 Business Mathematics I.....	(3-0)	3	MATH 142 Business Mathematics II.....	(3-0)	3
History elective ¹		3	History elective ¹		3
Humanities elective ²		3	*KINE 198 Health and Fitness Activity.....	(0-2)	1
		<u>16</u>			<u>15</u>

SOPHOMORE YEAR

BIOL 101 Botany			AGEC 350 Env. and Nat. Resource		
or			Economics	(3-0)	3
BIOL 111 Intro. Biology I.....	(3-3)	4	AGRO 301 Soil Science	(3-2)	4
RENr 205 Fund. of Ecology.....	(3-0)	3	GEOG 203 Planet Earth	(3-2)	4
RENr 215 Fund. of Ecology Lab.....	(0-3)	1	POLS 206 American National Govt.	(3-0)	3
Communication elective ³		3	Natural resource elective ⁴		3
*KINE 199 Required Physical Activity.....	(0-2)	1			<u>17</u>
		<u>12</u>			



JUNIOR YEAR

AGSM 337 Tech. for Env. and Nat. Resource Engineering..... (3-0)	3	GEOL 352 GPS in the Geosciences..... (1-3)	2
GEOG 398 Interpretation of Aerial Photos.... (2-3)	3	POLS 207 State and Local Govt..... (3-0)	3
GIS elective ⁵	3	RENr 444 Remote Sens. in Rew. Nat. Res... (2-3)	3
Natural resource elective ⁴	3	STAT 211 Prin. of Statistics I	
Social and behavioral science elective ⁶	3	or	
	<u>3</u>	STAT 302 Statistical Methods..... (3-0)	3
	15	Natural resource elective ⁴	<u>3</u>
			14

SENIOR YEAR

BESC 403 Sampling and Env. Monitoring (2-3)	3	RENr 470 Env. Impact Assessment..... (3-0)	3
FRSC 484 Internship.....	3	Policy/regulations elective ⁹	3
Spatial sciences elective ⁷	3	Spatial sciences electives ⁷	6
Visual and performing arts elective ⁸	3	Elective.....	<u>4</u>
Elective.....	<u>3</u>		16
	15		

total hours 120

- NOTES: 1. History electives to be selected from the University Core Curriculum.
 2. To be selected in consultation with academic advisor from GEOG 202, 301, 305, or 323.
 3. To be selected in consultation with academic advisor from COMM 203; ENGL 210, 301; AGJR 404.
 4. To be selected in consultation with academic advisor from AGRO 310; FRSC 304; RENr 375, 410; RLEM 301; WFSC 428.
 5. To be selected in consultation with academic advisor from FRSC 461, GEOG 390, LAND 461, RENr 405.
 6. To be selected in consultation with academic advisor from AGEc 105, ECON 202; GEOG 201, 304, 440.
 7. To be selected in consultation with academic advisor from AGSM 410; CPSC 206, 310; CVEN 201; ENDS 370, 375; FRSC 462; GEOG 361, 475; PLAN 365; RPTS 307; STAT 212.
 8. Visual and performing arts electives to be selected from the University Core Curriculum.
 9. To be selected in consultation with faculty academic advisor from FRSC 406, GEOG 330, MGMT 209, PHIL 314, PLAN 365, WFSC 303.

* See page 21.

Curriculum in Geography

Geography is the study of the relationships between people and their environments, relationships that vary from place to place over the Earth. Students inquire into those factors responsible for the variable and changing character of Earth's surface, which over time has been transformed into the human habitat. Geography integrates physical science, social science and the humanities. The Department requires that students understand both physical and human systems and develop the spatial analytical skills to do so.

Physical geography emphasizes a systematic and interdisciplinary approach to the study of landforms, climate, soils and vegetation. Human geography seeks to describe and explain the spatial patterns of human activities on Earth. These range from such economic activities as the distribution of retail sales and industrial production to cultural landscapes, which often have strong historic roots. Both physical and human geography use a set of analytic techniques that includes cartography, Geographic Information Science (GISci), quantitative methods and remote sensing.

A student seeking a B.S. degree in Geography is expected to complete a minimum curriculum of 40 hours in geography. A student should decide on applicable electives with a department undergraduate advisor. Geography courses may include field trips outside scheduled class hours. Students are required to defray some or all of the expenses incurred on such trips.

Graduates with the B.S. degree may be able to qualify for a variety of jobs using their analytic skills in locational and environmental analysis for business or industry, or for a variety of positions in local, state or federal agencies. Advanced degrees provide greater opportunities.

The Department of Geography administers the bachelor of science degree programs in Environmental Studies and Spatial Sciences for the College of Geosciences.

For students interested in a career in education, the Department of Geography works closely with the Department of Teaching, Learning and Culture. Geography is part of a Social Studies composite degree program that prepares students to teach at middle and high school levels.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	GEOG 202 Geog. of the Global Village	(3-0)	3
GEOG 201 Intro. to Human Geography	(3-0)	3	GEOG 203 Planet Earth System Science.....	(3-3)	4
American history ¹		3	MATH 141 Business Math. I.....	(3-0)	3
Science ²		4	Science ²		4
* KINE 198 Health and Fitness Activity.....	(0-2)	1	* KINE 199 Required Physical Activity.....	(0-2)	1
		14			15

SOPHOMORE YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
GEOG 304 Economic Geography.....	(3-0)	3	POLS 207 State and Local Govt.....	(3-0)	3
MATH 142 Business Math. II.....	(3-0)	3	STAT 303 Statistical Methods.....	(3-0)	3
POLS 206 American Natl. Govt.....	(3-0)	3	Visual and performing arts elective ³		3
Humanities elective ³		3	Electives ⁴		<u>6</u>
Elective ⁴		<u>3</u>			<u>15</u>
		15			

JUNIOR YEAR

GEOG 332 Thematic Cartography.....	(3-0)	3	English ⁷		3
American history ¹		3	Social and behavioral sciences elective ⁸		3
Regional geography ³		3	Topical systematic ⁶		3
Topical systematic ⁶		3	Electives ⁴		<u>9</u>
Electives ⁴		<u>6</u>			<u>18</u>
		18			

SENIOR YEAR

GEOG 450 Field Geography.....	(3-0)	3	GEOG 440 Hist. and Nature of Geography ..	(3-0)	3
Advanced topical ⁹		3	Advanced topical ⁹		3
Regional geography ⁵		3	Electives ⁴		<u>6</u>
Electives ⁴		<u>4</u>			<u>12</u>
		13			

total hours 120

- NOTES: 1. The American history requirement may be satisfied by:
- HIST 105 and 106, or
 - HIST 105 and one of the following: HIST 226, 372, 373, 451, 455, 457, 460, 463, or
 - HIST 106 and one of the following: HIST 226, 367, 368, 369, 416, 450, 457, 459, 462.
2. To be chosen from the following: BIOL 111, 112; or CHEM 101/111, 102/112; or GEOL 101, 106; or PHYS 201, 202.
3. Humanities and visual and performing arts electives to be chosen from the University Core Curriculum approved list, but must not include courses in geography that satisfy the University Core Curriculum.
4. Courses to be approved by faculty.
5. The regional geography requirement may be satisfied by:
- GEOG 301, 320, 321, 323, 325, 326 or
 - GEOG 305, 320, 321, 323, 325, 326.
6. GEOG 306, 311, 324, 330, 331, 335, 355, 360, 370, 380, 390, 398.
7. To be chosen from ENGL 203, 210, 235, 236, 241, 301.
8. Social and behavioral sciences electives to be chosen from the University Core Curriculum, but must not include courses in geography that satisfy the University Core Curriculum.
9. GEOG 331, 360, 361, 400, 401, 402, 403, 404, 406, 420, 430, 433, 434, 435, 475, 476.

* See page 21.

Geographic Information Science Option

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	GEOG 202 Geog. of the Global Village	(3-0)	3
GEOG 201 Human Geography	(3-0)	3	GEOG 203 Planet Earth System Science.....	(3-3)	4
MATH 141 Business Math. I.....	(3-0)	3	MATH 142 Business Math. II	(3-0)	3
POLS 206 American Natl. Govt.....	(3-0)	3	POLS 207 State and Local Govt.....	(3-0)	3
American history ¹		3	Humanities elective ²		3
* KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>	* KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>
		16			17

SOPHOMORE YEAR

GEOG 304 Economic Geography.....	(3-0)	3	GEOG 390 Principles of GIS.....	(2-2)	3
GEOG 332 Cartography.....	(3-0)	3	GEOL 352 GPS in the Geosciences.....	(1-3)	2
American history ¹		3	English ³		3
Science ³		4	Science ³		4
Visual and performing arts elective ⁴		<u>3</u>	Social and behavioral sciences elective ⁵		<u>3</u>
		16			15

JUNIOR YEAR

GEOG 475 Adv. Topics in GIS.....	(3-2)	4	CPSC 111 Intro. to Computer Science.....	(3-2)	4
STAT 303 Statistical Methods	(2-2)	3	GEOG 398 Interpretation of Aerial Photos....	(2-3)	3
Geographic specialization ⁷		3	Geographic specialization ⁷		3
Elective ⁸		<u>3</u>	Electives ⁸		<u>6</u>
		13			16

SENIOR YEAR

GEOG 450 Field Geography.....	(3-0)	3	GEOG 361 Remote Sensing in Geosciences...	(3-2)	4
GEOG 476 GIS Practicum	(3-0)	3	GEOG 440 Hist. and Nature of Geography ..	(3-0)	3
Geographic specialization ⁷		3	Geographic specialization ⁷		3
Electives ⁸		<u>4</u>	Electives ⁸		<u>4</u>
		13			14

total hours 120

NOTES: 1. The American history requirement may be satisfied by:

- a. HIST 105 and 106, or
- b. HIST 105 and one of the following: HIST 226, 372, 373, 451, 455, 457, 460, 463, or
- c. HIST 106 and one of the following: HIST 226, 367, 368, 369, 416, 450, 457, 459, 462.

2. Humanities electives to be chosen from the University Core Curriculum, but must not include courses in geography that satisfy the University Core Curriculum.
3. To be chosen from CHEM 101/111, 102/112 or BIOL 111, 112 or PHYS 201, 202 or BIOL 101, BIOL 107.
4. Visual and performing arts elective to be chosen from the University Core Curriculum.
5. To be chosen from ENGL 203, 210, 235, 236, 241, 301.
6. Social and behavioral sciences elective to be selected from the University Core Curriculum, but must not include courses in geography that satisfy the University Core Curriculum.
7. Students must see advisor for applicable classes.
8. These courses must be chosen in consultation with student's advisor.

* See page 21.

Minors in Geography and Geoinformatics

General Requirements

1. Minimum of 16 credits in the discipline with at least 6 hours in upper-division courses, 3 hours of which must be at the 400 level.
2. Minimum of 6 credits must be taken in residence at either Texas A&M University or Texas A&M at Galveston.
3. Students must meet with the department's advisor for minor programs for approval of courses selected (any substitutions must be approved by the department head.)
4. Minimum cumulative GPR of 2.0 must be achieved for all courses in the minor.

Students pursuing other majors may minor in geography by taking a minimum of 16 hours, which must include GEOG 201 and 203. The remaining 9 hours must include at least 6 hours in upper-division courses, 3 hours of which must be at the 400 level. The selection of courses must be made in agreement with the geography department advisor for minor programs.

Geoinformatics is used to solve problems associated with land administration, environment and natural resource management, planning and population studies, as well as traditional surveying and mapping applications. Geoinformatics uses GIS, remote sensing, and global positioning mapping to collect, analyze and display spatial information. Students must complete GEOG 390, 475 and GEOL 352. In addition, students must complete two of the following four courses: CPSC 111, 211, GEOG 361, GEOL 309.



Curricula in Geology

The undergraduate curricula in geology emphasize the development of sound scientific skills, including the ability to think, observe, analyze, classify, describe, and interpret data, and the application of these skills to the study of rocks, minerals, fossils, structures, landforms and other geologic phenomena. The curricula also emphasize the practical aspects of geology, including its applications to petroleum and mineral exploration, environmental management, siting of man-made structures and other related commercial activities.

The Department of Geology and Geophysics offers two undergraduate programs in geology, the Bachelor of Arts and the Bachelor of Science, in addition to the graduate degrees of Master of Science and Doctor of Philosophy (see the *Texas A&M University Graduate Catalog*). Both curricula are suitable for pursuit as terminal degree programs as well as preparation for more advanced study. However, the B.S. program is more rigorous with respect to required mathematics and physics and is designed for students seeking careers as geologists. The B.A. program is more appropriate for those wishing to combine geology with other disciplines. Details of the two programs are given below along with some specialty “tracks” available in both.

Some courses in geology require field trips. Students are required to pay expenses incurred on such trips.

Environmental Geology Track

The environmental geology track is a recommended group of electives that provides training for geology students to work on some of society’s most pressing problems including groundwater contamination and remediation, nonpoint-source pollution, water resources, and geologic hazards such as earthquakes, landslides, flooding, volcanism and surface deformation. The geology curriculum with an emphasis in environmental geology is designed to provide a strong foundation in geology coupled with specialized training in environmental and hydrologic topics. Students completing this track receive a B.S. degree in Geology from the Department of Geology and Geophysics and are prepared to go on to graduate school for an advanced geoscience degree. Typical careers for environmental geoscientists include careers with environmental and engineering consulting companies and other industrial corporations, governmental agencies or academics.

Specific classes recommended for the geology and technical electives include CVEN 365 Introduction to Geotechnical Engineering, GEOG 331 Geomorphology, GEOG 390 Principles of GIS, GEOL 410 Hydrogeology, GEOL 420 Environmental Geology, GEOL 440 Engineering Geology, GEOS 410 Global Change; or approved classes in other departments including Soil Science, Chemistry, Physics and Civil Engineering.

Petroleum Geology Track

The petroleum geology track is intended to prepare an undergraduate student for graduate study in this discipline, as well as provide training for the students who may be interested in service jobs in the oil and gas industry between their undergraduate and graduate careers. Many of the geology undergraduate classes prepare students for this track. In addition, students may select technical electives in petroleum engineering and other disciplines.

Specific classes recommended include GEOL 400 Reservoir Description, GEOL 404 Geology of Petroleum, PETE 311 Reservoir Petrophysics, PETE 321 Formation Evaluation, PETE 324 Well Performance, PETE 402 Petroleum Property Management. Qualified students may also take related graduate courses during the senior year. Such classes include GEOL 619 Petroleum Geology, GEOL 622 Stratigraphy, GEOL 623 Carbonate Rocks, GEOL 624 Carbonate Reservoirs, GEOL 668 Clastic Sedimentology and Sedimentary Petrology, and GEOP 629 Seismic Interpretation.

GeoPACT Program

The B.A. in Geology and the Geoscience Program for Accelerated Certification for Teaching (GeoPACT) is an innovative program to meet the critical shortage of science teachers in the State of Texas. In accordance with the Texas A&M System Regents' Initiative, GeoPACT seeks to provide quality, trained classroom teachers for our state's middle and high schools.

The Geology B.A. and GeoPACT program utilizes a combination of traditional courses in earth science, education, continuing education and a year-long internship to train science teachers in an accelerated format. In as little as one semester, a qualified student with an appropriate science background may complete all classroom work necessary for certification and then embark on a one year, paid, field-based teaching internship experience offered through the Region IV (Houston) TEA Office.

The Geology B.A. and GeoPACT program will meet the requirements for teacher certification in grade 4–8 science and grade 9–12 secondary composite science. The latter provides certification to teach earth science, environmental science, biology, chemistry and physics in grades 9–12. Electives must be chosen in consultation with an advisor.

Bachelor of Arts

The B.A. program in Geology provides the student a broad foundation in geology with a specialization in at least one other field through the minor program. The minor chosen by the student requires a minimum of 15 credit hours in one discipline. The B.A. program offers additional opportunities for the student to diversify through geology and technical electives.

The B.A. degree offers more flexibility than the B.S. program in terms of allowing a program of study which combines geology with subject areas such as geophysics, history, journalism, political science, mathematics, biology, business, computer science, education, medicine, physics or other areas. In addition, the mathematics and physics requirements are less rigorous than in the B.S. degree. The B.A. program meets the needs of many students who plan to use geology as a basis for careers in law (environmental, oil, gas, etc.), medicine, technical writing, teaching at pre-college level, environmental journalism, resource related sales and marketing, to name only a few possibilities. With a judicious selection of electives, the B.A. degree may conceivably be a starting point for further graduate education in geology or geophysics. However, the B.S. is far more appropriate for this goal.

Because of the great flexibility of this program, it is important to speak to a departmental advisor as soon as practicable. In any case, electives must be chosen in consultation with an advisor.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
CHEM 101 Fund. of Chemistry I.....	(3-0)	3	CHEM 102 Fund. of Chemistry II.....	(3-0)	3
CHEM 111 Fund. of Chemistry I Lab.....	(0-3)	1	CHEM 112 Fund. of Chemistry II Lab.....	(0-3)	1
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	GEOL 106 Historical Geology.....	(3-3)	4
GEOL 104 Physical Geology.....	(3-3)	4	MATH 131 Math. Concepts-Calculus ¹	(3-0)	3
MATH 166 Topics in Cont. Math. II ¹	(3-0)	3	Communication elective ²		3
		<u>14</u>			<u>14</u>

SOPHOMORE YEAR

GEOL 203 Mineralogy.....	(2-6)	4	GEOL 302 Intro. to Petrology.....	(3-3)	4
GEOP 341 Intro. to Global Geophysics.....	(3-0)	3	GEOL 309 Intro. to Geol. Field Methods.....	(1-6)	3
PHYS 201 College Physics ³	(3-3)	4	PHYS 202 College Physics ³	(3-3)	4
Minor elective ⁴		3	Minor elective ⁴		3
* KINE 198 Health and Fitness Activity.....	(0-2)	1	* KINE 199 Required Physical Activity.....	(0-2)	1
		<u>15</u>			<u>15</u>

JUNIOR YEAR

U.S. history or political science elective ²		3	GEOL 306 Sedimentology and Stratigraphy.....	(3-3)	4
Geology elective ⁵		4	GEOL 311 Principles of Geol. Writing.....	(1-0)	1
Minor elective ⁴		3	GEOL 312 Struct. Geology and Tectonics.....	(3-3)	4
Technical elective ⁶		3	Geology elective ⁵		3
Social and behavioral sciences elective ⁷		3	U.S. history or political science elective ²		3
		<u>16</u>			<u>15</u>

SUMMER FIELD STUDIES

GEOL 330 Geologic Field Trips.....	3
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SENIOR YEAR

Geology elective ⁵	4	Humanities elective ⁷	3
Minor elective ⁴	3	Minor elective ⁴	3
U.S. history or political science elective ²	3	U.S. history or political science elective ²	3
Visual and performing arts elective ⁷	3	General electives ⁸	3
General elective ⁸	3		12
	<u>16</u>		

total hours 120

- NOTES: 1. May substitute MATH 141 for MATH 166; may substitute MATH 142, 151 or 171 for MATH 131.
 2. These electives must be selected from the approved list of courses satisfying the University Core Curriculum.
 3. May substitute PHYS 218 for PHYS 201; may substitute PHYS 208 or 219 for PHYS 202.
 4. Fifteen hours of electives must be selected in a minor. Electives must be chosen in consultation with advisor.
 5. Any 300- or 400-level geology or geophysics course not already required.
 6. Any science, math, engineering or social science course that augments the degree with the approval of the advisor.
 7. These electives must be selected from the approved list of courses satisfying the University Core Curriculum and 6 hours must be selected from courses that also satisfy the international and cultural diversity requirement.
 8. General electives MAY NOT include BUAD 100; STLC 100-499; SLCX 100-499; DEVS 100-499; ENGL 100, 103; GEOL 101-104; KINE 198, 199; LBAR 201; MATH 102, 103, 131, 141, 142, 150, 151, 166, 171; AERS 100-499; MLSC 100-499; NVSC 100-499; SOMS 100-499.

* See page 21.

Bachelor of Science

The first two years of the B.S. program in Geology, which are identical to the B.S. in Geophysics, provide students with the basics of geology and geophysics and the allied fields of chemistry, physics, mathematics and computer science. The junior and senior years involve more advanced study in the field of geology, including the opportunity to concentrate study in specific disciplines such as petroleum geology and geophysics, environmental and engineering geology, hydrogeology, and others. Students are also encouraged to become involved in research problems with faculty members during their undergraduate studies, which can be accomplished through classes in Directed Studies (GEOL 285 and 485).

The B.S. degree is considered the preparatory degree in the field of geology. Those students desiring employment in industry are encouraged to pursue an M.S. degree. Students planning a research or university teaching career should pursue a Ph.D. degree.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
CHEM 101 Fund. of Chemistry I.....	(3-0)	3	CHEM 102 Fund. of Chemistry II.....	(3-0)	3
CHEM 111 Fund. of Chemistry I.....	(0-3)	1	CHEM 112 Fund. of Chemistry II Lab.....	(0-3)	1
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	GEOL 106 Historical Geology.....	(3-3)	4
GEOL 104 Physical Geology	(3-3)	4	MATH 152 Engineering Math. II.....	(3-2)	4
MATH 151 Engineering Math I.....	(3-2)	4	Communication elective ¹		3
		<u>15</u>			<u>15</u>

SOPHOMORE YEAR

GEOL 203 Mineralogy	(2-6)	4	GEOL 302 Introduction to Petrology.....	(3-3)	4
GEOP 341 Intro. to Global Geophysics.....	(3-0)	3	GEOL 309 Intro. to Geol. Field Methods.....	(1-6)	3
MATH 251 Engineering Math. III	(3-0)	3	MATH 308 Differential Equations.....	(3-0)	3
PHYS 218 Mechanics	(3-3)	4	PHYS 219 Electricity	(3-3)	4
		<u>14</u>			<u>14</u>



JUNIOR YEAR

GEOL 304 Igneous and Metamorphic Petrology.....	(3-3)	4	GEOL 306 Sedimentology and Stratigraphy ..	(3-3)	4
GEOL 305 Paleobiology	(2-3)	3	GEOL 311 Principles of Geol. Writing		1
Humanities elective ²		3	GEOL 312 Struct. Geology and Tectonics.....	(3-3)	4
U.S. history and political science ¹		3	GEOL 451 Geochemistry.....	(3-0)	3
* KINE 198 Health and Fitness Activity.....		<u>1</u>	U.S. history and political science elective ¹		<u>3</u>
		14			15

SUMMER FIELD STUDIES

GEOL 300 Field Geology	6
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SENIOR YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
Geology elective ³		3	Social and behavioral sciences elective ²		3
Technical elective ⁴		5	Technical elective ⁴		6
U.S. history or political science elective ¹		3	U.S. history or political science elective ¹		3
Visual and performing arts elective ²		<u>3</u>	*KINE 199 Required Physical Activity.....		<u>1</u>
		14			13

total hours 120

- NOTES:**
1. These electives must be selected from the approved list of courses satisfying the University Core Curriculum.
 2. These electives must be selected from the approved list of courses satisfying the University Core Curriculum AND 6 hours must be selected from courses that also satisfy the International and Cultural diversity requirement.
 3. Any approved 400-level geology or geophysics course not already required.
 4. Any science, math or engineering course that augments the degree with the approval of the advisor.

* See page 21.

Engineering Geology Option

The Engineering Geology option provides training for geology students to work in areas that are at the intersection between geology and engineering. Engineering geologists work in areas such as groundwater remediation and resource evaluation, mitigation of geologic hazards including earthquakes, landslides, flooding, volcanism, and surface deformation, siting critical facilities, and geotechnical evaluation of soils, sediments and rocks for civil engineering projects. The option curriculum is designed to provide a strong foundation in geology coupled with specialized training in environmental and engineering topics. Students completing this option receive a B.S. degree in Geology from the Department of Geology and Geophysics.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
CHEM 101 Fund. of Chemistry I.....	(3-0)	3	CHEM 102 Fund. of Chemistry II.....	(3-0)	3
CHEM 111 Fund. of Chemistry I Lab.....	(0-3)	1	CHEM 112 Fund. of Chemistry II Lab.....	(0-3)	1
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	GEOLOG 106 Historical Geology.....	(3-3)	4
GEOLOG 104 Physical Geology.....	(3-3)	4	MATH 152 Engineering Math. II.....	(3-2)	4
MATH 151 Engineering Math I.....	(3-2)	<u>4</u>	Communication elective ¹		<u>3</u>
		15			15

SOPHOMORE YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
GEOLOG 203 Mineralogy.....	(2-6)	4	GEOLOG 302 Introduction to Petrology.....	(3-3)	4
GEOLOG 341 Intro. to Global Geophysics.....	(3-0)	3	GEOLOG 309 Intro. to Geol. Field Methods.....	(1-6)	3
MATH 251 Engineering Math. III.....	(3-0)	3	MATH 308 Differential Equations.....	(3-0)	3
PHYS 218 Mechanics.....	(3-3)	<u>4</u>	PHYS 219 Electricity.....	(3-3)	<u>4</u>
		14			14

JUNIOR YEAR

GEOLOG 304 Igneous and Metamorphic Petrology.....	(3-3)	4	GEOLOG 306 Sedimentology and Stratigraphy ..	(3-3)	4
GEOLOG 305 Paleobiology.....	(2-3)	3	GEOLOG 311 Principles of Geol. Writing.....	(1-0)	1
Humanities elective ³		3	GEOLOG 312 Struct. Geology and Tectonics.....	(3-3)	4
U.S. history or political science elective ¹		3	GEOLOG 451 Geochemistry.....	(3-0)	3
* KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>	U.S. history or political science elective ¹		<u>3</u>
		14			15

SUMMER FIELD STUDIES

GEOLOG 300 Field Geology.....	6
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SENIOR YEAR

GEOLOG 410 Hydrogeology.....	(3-0)	3	Social and behavioral sciences elective ³	3
GEOLOG 440 Engineering Geology.....	(2-3)	3	Technical elective ²	5
Technical electives ²		3	U.S. history or political science electives ¹	3
U.S. history or political science elective ¹		3	* KINE 199 Required Physical Activity.....	<u>1</u>
Visual and performing arts elective ³		<u>3</u>		12
		15		

total hours 120

- NOTES: 1. These electives must be selected from the approved list of courses satisfying the University Core Curriculum.
 2. Any science, math or engineering course that augments the degree with the approval of the advisor.
 3. These electives must be selected from the approved list of courses satisfying the University Core Curriculum and 6 hours must be selected from courses that also satisfy the international and cultural diversity requirement.

* See page 21.

Curriculum in Geophysics

The B.S. degree in Geophysics is offered through the Department of Geology and Geophysics. Geophysics includes all areas of scientific inquiry that deal with the physical state of the planets, with the dynamic physical processes which act on and within the planets, and with their evolution. The deep interior, crust, atmosphere, oceans and space all lie within the province of the geophysicist. To work effectively in so broad an area requires considerable depth and breadth of understanding of physical principles and considerable proficiency in mathematics.

The objective of the undergraduate program is to develop a physically motivated approach to the study of earth phenomena. The curriculum provides a thorough treatment of the principles of physics. The courses in geophysics and geology introduce the principles, key observations and the major problem areas. Mathematical tools are developed to the point where the student can analyze problems in a resourceful and constructive manner. Electives provide the student with an opportunity to broaden cultural and scientific interests or to specialize in preparation for a specific career objective. Because of the emphasis on fundamentals, the student is admirably equipped for advanced study.

Geophysicists continue to play key roles in the development of new and novel exploration systems required in the oil and mineral industries. Recently, they have been finding new uses for their abilities in implementing enhanced production techniques in existing hydrocarbon reservoirs. They also are finding challenging careers in diverse government activities such as the exploration of ocean basins and the crust beneath them, the detection of underground nuclear explosions, the exploration of the solar system, earthquake and volcanic hazards reduction, and toxic waste disposal. It is in the latter area of environmental geophysics that many opportunities for contributions to society are anticipated. Geophysicists are expected to play a major role in this area both in the governmental and private sectors.

Questions pertaining to degree requirements for professional work in geophysics cannot be answered unequivocally because of the wide diversity of viewpoints among employers. However, there has been a trend toward requiring an M.S. degree for employment in petroleum and related industries.

Students interested in teaching in a university or working in one of the industrial or government research laboratories should seek the Ph.D.; however, teaching and research account for less than half of the total job opportunities in geophysics. Note that the first two years of the curriculum in geophysics are the same as the first two years of the curriculum in geology. Some courses in geophysics require field trips. Students are required to pay expenses incurred on such trips.

To graduate, as well as remain in satisfactory academic standing, geophysics majors are required to maintain a 2.0 or better GPR in all chemistry, geology, geophysics, mathematics and physics courses in the curriculum. These are considered "the courses in the major department" (see "Requirements for a Baccalaureate Degree" in this catalog).

Environmental Geophysics Track

The environmental geophysics track is intended for students interested in pursuing a career in the application of near-surface geophysics for hydrogeological, structural and stratigraphic characterization of the uppermost 100 meters, with applications to shallow resource and groundwater assessment and the solution of environmental and engineering problems. The student will acquire a basic understanding of traditional and emergent geophysical methods such as high-frequency electromagnetic induction, shallow seismic reflection, ground-penetrating radar, and high-resolution magnetic surveying techniques. Applications of environmental geophysics may include groundwater pollution studies, detection of buried hazardous wastes, landmines or unexploded ordnance, coastal subsidence studies, delineation of leakage from acid mines, landfills, and agricultural or industrial facilities, shallow-fault mapping, archaeological prospecting, etc.

Environmental geophysicists typically work as independent environmental consultants or with industrial corporations or government agencies. Specific classes recommended for this track include GEOL 410 Hydrogeology, GEOL 420 Environmental Geology, and GEOL 440 Engineering Geology, GEOP 413 Near-surface Geophysics, GEOP 435 Principles of Geophysical Exploration.

Petroleum Geophysics Track

The petroleum industry is the largest employer of geophysicists in the United States. The Texas A&M degree program provides a number of courses for students interested in careers in the petroleum industry. The overwhelming majority of petroleum geophysicists work in some area related to petroleum seismology. Reflection seismology is the principal tool used by industry to explore the subsurface and is a major tool in petroleum exploration and production.

Petroleum geophysicists work closely with petroleum geologists, petroleum engineers and other scientists and engineers involved in petroleum exploration and development. As a consequence, petroleum geophysicists need to have a working knowledge of engineering and geology. The mix depends on the geophysical specialty.

There are three main petroleum geophysics specialties: seismic theory, seismic imaging and seismic interpretation. All petroleum geophysicists should have a basic understanding of seismic theory, seismic imaging and seismic interpretation. In addition, they should have knowledge of gravity, magnetic and electrical methods used in petroleum exploration and development. Required courses provide for each of the above except for seismic interpretation and gravity-magnetics. Seismic interpretation is usually taught as a graduate course, but is available as an elective for undergraduates through Directed Studies (GEOP 485). Gravity and magnetics are covered in GEOP 475 Interpretation of Gravity and Magnetic Fields.

Students planning careers in seismic theory may wish to take additional courses in Physics, Mathematics (for example, MATH 417 Numerical Analysis I) and Computer Science. Students planning careers in seismic imaging may wish to take electives in Electrical Engineering (ECEN 444 Digital Signal Processing) and Computer Sciences. Other course recommendations are available from the teaching faculty. Students planning to specialize in seismic interpretation will benefit from GEOL 306 Sedimentation and Stratigraphy, GEOL 312 Structural Geology and Tectonics, PETE 201 Introduction to Petroleum Engineering, PETE 311 Reservoir Petrophysics, and PETE 320 Drilling and Production Systems.

Geophysics

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
CHEM 107 Gen Chem. for Eng. Students.....	(3-3)	4	GEOL 106 Historical Geology.....	(3-3)	4
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	MATH 152 Engineering Math. II.....	(3-2)	4
GEOL 104 Physical Geology	(3-3)	4	Communication elective ¹		3
MATH 151 Engineering Math. I	(3-2)	<u>4</u>	U.S. history or political science elective ²		<u>3</u>
		15			14

SOPHOMORE YEAR

GEOL 203 Mineralogy	(2-6)	4	GEOL 302 Introduction to Petrology.....	(3-3)	4
GEOG 341 Intro. to Global Geophysics	(3-0)	3	GEOL 309 Intro. to Geol. Field Methods.....	(1-6)	3
MATH 251 Engineering Math. III	(3-0)	3	MATH 308 Differential Equations.....	(3-0)	3
PHYS 218 Mechanics	(3-3)	4	PHYS 219 Electricity	(3-3)	4
*KINE 198 Health and Fitness Activity	(0-2)	<u>1</u>	*KINE 199 Required Physical Activity.....		<u>1</u>
		15			15

JUNIOR YEAR

GEOP 435 Principles of Geophysical Exploration.....	(3-3)	4	GEOL 311 Principles of Geol. Writing	(1-0)	1
PHYS 221 Optics and Thermal Physics.....	(3-0)	3	GEOL 312 Struct. Geology and Tectonics.....	(3-3)	4
Computer science ²		3	GEOP 413 Near-Surface Geophysics.....	(3-0)	3
U.S. history or political science elective ¹		3	MATH 311 Topics in Applied Math.	(3-0)	3
Visual and performing arts elective ³		<u>3</u>	Social and behavioral sciences elective ³		3
		16	U.S. history or political science elective ¹		<u>3</u>
					17

SENIOR YEAR

GEOP 421 Petroleum Seismology I	(3-3)	4	GEOP 470 Computational Methods	(3-0)	3
MATH 412 Theory of PDES	(3-0)	3	Technical electives ⁴		8
Humanities elective ³		3	U.S. history or political science elective ¹		<u>3</u>
Technical elective ⁴		<u>4</u>			14
		14			

total hours 120

- NOTES: 1. These electives must be selected from the approved list of courses satisfying the University Core Curriculum.
 2. Computer science course must entail programming with a high-level language.
 3. These electives must be selected from the approved list of courses satisfying the University Core Curriculum AND 6 hours must be selected from courses that also satisfy the international and cultural diversity requirement.
 4. Any science, math or engineering course that augments the degree with the approval of the advisor.

* See page 21.

Curriculum in Earth Sciences

The B.S. degree in Earth Sciences is offered through the Department of Geology and Geophysics. This program provides a general background in Earth Science, including Atmospheric Sciences, Geography, Geology and Oceanography. **Due to changes in Texas certification laws, this program no longer certifies students to teach earth science in grades seven and eight.** This program, with modification, can prepare students to teach earth science at the secondary school level through the Option IV Composite Science Certification. Students interested in this certification are urged to see their advisor. Because of the breadth of this program, the B.S. in Earth Sciences curriculum does not provide the background for admission to graduate studies in the geosciences.

FRESHMAN YEAR¹

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
CHEM 106 Molecular Science for Citizens ² ...	(3-0)	3	BIOL 101 Botany ^{2,3}	(3-3)	4
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	GEO 106 Historical Geology.....	(3-3)	4
GEO 101 Principles of Geology	(3-3)	4	HIST 106 History of U.S.....	(3-0)	3
HIST 105 History of U.S.....	(3-0)	3	INST 210 Understanding Special		
MATH 166 Topics in Cont. Math. II.....	(3-0)	<u>3</u>	Populations	(3-0)	3
		16	TEFB 201 Self Directed Experiences		
			with Adolescents	(1-3)	1
			Free elective.....		<u>2</u>
					17

SOPHOMORE YEAR¹

ATMO 201 Atmospheric Science.....	(3-0)	3	BIOL 107 Zoology ^{2,3}	(3-3)	4
COMM 203 Public Speaking.....	(3-0)	3	ENGL 210 Argument. and Comp.		
GEO 308 Integrated Earth Science	(3-3)	4	or		
POLS 206 American Natl. Govt.....	(3-0)	3	ENGL 241 Advanced Composition		
English literature elective ⁴		3	or		
*KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>	ENGL 301 Technical Writing	(3-0)	3
		17	GEO 301 Mineral Resources	(3-0)	3
			GEO 309 Intro. to Field Meth.	(1-6)	3
			TEFB 322 Teaching and Schooling.....	(2-3)	2
			*KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>
					16

JUNIOR YEAR¹

ASTR 101 Basic Astronomy	(3-0)	3	ASTR 102 Observa. Astronomy.....	(0-3)	1
PHIL 240 Intro. to Logic.....	(3-0)	3	EDTC 345 Microcomputer Awareness		
POLS 207 State and Local Govt.....	(3-0)	3	for Educators ⁶	(2-2)	3
TEFB 323 Teaching Skills I.....	(2-3)	3	PHYS 201 College Physics ²	(3-3)	4
Earth science elective ⁵		3	TEFB 324 Teaching Skills II	(2-2)	3
Free elective.....		<u>2</u>	Earth science elective ⁵	(4-0)	4
		17	Free elective.....	(3-0)	<u>3</u>
					18

SENIOR YEAR¹

SOCI 317 Minority Groups ⁷	(3-0)	3	TEFB 429 Supervised Student	
TEFB 406 Science in the Middle and Secondary Schools ⁸	(2-6)	3	Teaching ⁸	(0-24) <u>9</u>
Earth science elective ⁵		4		<u>9</u>
English literature elective ⁴		3		
Visual and performing arts ⁴		3		
Free elective.....		<u>2</u>		
		18		

total hours 128

- NOTES: 1. Current requirements of the College of Education and Human Development for teacher certification should be acquired from the advisor.
 2. Substitutions must be approved by the advisor. If Composite Science Certification is sought, the appropriate substitutions must be approved.
 3. Courses which are needed to satisfy the biology portion of the life-science teaching field.
 4. Must satisfy Humanities requirement of the University Core Curriculum.
 5. Earth science electives to be selected in consultation with student's advisor. The electives, in part, include any 300- or 400-level Geology course: AGRO 301 (4 hrs.), 310 (2 hrs.), 455 (3 hrs.); ANTH 302 (3 hrs.), 305 (3 hrs.), 308 (3 hrs.), 312 (3 hrs.), 313 (3 hrs.), 350 (3 hrs.), 351 (3 hrs.); ATMO 465 (2 hrs.); GEOG 324 (3 hrs.), 331 (3 hrs.), 400 (3 hrs.); OCNG 401 (3 hrs.); RENR 375 (3 hrs.).
 6. Other computer usage courses may be approved for substitution by the advisor.
 7. SOCI 323, 403 or 409 may be substituted as a multicultural course, satisfying both teacher certification and a part of the University Core Curriculum social science requirements.
 8. No other course may be taken with TEFB 429 except GEOL 485 (3 hrs.).

* See page 21.

Minors in Geology, Geophysics, Earth Sciences and Geoinformatics

The Department of Geology and Geophysics offers minors in three separate programs: Geology, Geophysics and Earth Sciences. Minors provide opportunities for broadening a student's background and tailoring the curriculum to specific career goals. For example, a minor in Geology or Geophysics may be especially beneficial to students majoring in fields that deal directly or indirectly with geological processes. These include agriculture, anthropology, archaeology, architecture, business, law, biology, chemistry, recreation and parks and soil science, to name a few.

The Departments of Geology and Geophysics, and Geography offer a minor in Geoinformatics. Geoinformatics is concerned with the collection, analysis and display of spatial information using geographic information systems, remote sensing, global positioning satellites and field mapping. The minor combines courses in computer science, mapping, geodesy, geographical information systems and remote sensing. Geoinformatics is used to solve problems associated with land administration, environment and natural resource management, planning and population studies in addition to traditional surveying and mapping applications. This minor represents a focused course of study, which can be combined with traditional areas of study in geology and geophysics, geography, and other areas of science and policy studies.

General Requirements for a Minor

1. Minimum of 15 credits in the discipline with at least 6 credits at the 300–400 level.
2. Minimum of 6 credits must be taken in residence at either Texas A&M in College Station or Texas A&M in Galveston.
3. Students must meet with the department's advisor for minor programs for approval of courses selected (any substitutions must be approved by the department head).
4. Minimum GPA of 2.0 must be achieved for all courses in the minor.

Additional Requirements for Specific Program

Minor in Geology

1. Either GEOL 101, 103, 104 or 320.
2. Remaining courses to be taken in Geology (except above and GEOL 308) or may include selected courses in Geography, Geophysics and Oceanography, with advisor approval.

Minor in Geophysics

1. 9 credits of Geophysics courses.
2. May include selected courses in Atmospheric Sciences, Geology and Oceanography, with advisor approval.

Minor in Earth Sciences

1. Either GEOL 101 or 104.
2. Remaining courses to be taken from at least three of the following five groups.
 - a. ATMO 151, 201, 206 or any upper-level courses.
 - b. GEOG 203, 213, 324, 330, 331, 361, 370, 390, 398, 400, 405, 434.
 - c. GEOL 106, 203, 301, 302, 304, 305, 306, 307, 309, 310, 312, 330, 404, 420, 451, 454; GEOP 213 or any upper-level courses.
 - d. GEOS 105, 405, 410.
 - e. OCNG 205, 251, 252, 401, 420.

Minor in Geoinformatics

1. 16 credit hours required.
2. 9 hours required.
 - a. GEOG 390 Principles of Geographic Information Systems
 - b. GEOG 475 Advanced GIS
 - c. GEOL 352 GPS in the Geosciences
3. Two of the following four courses.
 - a. CPSC 111 Introduction to Computer Science Concepts and Programming
 - b. CPSC 211 Data Structures and Their Implementations
 - c. GEOG 361 Remote Sensing
 - d. GEOL 309 Introduction to Geological Field Methods

Curriculum in Meteorology

The Department of Atmospheric Sciences offers the B.S. degree in Meteorology. The undergraduate curriculum in meteorology emphasizes weather and weather forecasting, but also includes courses in climatology, atmospheric chemistry, cloud physics and remote sensing of the atmosphere with radar and satellites. As a discipline, atmospheric science has close connection to oceanography and hydrology. As the meteorology curriculum makes clear, physics, chemistry and mathematics are the foundations of the study of the atmosphere.

The Department of Atmospheric Sciences occupies upper floors of the 15-story Oceanography and Meteorology Building. The Doppler weather radar on the roof of the building is a campus landmark, and the department also operates two mobile Doppler radars for research and teaching. The department also has four state-of-the-art chemistry labs, studying related phenomena ranging from ozone to aerosols, as well as modeling the chemical environment. A continuous, comprehensive stream of meteorological data is received from ground stations, balloons, aircraft, radars, and satellites around the world. Data are archived for research and teaching purposes. Two well-equipped computer labs are regularly upgraded to provide state-of-the-art educational equipment.

Students in the Department of Atmospheric Sciences enjoy low student-to-teacher ratios and small classes. Undergraduates have opportunities for individual study and participation in faculty research projects, including regional, national and international field programs.

Many students who receive B.S. degrees in Meteorology obtain employment with the National Weather Service, private meteorological consulting and weather forecasting companies, air quality consulting firms, airlines, TV stations, energy trading companies, universities, state governments, agricultural firms and computer-related industries. Some students choose to enter the military services as weather officers. Positions in teaching and research normally require a graduate degree.

Students interested in cooperative education arrangements should contact the head of the department for information.

Students of other disciplines, such as chemistry or mathematics may complete a minor in meteorology by taking a minimum of 16 hours in Atmospheric Sciences or upper division geosciences. GEOS courses may comprise no more than 6 of these hours, with the remainder being ATMO. At least 9 of the 16 hours must be in courses 300-level or above, including at least three 400-level hours. The selection of courses must be made in agreement with an advisor from the Atmospheric Sciences faculty.

In the curriculum presented, students are advised to note carefully the prerequisites for many of the courses.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ATMO 201 Atmospheric Sciences.....	(3-0)	3	CHEM 102 Fund. of Chemistry II.....	(3-0)	3
ATMO 203 Weather Forecasting Lab.....	(0-2)	1	CHEM 112 Fund. of Chemistry II Lab.....	(0-3)	1
CHEM 101 Fund. of Chemistry I.....	(3-0)	3	MATH 172 Calculus ¹	(4-0)	4
CHEM 111 Fund. of Chemistry I Lab.....	(0-3)	1	PHYS 218 Mechanics.....	(3-3)	4
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	U.S. history or political science elective ²		<u>3</u>
MATH 171 Analytical Geom. and Calc. ¹	(4-0)	<u>4</u>			<u>15</u>
		15			

SOPHOMORE YEAR

ATMO 251 Weather Obs. and Analysis.....	(2-2)	3	ATMO 335 Atmospheric Thermodynamics ...	(3-0)	3
ATMO 363 Atmospheric Chemistry.....	(3-0)	3	MATH 308 Differential Equations ¹	(3-0)	3
MATH 251 Engineering Math. III ¹	(3-0)	3	Computer science elective ³		3
PHYS 208 Electricity and Optics.....	(3-3)	4	U.S. history or political science elective ²		3
U.S. history or political science elective ²		<u>3</u>	*KINE 198 Health and Fitness Activity ²	(0-2)	<u>1</u>
		16			13

JUNIOR YEAR

ATMO 324 Physical and Regional Climatology.....	(2-2)	3	ATMO 336 Atmospheric Dynamics.....	(3-2)	4
MATH 311 Topics in Applied Math. I.....	(3-0)	3	Atmospheric sciences or technical electives ⁵ ...		3
STAT 211 Principles of Stat. I.....	(3-0)	3	Communication elective ²		3
Life sciences elective ⁴		3	Humanities elective ²		3
General elective ⁷		3	U.S. history or political science elective ²		<u>3</u>
*KINE 199 Required Physical Activity ²	(0-2)	<u>1</u>			<u>16</u>
		16			

SENIOR YEAR

ATMO 446 Physical Meteorology.....	(3-0)	3	Atmospheric sciences or technical electives ⁵ ...		12
ATMO Inst/Remote Sensing elective ⁶		2	General electives ⁷		<u>3</u>
General elective ⁷		3			15
Social and behavioral science elective ²		3			
Visual and performing arts elective ²		<u>3</u>			
		14			

total hours 120

- NOTES: 1. A grade of C or better is in MATH 171, 172, 251 and 308 (or equivalent).
 2. Course work to be selected from the University Core Curriculum.
 3. ATMO 321 recommended; CPSC 203, 206 also acceptable.
 4. Select from AGRO 301; BESC 201; BIOL 101, 107, 111; FRSC 302.
 5. Select in consultation with faculty academic advisor.
 6. Select from ATMO 441 or ATMO 489 Radar Meteorology.
 7. General electives MAY NOT include BUAD 100; CAEN 101-499; CAEX 101-499; DEVS 101-499; ENGL 100, 103; KINE 198-199; LBAR 201; MATH 102-103, 131, 141-142, 150-152, 166, 171-172, 221, 251, 253; PHYS 101, 201-202, 208, 218-219; AERS 100-499; MLSC 100-499; NVSC 100-499; SOMS 100-499.

* See page 21.

Studies in Oceanography

Oceanography is an interdisciplinary science that focuses on the oceans, their contents and their boundaries. Degree programs are offered at the graduate level, leading to the Master of Science and the Doctor of Philosophy degrees in oceanography. In addition, various undergraduate courses are offered, and qualified undergraduate students may participate in a 15-credit minor in Oceanography. A minor consists of at least 15 hours selected from OCNG 251, 252, 291, 401, 410, 420, 430, 440, 451, 485, 489 and 491. At least 6 hours must be upper division courses in the minor.

Oceanography is unusual as a graduate discipline. Whereas graduate programs in most disciplines lead to progressively greater degrees of specialization, oceanography as an interdisciplinary field takes graduates of biology, chemistry, geology, mathematics, physics, geophysics, meteorology or engineering and initially generalizes and broadens their education with a core of required courses. These core courses include the four subject areas of the oceanography program (biological, chemical, geological/geophysical and physical oceanography) and a seminar covering the state of the science. The student then refocuses in a particular subject area to pursue research and further study.

Effective study of oceanography requires a thorough undergraduate training in one of the pertinent undergraduate sciences, mathematics or engineering. During the undergraduate years, a student should consult with the oceanography faculty while enrolled in an appropriate undergraduate curriculum. In addition, the student should take advantage of the electives in the curriculum to ensure that at least one course is taken in biology, chemistry, geology, geophysics and physics, as well as OCNG 251, 252 and 401, and, if possible, one more course from OCNG 410, 420, 430, 440, 451, 485, 489 and 491. All of these courses may be applied toward an undergraduate minor in Oceanography. For honors students, OCNG 251H, 252H, 401H, 485H, 489H and 491H are available.



TEXAS A&M
UNIVERSITY

A black and white photograph of a bronze statue of a man with a beard and mustache, wearing a suit and tie. The statue is in the foreground, and in the background, there is a large, domed building, likely the Texas State Capitol, partially obscured by trees.

COLLEGE OF
LIBERAL ARTS

★ 2008–2009 UNDERGRADUATE CATALOG ★

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College of Liberal Arts

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General Statement

The examples of history show us that a liberal arts education is the foundation of a strong and progressive society. The College of Liberal Arts offers students an opportunity to explore the intellectual achievements of humankind through a disciplined and responsible study of issues that have been of enduring importance to people. Thus, courses in liberal arts help students develop a sensitivity to the questions and values that confront them in their daily lives. At the same time, skills are built which can be put to use in solving complex problems. One of the program's principal objectives is to achieve the hallmark of an educated person: a fundamental knowledge of the forces that have shaped and continue to direct our cultural identity.

The intrinsic purpose of the undergraduate program in the College of Liberal Arts is to foster independent thinking by offering students a broad education. To achieve this, the college supports the aims of the University Core Curriculum, which requires all students to engage in specific studies intended to promote an awareness of their heritage, their culture, and their environment. Students who choose to major in one of the Liberal Arts disciplines will complete a curriculum designed to promote this breadth of understanding while providing a focus through concentration in one specific area of study.

The first two years of undergraduate study in The College of Liberal Arts introduce students to the full range of arts, humanities, science, mathematics and social science areas that are established in the University Core Curriculum. During the last two years, students concentrate on their major and minor fields of study and complete their program with appropriate elective hours. Throughout the program, skills in critical analysis and in communication are developed, strengthened and polished.

Many graduates with bachelor's degrees in liberal arts continue their study at the graduate level in an academic discipline or in a profession such as medicine or law. The majority go directly into the job market. Studies have shown that liberal arts graduates are very successful in a variety of activities in commerce, business, or public service, because the knowledge and skills they have developed are valuable in today's world. Many businesses actively recruit liberal arts majors for entry-level positions.

Thus, whether as a foundation for further study or as a broad education preparatory to positions in business, industry, and the public domain, a liberal arts degree has intrinsic worth and enduring value.

Organization for Instruction

College of Liberal Arts	Baccalaureate	Masters	Doctorate
Interdepartmental Degree Programs			
American Studies	BA		
Comparative Literature and Culture		MA	
International Studies	BA		
Science and Technology Journalism		MS	
Department of Anthropology			
Anthropology	BA	MA	PhD
Department of Communication			
Communication	BA	MA	PhD
Telecommunication Media Studies	BA, BS		
Department of Economics			
Economics	BA, BS	MS	PhD
Department of English			
English	BA	MA	PhD
Department of European and Classical Languages and Cultures			
Classics	BA		
French	BA		
German	BA		
Russian	BA		
Department of Hispanic Studies			
Hispanic Studies			PhD*
Modern Languages		MA	
Spanish		X	
Spanish	BA		
Department of History			
History	BA	MA	PhD
Department of Performance Studies			
Music	BA		
Theatre Arts	BA		
Department of Philosophy and Humanities			
Philosophy	BA	MA	PhD
Department of Political Science			
Political Science	BA, BS	MA	PhD
Department of Psychology			
Psychology	BA, BS	MS	PhD
Community/Clinical			X
Industrial/Organizational			X
Department of Sociology			
Sociology	BA, BS	MS	PhD

X Indicates option in major shown above.

* Step 1 Doctoral Program with Texas A&M International University, Texas A&M University-Corpus Christi, and Texas A&M University-Kingsville.

General Degree Requirements

Degree requirements for Liberal Arts majors are organized into: (1) General Requirements, including University Core Curriculum requirements and College of Liberal Arts requirements; (2) Requirements of the major field of study; (3) Requirements of the Minor Field of Study; and (4) Electives. A minimum of 120 acceptable hours of course work is required for the baccalaureate degree. All courses are to be selected with the approval of the student's academic advisor. A minimum of 36 hours of 300- or 400-level course work must be completed at Texas A&M University.

I. **General Requirements.** The areas listed below include University Core Curriculum requirements and College of Liberal Arts requirements. The completion of requisite hours in these areas will thus satisfy both University Core Curriculum and college requirements.

A. Communication (6 hours)

1. ENGL 104

2. English Proficiency Qualifications

Students must demonstrate the ability to express themselves in acceptable written English. The College requirement is satisfied if a student earns a grade of C or better in ENGL 104.

Students who do not meet this standard must repeat the course prior to completing 60 hours and earn a grade of C or better or must immediately arrange with the director of the writing laboratory to be certified as competent in writing.

3. One course chosen from: ENGL 203, 210, 235, 236, 241 or 301; COMM 203 or 243.



B. Literature and Language

1. Literature in English (6 hours)

To be selected from ENGL 203, 212, 221, 222, 227, 228, 231, 232 or courses for which one of these listed courses is a prerequisite.¹

2. Foreign Language (6 hours, through course work or examination, at the intermediate level or equivalent) (14 hours for the B.A.).

a. Every student whose major leads to the Bachelor of Arts degree must successfully complete a two-course sequence at the intermediate level of a foreign language (201 and 202). Students who have not previously studied the language will normally complete one of the sequences of four courses listed below. Students who intend to enroll for the first time in a college Spanish, French, German, Russian, or Latin course, who have had knowledge of the language, however acquired, and who have no college credit in the language must take a placement test to determine the appropriate course for their level of ability. The foreign language placement test also serves as a basis for credit by examination. The test will be offered on the first day of the freshman conferences and during the semester for students who will be enrolling in the course after the fall semester. Students who have taken the Advanced Placement (AP) test or the Reading Achievement test in their foreign language of choice may substitute these test results for the placement exam.

i. FREN 201 or 221, 202 or 222

ii. GERM 201 or 221, 202 or 222

iii. RUSS 201 or 221, 202 or 222

iv. SPAN 201 or 221, 202 or 222

v. CLAS 121, 122, 221, 222

vi. CLAS 101, 102, 211, 311 or 312

vii. ITAL 101, 102, 201, 202

viii. JAPN 101, 102, 201, 202

ix. ARAB 101, 102, 201, 202

b. Students seeking a Bachelor of Science degree will substitute for the 6 hours of a language at the intermediate level additional work in computing science, mathematics, science or statistics as prescribed by their major department.

C. Mathematics (6 hours, at least 3 of which must be in mathematics)

To be selected from any MATH course (excluding 102, 103, 104, 130, 150)

D. Natural Sciences (8 hours, including at least one laboratory)²

To be selected from science courses approved for the University Core Curriculum.

E. Humanities and Visual and Performing Arts (9 hours)²

To be selected from humanities and Visual and Performing Arts courses approved for the University Core Curriculum with a minimum of 3 hours and a maximum of 6 hours of arts courses.³

F. Social and Behavioral Sciences (6 hours)²

To be selected from social and behavioral science courses approved for the University Core Curriculum.³

G. U.S. History and Political Science (12 hours, 6 hours of POLS and 6 hours of HIST)⁴

1. Political Science (6 hours)

POLS 206 and 207

2. U.S. History (6 hours)

Two courses in American history

H. International Cultures and Diversity (6 hours)⁵

To be selected from lists of approved courses and may also satisfy any other requirement.

I. Kinesiology (2 hours)⁶

II. **Major Field of Study.** To achieve depth as well as breadth, all students are required to select a major field of study. Each department sets its own requirements for the major, including no fewer than 27 hours of course work and no more than 33 hours. At least 12 semester hours in the major must be completed in advanced courses (300- and 400-level), and at least 12 semester hours in the major field must be completed in residence at Texas A&M. A grade of C or higher is required in a course to be counted toward the major.

III. **Minor Field of Study.** Completion of a minor is not a requirement of the College of Liberal Arts; however, individual departments may require their majors to have a minor. Students should consult with an advisor in their major department to determine if a minor is required. The minor program should provide either a concentration of prescribed courses that focus on a single content area or an interdisciplinary and/or comparative perspective on more than one area. The minor program comprises 15–18 hours with a minimum of 6 hours in residence at the 300- to 400-level. Minor programs are recognized on the transcript after graduation, but not on the diploma. A grade of C or higher is required if a course is to be counted toward the minor field. Each student who is required to complete a minor, or who chooses to do so, should contact the department that offers the minor to determine which specific courses are mandated. The student's college and/or major department determines the number of minor programs a student may seek and shall be responsible for advising after the student receives signed approval from the department, program, or college granting the minor program.

IV. **Electives.** To enhance the traditionally broad background of the liberal arts graduate, undergraduate students are allowed to include in their degree program a minimum of 9 semester hours of free elective courses. These courses may be chosen from any field within the University except from a student's major field. (See section on "Requirements for a Baccalaureate Degree" in this catalog.) All other elective hours must be selected with the approval of the student's advisor and dean. STLC 101, 102 and 289 may only be taken on an S/U basis. No more than 13 hours combined of KINE 199 and military training may be used as electives. Any undergraduate student may take up to four credit hours of KINE 199 on an S/U basis. In the College of Liberal Arts, students who have less than a 2.0 GPR and who enroll in KINE 199 must enroll in the course on an S/U

basis. Juniors and seniors in the College of Liberal Arts whose cumulative GPR is 2.50 or above may take up to twelve credit hours of “free electives” on an S/U basis. Transfer students must take at least 12 credit hours of regular course work at Texas A&M before enrolling in a course on an S/U basis. Courses offered only on an S/U basis may be taken by freshmen and sophomores. These courses count toward the 12 hour limit.

- NOTES:
1. ENGL 203 will count toward the Communication requirement or the Literature in English requirement, but not both.
 2. No course used to fulfill this requirement may fulfill any other college or University requirement except in the minor field of study.
 3. Acceptable humanities, visual and performing arts and social and behavioral sciences courses must be selected from the University Core Curriculum.
 4. Courses in military, air or naval science may not be substituted for required history or political science courses.
 5. The list of approved courses is available in the degree audit for each major.
 6. One hour of KINE 198 Health and Fitness credit and any other one KINE 199 Required Physical Activity courses.

See page 21.

Curricular Options

International and Intercultural Experiences. The International and Cultural Diversity requirement encourages all students to learn about attitudes and cultures different from their own. All students are required to select from a list of approved courses that foster greater awareness of our interdependent and diverse world.

Students also may select, as free electives, courses which address cultural diversity issues in the United States. Courses in this area encourage students to focus on issues of race, ethnicity and gender and to develop a broader understanding of the diverse cultures and traditions in the United States.

Further opportunity to increase international and national intercultural awareness can be accomplished through our study abroad and internship programs. More information on these programs is available through the Undergraduate Student Services Office in the College of Liberal Arts.

LBAR Honors PLAN. The College of Liberal Arts encourages qualified majors to participate in its Honors Plan, which is designed for academically talented high school graduates who have distinguished secondary school records (top 10%) and high scores on achievement tests (1250 SAT or 28 ACT). Students accepted into the LBAR PLAN take courses that foster an interdisciplinary outlook characteristic of the Liberal Arts and that synthesize knowledge from other courses. Participants work in small classes with some of the most distinguished faculty at Texas A&M University. Students develop their own interests and have the option to write an honors thesis under the direct supervision of a professor with whom they have chosen to work. For information about Texas A&M Honors Program and Fellows Program (i.e., the senior thesis), see the Web site honors.tamu.edu.

B.A. in American Studies. The B.A. in American Studies is an interdisciplinary degree administered by the College of Liberal Arts. Its principal educational objectives are: (1) to introduce students to the theories and methods of the well-established and vibrant field of American Studies; (2) to develop in students a sophisticated knowledge and appreciation of the rich diversity and complexity of United States culture, past and present; (3) to explore the interrelationships between United States culture and other national cultures; and (4) to provide students the opportunity and intellectual tools to explore in depth a particular aspect or aspects of American culture from an interdisciplinary perspective.

The B.A. in American Studies requires the completion of 33 hours (at least 12 advanced) in the major, including 15 hours of core courses and 18 hours of directed electives from four broad areas of interest: Arts and Culture, Ethnicity, Science and Technology, and Society and Government. Students are also required to complete a 15–18 hour minor. For more information, contact the Undergraduate Student Services Office in the College of Liberal Arts.

B.A. in International Studies. The B.A. in International Studies is an interdisciplinary degree administered by the College of Liberal Arts. Its principal objectives are: (1) to provide an international perspective on such issues as economics, political science, and history and to allow more concentrated course work in subjects and geographical regions aligned with a student's interest; (2) to assure competency in a foreign language appropriate for an International Studies degree; (3) to offer an integrated study experience at an international site; and (4) to develop an understanding of the important and complex human, social, political, and economic issues at work in international affairs.

The B.A. in International Studies thus requires: (1) a minimum of 23 credit hours in a foreign language at the college level; (2) at least one long semester or one 14 week summer approved experience in a study abroad or other international program with an emphasis on cultural and language immersion; (3) the completion of 36 hours (at least 12 advanced) in the major, including 18 hours of Core courses including an introductory course and a senior seminar; 3) 24 hours in one of five tracks or topic areas: International Politics and Diplomacy, International Commerce, International Environmental Studies, International Communication and Media, and International Arts and Culture; 4) 12 hours of area studies in courses related to Latin America, Europe, Africa and the Middle East or Asia. For more information, contact the Director of the International Studies Degree Program, 230 Reed McDonald.

Certificate in European Union Politics. The Certificate in European Union Politics is an initiative of the European Union Center and the Department of Political Science. Both interdisciplinary and international in its orientation, the Certificate program offers students seeking a Bachelor of Arts or Bachelor of Science degree at Texas A&M University the opportunity to combine courses, intermediate level foreign language skills, other relevant experiences on campus, and a study abroad.

Certificate requirements include 18 semester hours of course work including an approved study abroad program. The 18 semester hours of course work can be accommodated within the regular undergraduate curriculum. Students are encouraged to begin planning as freshmen to avoid the addition of extra hours to the degree plan. Certificate requirements are specified in a current brochure available in the Department of Political Science's Undergraduate Program Office, Allen Building, room 2024.

Interdisciplinary Minors. Formally organized interdisciplinary minors are offered in Africana Studies, Asian Studies, Classical Studies, Comparative Cultural Studies, Comparative Literature, Film Studies, Hispanic Studies, Journalism Studies, Religious Studies and Women's Studies. Specific course requirements and options are available from each interdisciplinary program director.

Requirements for the minor in **Africana Studies** total 18 hours including: (1) 6 hours in residence at 300/400 level taken as AFST 302, AFST 481, (2) a total of 12 hours from the following three-hour courses: AFST 201, ANTH 315, ENGL 205, ENGL 393, HIST 300, HIST 301, HIST 344, HIST 345, HIST 346, COMM 425, SOCI 317 or SOCI 323.

Requirements for the minor in **Classical Studies** include 18 hours to be taken as follows: (1) two semesters of either Greek or Latin language at the college level; (2) a minimum of four courses in classical civilization from an approved list.

Requirements for the interdisciplinary minor in **Asian Studies** total 18 credit hours, as follows: (1) six hours of Asian Studies humanities courses; (2) six hours of Asian Studies social sciences courses; (3) a three-hour Asian studies capstone course selected in consultation with the program coordinator; and (4) three hours of Asian Studies electives. Up to six hours of upper-division Asian language courses (300 level or higher) may count toward the minor. If six hours of language courses are used for the minor, the required hours in Asian Studies humanities and social sciences courses will be reduced from 12 hours to 9 hours, and the Asian language courses will be credited as electives.

Requirements for the minor in **Film Studies** total 18 hours including: (1) a foundation course which is FILM 201 or (with approval of the program coordinator) ENGL 251; (2) FILM 481; (3) FILM 301; (4) three additional FILM courses (9 hours). Courses that are primarily concerned with film and which are offered in any department within the College may be credited for the minor with the approval of the program coordinator.

Requirements for the minor in **Hispanic Studies** total 18 hours including (1) two courses (6 hours) in upper-level Spanish language courses: SPAN 301, Hispanic Culture and Civilization; SPAN 302, Contrastive Grammar; SPAN 303, Composition and Conversation; SPAN 304, Advanced Grammar for Native Speakers; or SPAN 350, Phonetics; (2) three courses (9 hours) in Hispanic topics and issues, to be selected from a list of recommended courses, with no more than two courses from any area; and (3) one "capstone" or "exit course" (3 hours) selected in consultation with the program coordinator.

Requirements of the interdisciplinary minor in **Journalism Studies** include 18 credit hours, not counting JOUR 102, a 3-hour prerequisite for admission to the minor. Fifteen credit hours are devoted to: (1) basic news-gathering and writing courses (6 hours), (2) a choice among advanced reporting, editing or communication law courses (3 hours), and (3) two "capstone" courses that include a media internship and a professional practices course taught by visiting Journalists-in-Residence (6 hours). The final three hours can be taken in a number of classes offered through Anthropology, Communication, Economics, English, History, Music, Political Science, Psychology or Architecture.

Requirements for the minor in **Religious Studies** total 18 hours, including: (1) 6 hours of World Religious Traditions taken as RELS 303 and 304; (2) 3 hours in Religious Texts selected from RELS 211, 213, 351, 360 or 392; (3) 3 hours in Religion in History selected from RELS 220, 317, 347, 365 or 404; (4) 3 hours in Religion in Psychology and the Social Sciences selected from RELS 326, 403 or 405; and (5) RELS 331, Philosophy of Religion.

Requirements for the minor in **Women's Studies** total 18 hours, including at least 6 hours at the upper-level, as follows: WMST 200, WMST 481, 3 hours in humanities women's studies courses, 3 hours in social science women's studies courses, and additional women's studies courses as approved by the coordinator of women's studies and the dean's office.

Departmental Minors. Departmental Minors are offered by all departments and some academic programs within the College of Liberal Arts (see page 40). Requirements total 15–18 hours of courses specified by the department; courses in the minor may also meet other degree requirements, but not in the major. At least 6 hours (9 hours for 18 hour minor) must be at the 300- or 400- level. Grades of C or better are required in each course.

Requirements for the minor in **Music** total 18 hours including (1) a total of 3 hours chosen from MUSC 200 Topics in Music or MUSC 201 Music and the Human Experience; (2) MUSC 204 Theory and Musicianship I; (3) a total of 3 hours of Individual/Ensemble Performance chosen from MUSC 250 Individual Performance—Piano I, MUSC 280 Ensemble Performance—Symphonic Band, MUSC 286 Ensemble Performance—Symphony Orchestra, or MUSC 290 Ensemble Performance—Choir; (4) elective courses: 9 additional credits in MUSC at the upper-level (300- or 400-level course). No more than 9 credits of the minor may be at the lower-level (100- or 200-level course). Students must earn grades of C or better in their minor course work.

Combined Degree Plan (Double Degree). Students may pursue a five-year program to qualify for two bachelor's degrees, either a Bachelor of Arts and a Bachelor of Science degree from different departments, or two Bachelor of Arts or two Bachelor of Science degrees, with the second degree from another college. Students must declare the double degree no later than the semester in which they will complete 95 hours. Students must have and maintain at least a 2.5 GPR cumulative and in the majors (or the minimum departmental GPR requirement in the major, whichever is higher), with at least a 2.5 GPR in at least 9 hours in the second field of study at the time of declaration. Transfer students who enter with a junior classification must file for the double degree no later than the end of their second semester in attendance. Before declaring the double degree, students should consult with the appropriate advisors and deans to formulate the combined degree plan.

Candidates for a double bachelor's degree must have been in residence at least two academic years and must complete all essential work of the second curriculum not covered in the first. To qualify for the double degree, the student must complete a minimum of 30 semester hours more than the higher of credit hours required for either degree.

Cooperative Education Program. Cooperative education enables students to gain practical work experience and a salary while completing academic requirements. During the four-year academic program, co-op students complete two to four periods of work away from campus, gaining experience through on-the-job training and thus improving their opportunities for future employment. An advisor in the cooperative education office provides additional information about this program. The student must register himself or herself.

Double Major. Instead of a major and a minor field, students in the College of Liberal Arts may elect to have two major fields of study. Both majors may be within the college, or one major may be outside the college, provided both majors lead to the same baccalaureate degree. Students must declare a double major no later than the semester in which they will complete 95 credit hours. Students must have and maintain at least a 3.0 GPR cumulative and in the majors (or the minimum departmental GPR requirement in the major, whichever is higher) with at least a 3.0 GPR in at least 9 hours in the second field of study at the time of declaration. Transfer students who enter with junior classification must file for the double major no later than the end of their second semester in attendance. The following requirements must be met: the student must (1) satisfy all University and college requirements; (2) complete all required courses in each major, if both majors are in the College of Liberal Arts (i.e., take all courses which are specifically listed in each regular degree program); and (3) in cases where one major is in the College of Liberal Arts and the other major is in another college, the student shall take in his or her liberal arts major field of study the same number of credit hours required of regular majors in that field and also satisfy whatever conditions are set by the other college for its major field.

For further information, contact the Undergraduate Student Services Office in the College of Liberal Arts.



Preparation for Professional Studies

Business (M.B.A. Programs). The Office of Pre-professional Advising should be consulted for recommendations regarding preparation for graduate programs in business. Although some graduate programs in business do not require any prerequisite work in business, others recommend that liberal arts majors take introductory courses in business, economics, math and statistics at the undergraduate level.

The following courses, developed for the business minor, are open to all undergraduates. Students should consult the catalog for prerequisites.

ACCT 209 and 210
 FINC 409
 INFO 209
 MGMT 209 and 309
 MKTG 409

Courses in economics and math common to undergraduate business curriculums include ECON 202 and 203; MATH 142 or another calculus course, and MATH 141 or a similar finite math course.

Government Service (M.P.A. Programs). Most graduate programs in public administration recommend a broad background of knowledge and skills in the following areas: the political, social, economic and legal context of administration; analytical tools; individual, group and organizational dynamics; policy analysis; administrative/management processes; and arts and science foundation skills. Students are best prepared for an M.P.A. program if their undergraduate programs are multidisciplinary in nature, drawing upon political science, economics, the behavioral sciences, the quantitative sciences, and administrative and managerial sciences.

Law. Most law school admissions committees require a student to have a four-year college program leading to a Bachelor of Arts, Bachelor of Science, or Bachelor of Business Administration degree, or equivalent, as well as an acceptable score on the Law School Admissions Test (LSAT). In general, law schools prefer that a student seek a liberal college education rather than one which is narrowly specialized. They favor thorough learning in some broad cultural field of a student's choice, such as history, economics, political science, philosophy, mathematics, science, literature, or the classics. Admissions committees rarely favor concentration in specialized, technical curricula unless such study is adequately supplemented by advanced work in the social sciences and humanities. The Law School Admissions Test Council and the Council of the Section on Legal Education and Admissions of the American Bar Association both advise against the taking of satisfactory/unsatisfactory courses by students intending to go to law school.

Normally students will register for one of the regular degree programs of their choice. It is advisable to include among the elective hours some of the following courses: ACCT 209, 210; ECON 202, 203; ENGL 210, 301, 341; HIST 213; HIST 447, 448, or POLS 210, 353, 354, 355, 357; PHIL 240, 483; PSYC 107; and COMM 203, 243. Students should avoid an excessive number of courses titled "law" in favor of those of a general educational nature, although exposure to "law" courses should help in the decision of whether to apply to law school.

Advising for pre-law students regardless of major, including application forms for taking the Law School Admissions Test, may be obtained from the Office of Professional School Advising, Room 205 Academic Building, (979) 847-8938.

Medicine. Liberal arts majors interested in applying to medical school should meet with an advisor in the Office of Professional School Advising as early as possible. Out-of-state medical schools vary in the courses they require, but the following courses are the prerequisites for the Texas medical schools:

BIOL 111, 112 and two semesters of upper-level biology course work;
CHEM 101 (or 103/113), 102 (or 104/114), 227, 237, 228 and 238;
ENGL 104 and a literature course;
MATH 131, 151 or 171;
PHYS 201 and 202.

Advising for all pre-health students, including medical and dental students, may be obtained from the Office of Professional School Advising, Room 205 Academic Building, (979) 847-8938. Students are urged to stop by the office to pick up information on professional schools and talk with an advisor very early and often during their collegiate career.

Nursing. Texas A&M does not offer a pre-nursing major. Specific information about course selection and nursing programs to which students may transfer is available from the Office of Professional School Advising, Room 205 Academic Building, (979) 847-8938.

Teacher Certification. Students majoring in one of the departments of the College of Liberal Arts and working toward a teaching certificate must meet the minimum requirements described in the College of Education and Human Development section under secondary teacher certification. In that many certification requirements are determined by the State of Texas and thus are subject to periodic change, students working toward certification should maintain frequent contact with advisors in the College of Education and Human Development.

Theology. The American Association of Theological Schools recommends that students planning to enter a theological seminary include in their undergraduate curriculum the following subjects.

English (6 semesters)
History (3 semesters)
Philosophy (3 semesters)
Natural science (2 semesters)
Social science (6 semesters)
Foreign language (4 semesters): Latin, German or French
Religion (3 semesters). Courses taught at Texas A&M in religion include:
ENGL 365, HUMA 211, 213, 303, 304, PHIL 331 and SOCI 326

For more information see the Coordinator of the Religious Studies Program in the college.

University Honors Program

The College of Liberal Arts encourages qualified majors to participate in the University Honors Program, which is designed for academically talented high school graduates who have distinguished secondary school records and high scores on achievement and Scholastic Aptitude Tests (SAT) or American College Tests (ACT). For additional information, see the information on the University Honors Program in this catalog.

The English Language Institute

The English Language Institute (ELI), an institute in the College of Liberal Arts, offers a comprehensive program designed to help international students improve their English language ability. The goal of the English Language Institute is to provide the necessary language and cultural skills for international students to enter and participate in academic programs at Texas A&M. This intensive English program facilitates international students' participation in technology, science and management. Enriched by the arts and humanities, the program serves current and future University students and emphasizes diversity and excellence.

Full-time ELI admitted students receive 25 hours of instruction per week, while part-time admitted students take from 3 to 12 or more hours per week. ELI classes meet on a regular University semester schedule in classrooms on the Texas A&M campus.

The ELI uses the most current textbooks, supplementary materials, language learning equipment and instructional techniques in the field of language learning. Courses emphasize listening and reading comprehension, fluency in speaking and writing, and the development of pronunciation skills, vocabulary and grammar. Courses are offered at beginning (100), intermediate (200), and advanced (300) levels. In addition, 500-level courses in oral skills prepare graduate students to serve as teaching assistants, while 500-level courses in composition teach preparation for thesis and dissertation writing. For more information, contact the ELI Office at (979) 845-7936.

International and Cultural Diversity Requirement

Texas A&M University requires its students to meet an International and Cultural Diversity requirement as part of the University's Core Curriculum. Meeting this requirement will require the careful selection of courses. The student is directed to page 20 of this catalog for detailed information regarding this requirement and also is encouraged to seek the advice of the student's academic advisor.

Curriculum in American Studies

The undergraduate program in American Studies (AMST) is designed to provide students with a broad-based liberal arts education and introduce students to the theories and methods of the well-established and vibrant field of American Studies. Administered by the College of Liberal Arts, the American Studies curriculum is interdisciplinary and intercollegiate. Students take courses in a number of departments and work with an advisor to construct the major curriculum most appropriate to individual interests and areas of concentration.

Graduates in American Studies compete successfully for jobs in a broad variety of fields in education, business, government and non-profit organizations. Demand for graduates with specific training in American Studies exists in elementary and secondary education, in museum work, and in the U.S. Departments of State and of the Interior. American Studies undergraduates may prepare for admissions to graduate programs in law, American studies, public service, history, English, philosophy, sociology or political science.

Requirements

American Studies. 15 credits. Courses to be selected in consultation with your advisor. A grade of C or higher is required for each course counted toward the major.

Core Courses: 15 credits

Credit	Course
3	AMST 300 Imagined Americas
12	To be selected from the following or in consultation with the Director of American Studies:
	AMST 310 Confronting Conflict
	AMST 320 Versions of the American Dream
	AMST 330 Intersecting Cultures
	AMST 340 Region and Place
	AMST 350 Materializing America
	AMST 481 Senior Seminar
	AMST 489 Special Topics

Area Studies Directed Electives. 18 credits. Students must take 9 credits (3 courses) from an approved list of courses relevant to a concentration in Arts and Culture, Ethnicity, Science and Technology, or Society and Government. Student may focus up to 9 credits in one subdivision within each area. The list of approved courses is available through the Office of the American Studies Coordinator and in the Undergraduate Student Services Office in the College of Liberal Arts.

Minor Field of Study. 15–18 credits. American Studies students are required to select a minor. Minors must conform to the minor requirements of the College of Liberal Arts. Ordinarily, the minor will be completed within a single department to allow a focus on a traditional discipline; a student may, however, complete a cross-departmental minor with the approval of the American Studies Program Director. A grade of C or higher is required for each course counted toward a minor.

Free Electives. 5–8 credits. The number of elective hours vary depending on the number of hours taken to complete the minor.

College and University Requirements. 72 credits. Students should consult the approved list of courses available in the University Core Curriculum section of the catalog. The following lists incorporate University Core Curriculum requirements.

Credit	Category
6	Communication: ENGL 104 and one course selected from ENGL 203, 210, 235, 236, 241 or 301; COMM 203 or 204.
6	Literature in English: ENGL 203 (unless 203 is used to satisfy the communication requirement), 212, 221, 222, 227, 228, 231, 232 or a course for which one of these listed courses is a prerequisite.
14	Foreign Language (14 hours or equivalent): Four-course sequence in French, German, Greek, Italian, Japanese, Latin, Russian, Spanish, unless permission is received from the American Studies coordinator to substitute work in another language. This will not satisfy the college humanities and visual and performing arts requirement.
6	Mathematics: At least 3 hours must be in MATH (excluding 102, 103, 104, 130, 150, 165, 365, 366). Three hours may be selected from PHIL 240, 341 or 343.
8	Natural Sciences: Two or more courses; minimum of one course shall include a corresponding laboratory, to be selected from BIOL 107; BIOL 111; BIOL 101; CHEM 101, 103/113; GEOL 101; PHYS 201, 218; . The other course may be chosen from the preceding list or the approved list of courses in agronomy, anthropology, biology, chemistry, forest science, genetics, geography, geology, horticulture, meteorology, oceanography, physics, renewable natural resources and zoology. The approved list is available in the University Core Curriculum section of this catalog.
9	Humanities and Visual and Performing Arts: Selected from the approved list of courses in anthropology, architecture, classical studies, art history, environmental design (architectural history), English, French, German, history of landscape architecture, humanities (religious studies), linguistics, modern languages, philosophy, Russian, speech communication, Spanish, theatre arts. The approved list is available in the University Core Curriculum section of this catalog.
6	Social and Behavioral Sciences: Selected from the approved list of courses in such areas as anthropology, archaeology, economics, geography, journalism, political science, psychology, speech communication and sociology. The approved list is available in the University Core Curriculum section of this catalog.
6	Political Science: POLS 206 and 207.
*2	Kinesiology: KINE 198 Health and Fitness Activity and KINE 199 Required Physical Activity.
6	U.S. History: Two courses in U.S. history; no more than one course may be in Texas history.
3	International and Cultural Diversity: To be selected from approved list. This course may also be used to satisfy any other requirement.
128	total hours

* See page 21.

Curriculum in Anthropology

Anthropology is the study of humankind over the entire world and throughout time. With such a broad approach, anthropologists study existing cultures and human behavior (cultural anthropology), traditions (folklore), prehistoric cultures and lifeways (archaeology), the biological makeup and evolution of humans (physical anthropology), and the origin and nature of language (linguistics). The study of anthropology promotes an understanding of humankind and provides an introduction to the variety inherent in our biological and cultural heritage. Through the comparative study of the many diverse prehistoric and modern cultures of the world, we have a means of reaching a clearer understanding of ourselves and other people.

Anthropology majors receive foundations in all four subfields of anthropology and in-depth training in one of these subfields. In addition, majors receive a broad yet rigorous liberal arts education. The curriculum leading to a degree in anthropology provides students with the background necessary to pursue graduate studies in anthropology, but is well-rounded and flexible enough to allow students to pursue graduate studies in other disciplines. Employment opportunities include careers in: teaching and research in college, university, museum and foundation settings; administration and research in local, state and federal governments (such as the National Park Service, Bureau of Indian Affairs, National Institute of Health and others); foreign service with government agencies (such as the Agency for International Development, United Nations organizations and others); private archaeological research institutions; secondary schools that are adding anthropology to their curricula; and nontraditional opportunities emerging in business and management. Anthropology offers diverse career opportunities and is an expanding and dynamic field that is relevant to many fields of study.

Anthropology. 31 hours required; 12 hours must be in residence; 12 hours must be in upper-division courses. A grade of C or higher is required for a course to count in the major.

Minor Field of Study. All anthropology majors may select a minor field of study from departments or divisions within or outside the College of Liberal Arts or in a particular area of interest (as with interdisciplinary minors or career opportunity minors). The minor will consist of 15–18 hours of course work, no more than 9 of which may be at the lower-division level. A grade of C or higher is required if a course is to count in the minor. A minor must be declared before the student has completed 75 credit hours. Interdisciplinary minors such as women's studies, classical studies, religious studies, and business have specific requirements; students should consult the Undergraduate Student Services Office in the College of Liberal Arts for details.

Other Departmental Requirements. STAT 302 or 303.

College and University Requirements. Other courses may qualify for this category. Students should consult the approved lists of courses available in the Undergraduate Student Services Office in the College of Liberal Arts. The following list incorporates University Core Curriculum requirements. No course can be counted in more than one category. To promote the opportunity for anthropology majors to acquire a broad educational experience, anthropology students must satisfy their University requirements for humanities, social and behavioral sciences, and the sciences with courses other than those offered by anthropology.

Students must complete a minimum of 36 hours of 300- or 400-level course work at Texas A&M University.

Anthropology Requirements

Credit	Course
3	ANTH 202 Introduction to Archaeology
3	ANTH 210 Social and Cultural Anthropology
4	ANTH 225 Biological Anthropology
3	ANTH 410 Anthropological Theory
3	ANTH 415 Anthropological Writing
3	Anthropology elective (archaeology) 300- or 400-level
3	Anthropology elective (cultural) 300- or 400-level
3	Anthropology elective (physical) 300- or 400-level
<u>6</u>	Anthropology electives (at least one course 300- or 400-level)
31	

Minor Requirements

Credit	
(15–18)	Not Required

Other Departmental Requirements

Credit	Course
<u>3</u>	STAT 302 or 303
3	

College and University Requirements

Credit	Category
3	ENGL 104 Composition and Rhetoric.
3	Communication: One course chosen from ENGL 203, 210, 241, 301 or 325; COMM 203 or 243.
6	Literature in English (6 hours): To be selected from ENGL 203 (unless 203 is used to satisfy the communication requirement), 212, 221, 222, 227, 228, 231, 232 or courses for which one of these listed courses is a prerequisite.
14	Foreign Language: Four-course sequence in French, German, Russian, Spanish, Italian, Greek, Chinese, Japanese, Arabic or Latin unless permission is received from the department head to substitute work in another language.
6	Mathematics: At least 3 hours must be in MATH (excluding 102, 103, 104, 130, 150, 165, 365, 366); 3 hours may be in logic.
8	Natural Sciences: To be selected from natural science courses approved for the University Core Curriculum (excluding ANTH 225).
6	Humanities and Visual and Performing Arts: To be selected from the approved list of courses in the University Core Curriculum section of this catalog. No anthropology course will satisfy this requirement (take at least one upper-level course).
6	Social and Behavioral Sciences: To be selected from the approved list of courses in the University Core Curriculum section of the catalog. No anthropology course will satisfy this requirement (take at least one upper-level course).
6	Political Science: POLS 206 and 207.
6	U.S. History: Two courses in American history; no more than one course may be in Texas history.
(6)	International and Cultural Diversity: To be selected from approved list. These courses may also be used to satisfy any other requirement.
*2	Kinesiology: KINE 198 Health and Fitness Activity and KINE 199 Required Physical Activity.
20	Electives: Minimum of 3 hours if 18-hour minor; minimum of 5 hours if 15-hour minor; minimum of 20 hours if no minor. Anthropology courses may not be used as elective hours. (Take at least three courses upper level.)
<hr/> 120	total hours

* See page 21.

Curriculum in Communication

Communication is concerned with one of the most distinctly human characteristics: the use of spoken language to communicate information, maintain social contact, and influence others. The Bachelor of Arts degree in Communication provides instruction in both the principles of effective communication and the application of those principles in a variety of communication situations. Communication is an attractive major because it provides students with a broad liberal arts education, while at the same time focusing on vital communication skills which are much in demand in the working world. Those communication skills include oral presentation skills, such as public speaking, argumentation, and technical communication, as well as other communication skills, such as small group interaction, interviewing and communication technology.

Degree requirements include the study of rhetorical and communication theories, the study of communication research methods, and the use of those theories and research methods in a variety of communication contexts. Such contexts include health communication, intercultural communication, interpersonal communication, mass media and new communication technologies, organizational communication, political rhetoric, religious communication, and others.

The career interests of communication majors vary. Some students pursue advanced degrees in communication, law, business, or religion. Others take communication-related positions in marketing and sales, training and human resources, public relations, communication media, and related areas of business, industry, government, and non-profit organizations. Still others prepare for teaching careers.

Teaching Certification

Students desiring certification to teach communication in secondary schools of Texas may either major in communication (College of Liberal Arts) or in another field, but in either case, they must include the following courses in their degree plans: COMM 203, 210, 243, 301, 305, 315, 350, and 330 or 340 or 435; and THAR 407. Additional education courses are required. More complete information on the requirements for teacher certification may be found in the College of Education and Human Development section under secondary teacher certification.

Degree Requirements

The courses listed below are those required for a B.A. degree in Communication. Included in graduation requirements are the following stipulations: (1) a minimum of 2.0 GPR; (2) minimum grade of C in each course applied in the category “Major” (see below); and (3) minimum of 12 hours of upper-level COMM course work at Texas A&M.

Credit	Category
	MAJOR: 33 credit hours of COMM course work; minimum grade of C in each class; no more than 3 credit hours of COMM 484; no more than 3 credit hours of COMM 485.
3	One of the following courses: COMM 203 Public Speaking COMM 205 Communication for the Technical Professions COMM 243 Argumentation and Debate
3	One of the following courses: COMM 210 Group Communication and Discussion COMM 215 Interviewing: Principles and Practices COMM 230 Communication Technology Skills COMM 240 Rhetorical Criticism
3	COMM 301 Rhetoric in Western Thought (Should be completed by end of junior year)
3	COMM 305 Theories of Communication (Should be completed by end of junior year)
3	COMM 308 Research Methods in Communication (Should be completed by end of junior year)
6	COMM Electives at 300-level
6	COMM Electives at 401–480 (The following courses may not be used as 400-level COMM electives: COMM 454, 456.)
6	COMM Electives at any level from 100-level to 400-level (except COMM 454, 456). COMM 101 is required for in-coming freshmen in the Fall Semester of the freshman year.
6	Communication: ENGL 104 (with minimum grade of C), and a writing elective selected from: ENGL 203, 210, 235, 236, 241 or 301.
6	Literature in English: Two courses from ENGL 203, 212, 221, 222, 227, 228, 231, 232 or courses for which one of these listed courses is a prerequisite. Note: ENGL 203 will count toward the Communication requirement or the Literature in English requirement, but not both.
6	Mathematics: At least 3 credit hours must be in mathematics (excluding MATH 102, 103, 150, 365 and 366); 3 credit hours may be in logic (PHIL 240, 341 or 342).
6	U.S. History: Two courses in U.S. history of which one course may be in Texas history.
6	Political Science: POLS 206 and 207.
8	Natural Sciences: Minimum of 1 credit hour of laboratory science. Select only courses approved in the University Core Curriculum section of this catalog.
9	Humanities and Visual and Performing Arts: 3 credit hours in humanities; 3 credit hours in visual and performing arts; and 3 credit hours in either humanities or performing arts. Select only courses approved in the University Core Curriculum section of this catalog. A student in the Communication B.A. Degree Program may not use a COMM course to fulfill this requirement.
6	Social and Behavioral Sciences: Two courses to be selected from the list in the University Core Curriculum section of this catalog. A student in the Communication B.A. Degree Program may not use a COMM course to fulfill this requirement.
(6)	International and Cultural Diversity: Two courses selected from the course list in the University Core Curriculum section of this catalog. These courses may also be used to satisfy any other requirement.
14	Foreign Language: Most students will take a four-course sequence totaling 14 credit hours. Some students may take fewer hours, depending on their prior proficiency in the language as demonstrated on a placement test. Must be in the same language; may not skip courses in the sequence. To be selected from French, German, Greek, Italian, Japanese, Latin, Russian, Spanish, or another language if approved by the department head.

Credit	Category
2	Kinesiology: KINE 198 Health and Fitness Activity and KINE 199 Required Physical Activity. (KINE 199 must be taken S/U.)
15-18	Minor: Must be selected from sequences approved by the College of Liberal Arts (except: a student majoring in speech communication cannot select a minor offered by the Department of Communication). No more than 9 credit hours may be at the lower-division (100 and 200) level. A minimum grade of C is required in each course applied to the minor. A minor must be declared before a student completes 75 credit hours.
0-3	General Electives. COMM courses may not be used. Maximum of 9 credit hours of any combination of military science and physical activity courses.
120	total hours

Curricula in Telecommunication Media Studies

Telecommunication Media Studies focuses on media industries, technologies, and communication systems in cultural and historical contexts, their audience processes and effects, and social implications of the media.

The Telecommunication Media Studies major provides students with tools for understanding the media and their roles in social life theoretically, historically and critically. The degree allows students to choose a broadly based communication and media studies major or a more specialized study of telecommunication and information systems. The BA and BS are both available. The BA is a more flexible, liberal arts oriented degree; the BS is more directed and requires courses in Engineering Technology and Computer Science or Information and Operations Management. Students in both the BA and BS can choose Communication courses that address media industries, law and policy, technology and society, media audiences, processes, and effects, and the theory, history, and criticism of media, culture, and communication.

A degree in Telecommunication Media Studies may be useful in a broad variety of careers, from media and telecommunication industries, through communication-related positions in business, government, or non-profit organizations, to higher education. The curriculum is designed to educate citizens for a productive future in a changing world. Our students may become industry leaders, government regulators, spokespeople, politicians, writers, artists, activists, and informed citizens.

Bachelor of Arts

Telecommunication Media Studies. 34 credit hours. Students take 19 credit hours of required program core courses and 15 credit hours of telecommunication elective courses. At least 12 credits must be at the upper-division level. At least 12 credits must be taken in residence at Texas A&M University. Minimum grade of C in each course. No more than 3 credit hours of COMM 484; no more than 3 credit hours of COMM 485.

Program Core Course Requirements:

Credit	Course
3	COMM 308 Research Methods in Communication
3	COMM 350 Theories of Mediated Communication
4	ENTC 215 Introduction to Telecommunication
3	Communication and Society (select one of the following):
	COMM 101 Introduction to Communication
	COMM 330 Technology and Human Communication
	COMM 360 Cultural History of the Media
	COMM 375 Media Audiences
	ENTC 325 Telecommunications Services Analysis
	GEOG 433 Geography of Communication
	JOUR 102 American Mass Media
6	Telecommunication/Media: History, Economics, Policy, Law (select two of the following):
	COMM 345 Media Industries
	COMM 354 Political Economy of Telecommunication
	COMM 365 International Communication
	COMM 454 Telecommunication Policy
	COMM 458 Global Media
	JOUR 301 Mass Communication, Law, and Society/COMM 307 Mass Communication, Law and Society

Telecommunication Media Studies Elective Courses for the B.A. Degree. The B.A. student will select 15 credit hours from the list below and from any of the courses listed above that have not been selected to meet program core requirements. Students should confirm that they have completed any prerequisites prior to enrolling in a course.

COMM 101 Introduction to Communication
 COMM 210 Group Communication and Discussion
 COMM 230 Communication Technology Skills
 **COMM 289 Special Topics in . . .
 COMM 305 Theories of Communication
 COMM 320 Organizational Communication
 COMM 325 Persuasion
 COMM 330 Technology and Human Communication
 COMM 335 Intercultural Communication
 COMM 340 Communication and Popular Culture
 COMM 345 Media Industries

COMM 354 Political Economy of Telecommunication
 COMM 360 Cultural History of the Media
 COMM 365 International Communication
 COMM 375 Media Audiences
 COMM 410 Radio, Records and Popular Music
 COMM 415 New Media and Civil Society
 COMM 435 Rhetoric of Television and Film
 COMM 447 Communication, Group Processes and Collaboration
 COMM 450 Media Campaigns
 COMM 454 Telecommunication Policy
 COMM 456 Telecommunication and Media Management
 COMM 458 Global Media
 **COMM 484 Internship in Communication
 **COMM 485 Directed Studies
 **COMM 489 Special Topics in . . .
 **COMM 497 Independent Honors Studies
 CPSC 110 Programming I
 CPSC 203 Introduction to Computing
 CPSC 206 Structured Programming in C
 EHRD 472 Television Production Techniques for Distance Learning
 EHRD 474 Distance Networking for Training and Development
 ENGL 251 Language of Film
 ENTC 315 Local-and-Metropolitan-Area Networks
 ENTC 325 Telecommunications Services Analysis
 FILM 201 Introduction to Film Analysis
 GEOG 433 Geography of Communication
 *INFO 209 Business Information Systems Concepts
 *INFO 210 Fundamentals of Information Systems
 INFO 250 Business Programming Logic and Design
 INFO 306 Data Communications and Network-Based Systems
 INFO 322 Business Object Oriented Programming with Java
 INFO 328 Database Management Systems
 INFO 422 Complex Business Application Design
 JOUR 102 American Mass Media
 JOUR 301 Mass Communication, Law and Society
 MGMT 209 Business, Government, and Society
 MGMT 309 Survey of Management
 POLS 302 Mass Media and Politics
 POLS 313 Public Opinion

At least 6 hours must be chosen from Writing Intensive courses in COMM.

College and University Requirements. The following courses satisfy College of Liberal Arts and University Core Curriculum requirements. Complete lists of acceptable courses for each area are available from the Coordinator of Undergraduate Advising in the Department of Communication, and from the College of Liberal Arts Undergraduate Advising Office.

Credit	Category
6	Communication: ENGL 104 and one course from ENGL 203, 210, 235, 236, 241 or 301, COMM 203 or 243.
6	Literature in English: Two courses from ENGL 203, 212, 221, 222, 227, 228, 231, 232 or courses for which one of these listed courses is a prerequisite. Note: ENGL 203 will count toward the Communication requirement or the Literature in English requirement, but not both.
14	Foreign Language: Most students will take a four-course sequence totaling 14 credit hours in the same language. Some students may take fewer hours, depending on their prior proficiency in the language. To be selected from French, German, Greek, Italian, Japanese, Latin, Russian, Spanish, or another language if approved by the department head.
6	Mathematics: At least 3 credit hours must be in mathematics (excluding MATH 102, 103, 150, 365 and 366); 3 credit hours may be in logic (PHIL 240, 341 or 342).
8	Natural Sciences: PHYS 201 and PHYS 202.
9	Humanities and Visual and Performing Arts: Three courses to be selected from the course list in the University Core Curriculum section of this catalog. One course must be in the humanities; one course must be in visual and performing arts; the third course may be either in the humanities or in the visual and performing arts. A student in the Telecommunication Media Studies B.A. degree program may not use a COMM course to fulfill this requirement.
6	Social and Behavioral Sciences: ECON 202 and a 3-credit course selected from the course list in the University Core Curriculum section of this catalog. A student in the Telecommunication Media Studies B.A. degree program may not use a COMM course to fulfill this requirement.
12	U.S. History and Political Science: POLS 206 and 207 and two courses in U.S. history. One of the history courses may be in Texas history.
(6)	International and Cultural Diversity: Two courses selected from the course list in the University Core Curriculum section of this catalog. These courses may also be used to satisfy any other requirement.
2	Kinesiology: KINE 198 Health and Fitness Activity and KINE 199 Required Physical Activity. (KINE 199 must be taken S/U.)
15-18	Minor: Must be selected from sequences approved by the College of Liberal Arts (except: a student majoring in telecommunication media studies cannot select a minor offered by the Department of Communication). No more than 9 credit hours may be at the lower-division (100 and 200) level. A minimum grade of C is required in each course applied to the minor. A minor must be declared before a student completes 75 credit hours.
0-3	General Electives. COMM courses may not be used. Maximum of 9 credit hours of any combination of military science and physical activity courses.
<u>120</u>	total hours

*A student may not take both INFO 209 and INFO 210. INFO 209 will not fulfill the prerequisite requirements for subsequent INFO courses, while INFO 210 is a prerequisite for subsequent INFO courses.

** These courses may be applied to a student's degree plan for the B.A. in Telecommunication Media Studies only with the approval of the coordinator for undergraduate advising for communication.

Bachelor of Science

Telecommunication Media Studies. 32-34 credit hours. Students take 23 credit hours of required program core courses and 9-11 credit hours of telecommunication media studies elective courses. At least 12 credits must be at the upper-division level. At least 12 credits must be taken in residence at Texas A&M University. Minimum grade of C in each course. No more than 3 credit hours of COMM 484; no more than 3 credit hours of COMM 485.

Program Core Course Requirements:

Credit	Course
3	COMM 350 Theories of Mediated Communication
4	ENTC 215 Introduction to Telecommunication
4	ENTC 315 Local-and-Metropolitan-Area Networks
3	ENTC 325 Telecommunications Services Analysis
3	Communication and Society (select one of the following): COMM 101 Introduction to Communication COMM 330 Technology and Human Communication COMM 360 Cultural History of the Media COMM 375 Media Audiences GEOG 433 Geography of Communication JOUR 102 American Mass Media
6	Telecommunication/Media: History, Economic, Policy, Law (select two of the following): COMM 345 Media Industries COMM 354 Political Economy of Telecommunication COMM 365 International Communication COMM 454 Telecommunication Policy COMM 458 Global Media JOUR 301 Mass Communication, Law and Society/COMM 307 Mass Communication, Law and Society



Telecommunication Media Studies Elective Courses for the B.S. Degree:

Credit	Course
3-4	Information Technology Design and Management (select one of the following): Note: Programming courses are indicated with an asterisk (*) CPSC 110 Programming I* CPSC 203 Introduction to Computing* CPSC 206 Structured Programming in C* INFO 250 Business Programming Logic and Design* INFO 306 Data Communications and Network-Based Systems INFO 322 Business Object Oriented Programming with Java* INFO 328 Database Management Systems INFO 422 Complex Business Application Design*
6-7	The B.S. student will select 6-7 credit hours from the list below and/or from any of the courses listed above that have not been selected to meet other program requirements. Students should confirm that they have completed any prerequisites prior to enrolling in a course. COMM 101 Introduction to Communication COMM 210 Group Communication and Discussion COMM 230 Communication Technology Skills **COMM 289 Special Topics in . . . COMM 305 Theories of Communication COMM 320 Organizational Communication COMM 330 Technology and Human Communication COMM 335 Intercultural Communication COMM 340 Communication and Popular Culture COMM 345 Media Industries COMM 354 Political Economy of Telecommunication COMM 360 Cultural History of the Media COMM 365 International Communication COMM 375 Media Audiences COMM 410 Radio, Records and Popular Music COMM 415 New Media and Civil Society COMM 447 Communication, Group Processes and Collaboration COMM 454 Telecommunication Policy COMM 456 Telecommunication and Media Management COMM 458 Global Media **COMM 484 Internship in Communication **COMM 485 Directed Studies **COMM 489 Special Topics in . . . **COMM 497 Independent Honors Studies CPSC 110 Programming I CPSC 203 Introduction to Computing CPSC 206 Structured Programming in C EHRD 472 Television Production Techniques for Distance Learning EHRD 474 Distance Networking for Training and Development GEOG 433 Geography of Communication INFO 250 Business Programming Logic and Design INFO 306 Data Communications and Network-Based Systems INFO 322 Business Object Oriented Programming with Java INFO 328 Database Management Systems INFO 422 Complex Business Application Design

Credit	Course
	JOUR 102 American Mass Media
	JOUR 301 Mass Communication, Law, and Society
	MGMT 209 Business, Government, and Society
	MGMT 309 Survey of Management

At least 6 hours must be chosen from Writing Intensive courses in COMM.

College and University Requirements. The following courses satisfy College of Liberal Arts and University Core Curriculum requirements. Complete lists of acceptable courses for each area are available from the Coordinator of Undergraduate Advising in the Department of Communication, and from the College of Liberal Arts Undergraduate Advising Office.

Credit	Category
6	Communication: ENGL 104 and one course from ENGL 203, 210, 235, 236, 241 or 301, or COMM 203 or 243.
6	Literature in English: Two courses from ENGL 203, 212, 221, 222, 227, 228, 231, 232 or courses for which one of these listed courses is a prerequisite. Note: ENGL 203 will count toward the Communication requirement or the Literature in English requirement, but not both.
12	Quantitative Skills: INFO 210, STAT 303, STAT 307 and either CPSC 203 or INFO 250 or SOCI 220. (May not use the course the student takes to fulfill the "Information Technology Design and Management" degree requirement.)
6	Mathematics: At least 3 credit hours must be in mathematics (excluding MATH 102, 103, 150, 365 and 366); 3 credit hours may be in logic (PHIL 240, 341 or 342).
8	Natural Sciences: PHYS 201 and PHYS 202.
9	Humanities and Visual and Performing Arts: Three courses to be selected from the course list in the University Core Curriculum section of this catalog. One course must be in the humanities; one course must be in visual and performing arts; the third course may be either in the humanities or in the visual and performing arts. A student in the Telecommunication Media Studies B.S. degree program may not use a COMM course to fulfill this requirement.
6	Social and Behavioral Sciences: ECON 202 and a 3-credit course selected from the course list in the University Core Curriculum section of this catalog. A student in the Telecommunication Media Studies B.S. degree program may not use a COMM course to fulfill this requirement.
12	U.S. History and Political Science: POLS 206 and 207 and two courses in U.S. history. One of the history courses may be in Texas history.
(6)	International and Cultural Diversity: Two courses selected from the course list in the University Core Curriculum section of this catalog. These courses may also be used to satisfy any other requirement.
2	Kinesiology: KINE 198 Health and Fitness Activity and KINE 199 Required Physical Activity. (KINE 199 must be taken S/U.)
15-18	Minor: Must be selected from sequences approved by the College of Liberal Arts (except: a student majoring in telecommunication media studies cannot select a minor offered by the Department of Communication). No more than 9 credit hours may be at the lower-division (100 and 200) level. A minimum grade of C is required in each course applied to the minor. A minor must be declared before a student completes 75 credit hours.
1-6	General Electives. COMM courses may not be used. Maximum of 9 credit hours of any combination of military science and physical activity courses.
120	total hours

** These courses may be applied to a student's degree plan for the B.S. in Telecommunication Media Studies only with the approval of the coordinator for undergraduate advising for communication.

Curricula in Economics

Economics involves the study of how people—as consumers, workers and managers—make decisions about money and resources and the results of these decisions at the local, national and international levels. Thus, economics is about such current issues as inflation, unemployment, monopoly, pollution, protectionism, poverty, the government deficit and tax reform.

The curriculum in economics gives students the opportunity to combine the breadth of a liberal arts education with sound preparation for careers in economics, business or law. Course work in economics carefully integrates theory with practical applications, examining the role of economic analysis in business and public policy decisions. Economics teaches students how to think concisely and systematically about problems—and how to solve them.

Both the Bachelor of Science and the Bachelor of Arts degrees are offered. Each curriculum combines economics with course work in mathematics, statistics and accounting to develop the student's analytical and quantitative skills. Students may select a minor or area of concentration in a second area of study. Students can choose to place additional emphasis on liberal arts such as a foreign language, history, journalism, political science or psychology. Alternatively, students can opt for a more business-oriented degree by electing an emphasis in such areas as accounting, business analysis, computer science or finance.

The Department of Economics participates actively in the University Honors Program. Honors sections of ECON 202 and 203 are scheduled regularly. For more details, please see the University Honors Program section in this catalog.

Teacher Certification

Students desiring certification to teach economics as either a first or second teaching field in secondary schools of Texas must meet special additional requirements. Required courses will include ECON 202, 203, 311, 323, 410. Nine hours of electives must be selected from ECON 312, 319, 320, 324, 330, 412, 415, 418, 420, 425, 426, 435, 440, 452, 453, 459, 465, 489 and ECMT 463. More complete information on the requirements for teacher certification may be found under the College of Education and Human Development section under secondary teacher certification.

Five-Year Joint Degree Program

Pending approval of the Texas Higher Education Coordinating Board

The Economics Department, in conjunction with the Bush School of Government and Public Service, offers a joint degree program that enables students to receive both their Economics undergraduate degree and a Master of Public Service and Administration (MPSA) graduate degree or a Master of International Affairs (MPIA) graduate degree in five years. Students admitted into this program will be enrolled in Bush School graduate courses with an undergraduate classification for the fall of their fourth year and will be reclassified as degree seeking master's degree students upon completing 108 credit hours, typically in the following semester. These credit hours must include all specific course prerequisites either for a Bachelor of Arts or Bachelor of Science degree in Economics, as well as the courses required by the College of Liberal Arts and by Texas A&M University for an undergraduate degree. Students will be required to complete the same two-year, 48-hour curriculum as other students admitted to the Bush School's MPSA program.



Bachelor of Arts

Economics. 30 credits; no more than 30 credits in economics can be applied to this degree. A grade of C or higher is required for a course to be counted in the major field. **NOTE:** Credit for ECON 322 **may not** be applied toward an economics major.

Credit	Course
3	ECON 202 Principles of Economics
3	ECON 203 Principles of Economics
3	ECON 323 Microeconomic Theory
3	ECON 410 Macroeconomic Theory
3	ECON 319 Economic Development of U.S., ECON 320 Economic Development of Europe, ECON 330 Economic Development or ECON 452 International Trade Theory and Policy.
15	Economics electives

Minor Field of Study (optional). 15 credits; all economics majors may select a minor field of study from departments or divisions within or outside of the College of Liberal Arts or in a particular area of interest (as in the case of interdisciplinary minors). The minor will consist of a minimum of 15 hours of course work, 9 hours of which must be in advanced (300- or 400-level) courses, and no more than 6 hours from the minor may be used to fulfill other requirements. A grade of C or higher is required if a course is to be counted toward the minor. **A minor must be declared before the student has completed 75 credit hours.** Interdisciplinary minors such as women's studies, classical studies, religious studies, and business have specific requirements; students should consult the Undergraduate Student Services Office in the College of Liberal Arts for details. A second major may substitute for the minor.

Departmental Requirement: 3 credits.

Credit	Course
3	ACCT 209 Survey of Accounting Principles or ACCT 229 Introductory Accounting

College and University Requirements. Other courses may qualify for the following categories. Students should consult the approved list of courses available in the Undergraduate Student Services Office in the College of Liberal Arts. The following lists incorporate University Core Curriculum requirements. No course can be counted in more than one category.

Credit	Category
6	Communication: ENGL 104 Composition and Rhetoric and one course chosen from: ENGL 203, 210, 235, 236, 241 or 301; COMM 203 or 243.
6	Literature in English: To be selected from ENGL 203 (unless 203 is used to satisfy the communication requirement), 212, 221, 222, 227, 228, 231, 232 or courses for which one of these listed courses is a prerequisite.
14	Foreign Language: Four-course sequence in French, German, Greek, Italian, Japanese, Latin, Russian or Spanish unless permission is received from the department head to substitute work in another language. This will not satisfy the college humanities and visual and performing arts requirement.
3	MATH 141 Business Mathematics I (3 hrs.)
3	MATH 131 Mathematical Concepts—Calculus (3 hrs.) or MATH 151 Engineering Mathematics I (4 hrs.) or MATH 142 Business Mathematics II (3 hrs.) Any one of these courses satisfies 3 hours of the College of Liberal Arts and the University Core Curriculum requirement for mathematics.
3	PHIL 240 Introduction to Logic. This course satisfies 3 hours of the College of Liberal Arts and the University Core Curriculum requirement for mathematics or INFO 209 Business Information Concepts.
3	STAT 303 Statistical Methods or STAT 211 Principles of Statistics I. Note: The prerequisite for STAT 211 is MATH 152 or 172.
6	U.S. History: One course in U.S. history and one course in either U.S. history or Texas history.
6	Political Science: POLS 206 and POLS 207.
6	Social and Behavioral Sciences: Courses should be selected from the approved list of courses in the University Core Curriculum section of the catalog.
9	Humanities and Visual and Performing Arts: Courses should be selected from the approved list of courses in the University Core Curriculum section of the catalog.
8	Natural Sciences: Two or more courses, a minimum of one course shall include a corresponding laboratory. Courses should be selected from the approved list of courses in the University Core Curriculum section of the catalog.
(3)	International and Cultural Diversity: To be selected from approved list. This course may also be used to satisfy any other requirement.
*2	Kinesiology: KINE 198 Health and Fitness Activity and KINE 199 Required Physical Activity.
12	Free Electives: The student may select any courses other than economics courses as free electives. No more than nine credits of any combination of military, air or naval science and physical activity will be allowed to count as electives. If a computer science course is needed to satisfy the University Core Curriculum requirement, it may be counted as an elective. Any math credits greater than 6 will be counted as free electives. The number of elective hours varies depending on whether or not the student chooses to complete a minor field of study. (Economics courses may not be used as elective hours.)
120	total hours

* See page 21.

Bachelor of Science

Economics. 33 credits; no more than 33 credits in economics can be applied to this degree. A grade of C or higher is required for a course to be counted in the major field. **NOTE:** Credit for ECON 322 **may not** be applied toward an economics major.

Credit	Course
3	ECON 202 Principles of Economics
3	ECON 203 Principles of Economics
3	ECON 323 Microeconomic Theory
3	ECON 410 Macroeconomic Theory
3	ECON 319 Economic Development of U.S., ECON 320 Economic Development of Europe, ECON 330 Economic Development or ECON 452 International Trade Theory and Policy
3	ECMT 463 Introduction to Econometrics. This course satisfies 3 hours of the College of Liberal Arts and the University Core Curriculum requirement for mathematics.
15	Economics electives

Minor Field of Study (optional). 18 credits; all economics majors may select a minor field of study from departments or divisions within or outside of the College of Liberal Arts or in a particular area of interest (as in the case of interdisciplinary minors). The minor will consist of a minimum of 18 hours of course work, 9 hours of which must be in advanced (300- or 400-level) courses, and no more than 6 hours from the minor may be used to fulfill other requirements. A grade of C or higher is required for a course to be counted in the minor field. **A minor field must be declared before the student has completed 75 credit hours.** Interdisciplinary minors such as women's studies, classical studies, religious studies and business have specific requirements; students should consult the Undergraduate Student Services Office in the College of Liberal Arts for details. A second major may substitute for the minor.

Departmental Requirements: 6 credits.

Credit	Course
3	ACCT 209 Survey of Accounting Principles or ACCT 229 Introductory Accounting
3	ACCT 210 Survey of Managerial and Cost Accounting Principles or ACCT 230 Introductory Accounting

College and University Requirements. Other courses may qualify for the following categories. Students should consult the approved list of courses available in the Undergraduate Student Services Office in the College of Liberal Arts. The following lists incorporate University Core Curriculum requirements. No course can be counted in more than one category.

Credit	Category
6	Communication: ENGL 104 Composition and Rhetoric and one course chosen from ENGL 203, 210, 235, 236, 241 or 301; COMM 203 or 243.
6	Literature in English: To be selected from ENGL 203 (unless 203 is used to satisfy the communication requirement), 212, 221, 222, 227, 228, 231, 232 or courses for which one of these listed courses is a prerequisite.
3	CPSC 203 Introduction to Computing or INFO 209 Business Information Systems Concepts.
3	MATH 141 Business Mathematics I (3 hrs.)
3	MATH 131 Mathematical Concepts—Calculus (3 hrs.) or MATH 151 Engineering Mathematics I (4 hrs.) or MATH 142 Business Mathematics II (3 hrs.) Any one of these courses satisfies 3 hours of the College of Liberal Arts and the University Core Curriculum requirement for mathematics.
3	STAT 303 Statistical Methods or STAT 211 Principles of Statistics I. Note: The prerequisite for STAT 211 is MATH 152 or 172.
6	U. S. History: One course in U.S. history and one course in either U.S. history or Texas history.
6	Political Science: POLS 206 and POLS 207.
6	Social and Behavioral Sciences: Courses should be selected from the approved list of courses that is available from the Undergraduate Student Services Office in the College of Liberal Arts.
9	Humanities and Visual and Performing Arts: Courses should be selected from the approved list of courses that is available from the Undergraduate Student Services Office in the College of Liberal Arts.
8	Natural Sciences: Two or more courses, a minimum of one course shall include a corresponding laboratory. Courses should be selected from the approved list of courses available from the Undergraduate Student Services Office in the College of Liberal Arts.
(3)	International and Cultural Diversity: To be selected from approved list. This course may also be used to satisfy any other requirement.
*2	Kinesiology: KINE 198 Health and Fitness Activity and KINE 199 Required Physical Activity.
20	Free Electives: The student may select any courses (not counting ENGL 103), other than economics courses as free electives. No more than 9 credits of any combination of military, air or naval science and physical activity will be allowed to count as electives. If language courses are needed to satisfy the University Core Curriculum requirement, they may be counted as electives. Any math credits greater than 6 will be counted as free electives. The number of elective hours varies depending on whether the student chooses to complete a minor field of study. (Economics courses may not be used as elective hours.)
120	total hours

* See page 21.

Curriculum in English

The study of English language and literature is central to an understanding of our culture and our relationship to it. Mastery of the English language is essential to all of us at Texas A&M, no matter what our interests or profession. An awareness of our heritage as it is embodied in great literary works provides us with a sense of the traditions, ideas, and rhetorics that have shaped us and our world; and it enables us to define ourselves and our values in relation to this valued past. The Department of English offers students an opportunity to explore our linguistic and literary inheritance. Courses are offered in British literature, American literature, rhetoric and composition, creative writing, literary criticism, linguistics, and film. Students can discover the roots of the English language or learn about the latest linguistic theories. They can acquire the skills necessary to be a technical writer and editor or begin to learn the craft of writing poetry and fiction. They can immerse themselves in literature from Beowulf to Virginia Woolf, from Captain John Smith to Toni Morrison; and they can explore the extensions and challenges to tradition found in women's writing, ethnic literature, and postmodernist experimentation. Students also may explore literature in relation to the other arts and religion and culture, and investigate the global through studies in Africana and postcolonial literature. The flexibility of the degree in English and the options available in the department enable students to pursue their own interests while acquiring important analytic and writing skills and discovering the riches of our literary heritage.

English graduates, with relevant minors or specialized courses outside English, may pursue careers in technical writing, editing and publishing, government service, public relations, personnel work, and advertising or administrative positions in business and industry. The program in English also provides excellent preparation for later professional training in law, medicine, business and the ministry, as well as for graduate work in the humanities, including English. Supported by work in the College of Education and Human Development, the English program also may lead to careers in teaching or educational administration.

Requirements

English. 33 credits in English can be applied to the degree; at least 21 credits must be in literature. A grade of C or higher is required for a course to be counted in the major.

All majors must take the following courses:

Credit	Courses
3	ENGL 104 Composition and Rhetoric
3	ENGL 203, 210, 235, 236, 241, 301
3	ENGL 231 Survey of English Literature I

All majors must take courses in the following categories:*

Credit	Courses
3	From ENGL 227 American Literature: Colonial to American Renaissance, ENGL 228 American Literature: Civil War to Present, ENGL 232 Survey of English Literature II
9	From 300-level courses, in consultation with an advisor
6	From ENGL 412, 414, 415, 431
3	ENGL 481 Senior Seminar
3	English elective

*In selecting these courses, majors should be certain that they have at least two courses in British literature, one of which must cover material prior to 1800 at the 300- or 400-level, and at least two courses in American literature. One course must be Shakespeare. Majors must complete two courses formally designated as writing intensive as well as one inquiry course.

College and University Requirements. The following lists incorporate University Core Curriculum requirements. No course can be counted in more than one category.

Credit	Courses
3	ENGL 104 Composition and Rhetoric (fulfilled by major requirements).
3	Communication (3 hours): One course chosen from: ENGL 203, 210, 235, 236, 241 or 301; COMM 203 or 243.
6	Literature in English (6 hours): To be selected from ENGL 203 (unless 203 is used to satisfy the communication requirement), 212, 221, 222, 227, 228, 231, 232, or courses for which one of these listed courses is a prerequisite.
14	Foreign Language (14 hours or equivalent): Four-course sequence in French, German, Russian, Spanish, Italian, Japanese, Greek, or Latin unless permission is received from the department head to substitute work in another language. This will not satisfy the college humanities and visual and performing arts requirement.
6	At least 3 hours must be in MATH (excluding 102, 103, 104, 130, 150, 365, 366). Three hours may be in logic.
8	Natural Sciences: Two or more courses; minimum of one course shall include a corresponding laboratory. Four hours to be selected from: BIOL 107; BIOL 111; BIOL 101; CHEM 101, 103/113; GEOL 101; PHYS 201, 218. Remaining hours to be selected from the above courses and/or the following: AGRO 301, 405; ANTH 225; BIOL 112; BIOL 225; CHEM 102, 104/114, 106/116, 222/242; FRSC 204; GENE 301, 310; GEOG 203/213; GEOL 106; HORT 201/202; ATMO 301, 304, 326; OCNB 251/252; PHYS 202, 208, 213, 219, 306/307; RENR 205/215; .
9	Humanities and Visual and Performing Arts: To be selected from the approved list under humanities and visual and performing arts in the University Core Curriculum.
6	Social and Behavioral Sciences: To be selected from social and behavioral science courses approved for the University Core Curriculum.
6	Political Science: POLS 206 and 207.
6	Two courses in U.S. history.
(3)	International and Cultural Diversity: To be selected from approved list. This course may also be used to satisfy any other requirement.
*2	Kinesiology: KINE 198 Health and Fitness Activity and KINE 199 Required Physical Activity.
15–18	Minor Field of Study for those who select a minor.
<u>12–15</u>	Minimum Number of Free Electives (English courses may not be used as elective hours.)
120	total hours

* See page 21.

The Literature Track

Over 70 percent of our English majors pursue the Literature Track. Students seeking certification at the secondary level generally employ the Literature Track as the foundation for their degrees. This track provides students with over 30 hours of intensive study in English language and literature courses, including ENGL 231—Survey of English Literature to 1800; ENGL 412—Studies in Shakespeare; and ENGL 481—Senior Seminar on a significant figure, movement, or issue in literature or rhetoric.

The Creative Writing Track

English majors who wish to focus their efforts in creative writing will follow the usual major requirements, but will take 9 hours of courses in creative writing (creative nonfiction, fiction, poetry or drama) for their English electives, selecting either a prose sequence (ENGL 235, 345, 347), a poetry sequence (ENGL 346, 348) or a mixture of genres. Students will complete a capstone course in creative writing offered as ENGL 481, Senior Seminar.

The Rhetoric Track

English majors who wish to concentrate their studies on the theory and practice of written communication may take the rhetoric track, by completing 15 hours of course work in writing and rhetoric including ENGL 353, 354 and 355, 12 hours of literature electives, and a senior seminar. Selections will be made in consultation with an English advisor or the Writing Programs Office.

Minor Field of Study

English majors are advised, but not required, to select a minor field of study. Students who elect to complete a minor should contact the department or program that offers the minor to determine the requirements for that minor. A grade of C or higher is required for a course to be counted in the minor field. A minor field must be declared before the student has completed 75 credit hours.

Teacher Certification Programs in English

Teacher Certification in English Language Arts/Reading. OPTION II (Secondary)

Students desiring certification by Option II to teach English language arts and reading in the secondary schools of Texas should consult an undergraduate English advisor as early as possible. Requirements include 36 semester hours in literature, language, reading, and rhetoric and composition (an optional 24–30 hours in a second teaching field is possible); and professional education courses.

Teacher Certification in English Language Arts and Reading. OPTION IV (Secondary)

Students desiring certification by Option IV to teach English language arts and reading in the secondary schools of Texas should consult an undergraduate English advisor as early as possible. Option IV, the English composite, consists of 57 semester hours in literature, language and language acquisition, rhetoric and composition, reading, theatre arts, speech communication, and journalism as well as professional education courses.

To complete initial secondary certification, students must qualify for admission to the post-baccalaureate program of the Department of Teaching, Learning and Culture. The program requires 24 hours of graduate courses applicable to the Master of Education degree, a full year of public school teaching and passing scores on all state-required examinations.

Degree and Certification Program for Middle School in English Language Arts/Reading

The Department of English offers a degree and certification program in English language arts/reading for prospective middle-school teachers. This program requires 39 hours of literature, linguistics, composition and rhetoric and 15 hours of reading along with an 18-hour professional education component.

All students seeking certification should consult the College of Education and Human Development and the section under secondary certification for additional information.

Professional Writing Certificate

The Professional Writing Certificate gives students 18 hours of intensive training in a broad range of communication skills. Students who are eligible for the minor in English with an emphasis in professional writing may not participate in the certification program. English majors (who cannot receive a minor in English) and students from majors which do not allow for a minor are eligible. Students who achieve a grade of B or better in all 18 hours of course work will receive a certificate signifying their successful completion of this training. Students should allow at least a year and a half to complete the courses, some of which are offered only once a year. Transfer courses, independent studies and credit by exam cannot be counted toward the 18 hours. Required courses include ENGL 210 or 301, 320, 241 and 355. With the help of the Writing Programs advisor, the student must also select two additional courses in rhetoric, communication or a related field.

Departmental Minors

The Department of English offers three minors. Students seeking to minor in English, Linguistics, or English with an emphasis in Professional Writing should consult with their advisor and with the Office of Undergraduate Studies in English.

Minor in English

- Total Credits Required: 18
- Required Course: 3 hours ENGL 104
- Electives: 15 hours in English distributed as follows:
 - 6 hours at the 200-level
 - 6 hours at the 300-level
 - 3 hours at the 400-level

Minor in Linguistics

- Total Credits Required: 18
- Required Course: 3 hours LING 209
- Electives: 15 hours in other linguistics courses. Students may substitute up to 6 hours of approved courses with other course prefixes.

Minor in English with an Emphasis in Professional Writing

Total Credits Required:	18
Required Courses:	3 hours ENGL 104 Composition and Rhetoric
	3 hours ENGL 210 Scientific and Technical Writing
	or
	ENGL 301 Technical Writing
3 hours.....	ENGL 320 Technical Editing and Writing
3 hours.....	ENGL 353 History of Rhetoric
3 hours.....	ENGL 354 Modern Rhetorical Theory
3 hours	ENGL 355 Rhetoric of Style

Curricula in European and Classical Languages and Cultures

The Department of European and Classical Languages and Cultures offers a wide range of courses at all levels of the undergraduate curriculum as part of its mission to advance, refine and disseminate knowledge of the languages, literatures and cultures of Europe, both ancient and modern. At present the following languages are taught: Classical Greek, French, German, Italian, Latin and Russian. The program is designed to offer students an introduction to the language, literature and culture of these language communities. Survey introductory courses are complemented by in-depth studies, providing opportunities to fulfill electives as well as to develop more specific interests of students of literature and culture. The department insists on a high competence in the language which is the basis for all other options. In addition to classes at the College Station campus, the department offers summer study programs for credit in France, Germany and Russia. Semester and full-year programs abroad are also available and encouraged.

Degree candidates in Classics, French, German and Russian are offered various options in addition to the major: a major in one foreign language with a minor in another field; a major in one foreign language with a minor in a second foreign language; a major in one foreign language with a major in a second foreign languages or another academic field. The department does not offer degrees in the other languages. Departmental and Interdisciplinary minors in which languages play an important role, such as the minor in Classical Studies, Hispanic Studies, Italian, or Comparative Cultural Studies are also important options. In general, the careful combination of foreign language skills with other curricula enhances preparation for careers in business, industry and government. Teaching certification is available to majors through the College of Education and Human Development. Consult the College of Education and Human Development section under secondary teacher certification for additional information.

Students will be required to complete, by course work or placement test, all 100- and 200-level courses in sequence (except FREN, GERM, RUSS 221 and 222, which are taken concurrently) before taking any upper-level course. **Once a student has received credit for a higher-level language course, the student is no longer eligible to receive credit for prerequisite courses.**

Curriculum in Classics

Thirty-one hours are required in the major field: 16 hours of foundational language courses in either Greek or Latin, plus 15 hours of Classical Studies courses. Up to 4 hours of first-year courses (100 level) in the foundational language may be applied toward major credit. Up to 8 hours of first-year courses (100 level) in the language not chosen for the foundational sequence may be applied toward general elective credit. Choose either Greek or Latin for the foundational language sequence.

Foundational language Greek: 16 hours required

Credit	4 hours at 100 (elementary) level:
4	CLAS 102 Beginning Greek II
Credit	3 hours at 200 (intermediate) level:
3	CLAS 211 Intermediate Greek
Credit	9 hours at 300 (advanced) level:
3	CLAS 311 Advanced Greek: New Testament
3	CLAS 312 Advanced Classical Greek (either CLAS 311 or 312 may be repeated for credit)

Foundational language Latin: 16 hours required

Credit	4 hours at 100 (elementary) level:
4	CLAS 122 Beginning Latin II
Credit	6 hours at 200 (intermediate) level:
3	CLAS 221 Intermediate Latin I
3	CLAS 222 Intermediate Latin II
Credit	6 hours at 300 (advanced) level:
3	CLAS 321 Advanced Latin Prose
3	CLAS 322 Advanced Latin Poetry

Classical Studies: 15 hours required. At least 6 hours must be in non-language courses (CLAS 330-499)

Credit 15 hours at 200, 300, and 400 level. Choose from:

CLAS 211 Intermediate Greek (only with Latin foundational sequence)
 CLAS 221 Intermediate Latin I (only with Greek foundational sequence)
 CLAS 222 Intermediate Latin II (only with Greek foundational sequence)
 CLAS 311 Advanced Greek: New Testament
 CLAS 312 Advanced Classical Greek
 CLAS 321 Advanced Latin Prose
 CLAS 322 Advanced Latin Poetry
 CLAS 330 Women in Ancient Greece and Rome
 CLAS 351 Classical Mythology
 CLAS 352 Greek and Roman Drama
 CLAS 353 Archaeology of Ancient Greece
 CLAS 354 Archaeology of Ancient Italy
 CLAS 361 Greek Literature in Translation
 CLAS 371 In Search of Homer and the Trojan War
 CLAS 372 Greek and Roman Epic
 CLAS 381 Ancient Athletics
 CLAS 426 The Ancient Greeks
 CLAS 428 The Roman Republic
 CLAS 429 The Roman Empire

Supporting Electives: 12 hours required from at least two different Departments. (Courses marked * are cross-listed with CLAS and cannot be taken to fulfill both the major and the supporting elective requirements.) Choose from:

ANTH 313	Historical Archaeology	*HIST/*WMST 330	Women in Ancient Greece and Rome
ANTH 316	Nautical Archaeology	HIST 331	Medieval Europe, 300 to 1300
ANTH 317	Introduction to Biblical Archaeology	*HIST 426	The Ancient Greeks
ANTH 351	Classical Archaeology	*HIST 428	The Roman Republic
*ANTH 353	Archaeology of Ancient Greece	*HIST 429	The Roman Empire
*ANTH 354	Archaeology of Ancient Italy	HUMA 303	Near Eastern Religions (unless taken as RELS 303)
ARCH 345	History of Building Technology		
ARCH 430	History of Ancient Architecture	LING 209	Introduction to Linguistics
ARCH 434	Sculpture and Painting in Ancient Architecture	LING 425	Introduction to Applied Linguistics
		PHIL 332	Social and Political Philosophy
ARTS 149	Art History Survey I	PHIL 410	Classical Philosophy
ARTS 335	The Art and Architecture of Rome	PHIL 411	Medieval Philosophy
ENGL 308	History of Literary Criticism	POLS 349	Early Political Thought
ENGL 353	History of Rhetoric	RELS 303	History of Christianity (unless taken as HUMA 303)
HIST 220	History of Christianity		

A 15-18 hour university-approved minor may be chosen to meet this requirement.

Curricula in French, German, Russian

French: 33 credits. The following courses are required:

- Credit 6 hours at the 200- (intermediate) level:**
- 3 FREN 201 Intermediate French I
or FREN 221 Field Studies I
 - 3 FREN 202 Intermediate French II
or FREN 222 Field Studies II
- Credit 18 hours at the 300-level (prerequisite for all courses: 202 or 222):**
- 3 FREN 300 Composition
 - 3 FREN 301 Culture and Civilization
 - 3 FREN 306 Technical and Business French
 - 3 FREN 311 Advanced Oral Expression
 - 3 FREN 321 Survey of French Literature I
 - 3 FREN 322 Survey of French Literature II
 - 3 FREN 336 Contemporary France
- Credit 9 hours of 300- and 400-level courses. At the 400-level choose from:**
- FREN 410 Seminar in French Literature
 - FREN 418 Seminar in French Civilization
 - FREN 425 French Film

German: 33 credits. The following courses are required:

- Credit 6 hours at the intermediate level:**
- 3 GERM 201 Intermediate German I or GERM 221 Field Studies I
 - 3 GERM 202 Intermediate German II or GERM 222 Field Studies II
- Credit 3 hours at the 300-level:**
- 3 GERM 310 Composition
- Credit 9 hours at the 300-level:**
- 3 GERM 305 German Literary Expression
 - 3 GERM 311 Conversation
 - 3 GERM 316 Advanced Business German
 - 3 GERM 321 German Culture and Civilization I
 - 3 GERM 322 German Culture and Civilization II
 - 3 GERM 334 German Drama
 - 3 GERM 362 The German Roaring '20s

Credit	15 hours at the 300- and 400- level. At the 400-level choose from:
3	GERM 417 The Weimar Republic as Paradigm for European Modernity
3	GERM 430 Seminar in German Literature and Culture
3	GERM 431 German Author and Genre Studies
3	GERM 432 Music in German Culture
3	GERM 434 Martin Luther and the Reformation in Germany
3	GERM 435 German Film
3	GERM 436 German Fairy Tales

Credit At least 3 hours at the 400-level

NOTE: 1. A grade of C or higher is required for a course to be counted in the major field.

All German majors are required to study for one semester in a German-speaking country approved by the department.

Russian: 33* credits. The following courses are required:

Credit	6 hours at the intermediate level:
3	RUSS 201 Intermediate Russian I or RUSS 221 Field Studies I
3	RUSS 202 Intermediate Russian II or RUSS 222 Field Studies II

Credit	6 hours at the 300-level:
3	RUSS 301 Advanced Grammar and Composition I
3	RUSS 302 Advanced Grammar and Composition II

Credit	3 hours at the 400-level:
3	RUSS 410 Seminar in Russian Studies

Credit	3 hours at the 400-level:
3	RUSS 441 The Russian Novel I
3	RUSS 442 The Russian Novel II
3	RUSS 443 Contemporary Russian Prose

Credit	3 hours at the 400-level:
3	RUSS 446 Russian Artistic Culture I
3	RUSS 447 Russian Artistic Culture II

Credit	12 hours at the 200-, 300- and 400-level. Select from Russian courses not used for credit previously. Up to 6 hours may be selected from EURO 441, EURO 442, EURO 443, EURO 444, EURO 446 and EURO 447.
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* The following restriction applies: A maximum of 12 credits for courses at the 200-level.

Other Departmental Requirements. Language majors are required to complete 12 hours in supporting courses to be chosen from a list of recommended courses in consultation with the departmental advisor. 6 hours must be outside the EURO department, yet appropriate to the student's major; 6 hours must be outside the student's major language, yet within the EURO department.



Minor Field of Study. Instead of 12 hours in supporting courses, language majors may select a minor field of study from departments or divisions within or outside of the College of Liberal Arts or in a particular area of interest (as in the case of interdisciplinary minors or career opportunity minors). The minor will consist of a minimum of 15 hours of course work; 9 hours must be in advanced (300- or 400-level) courses. A minor in a language offered by the department consists of 18 hours of course work beyond the 100-level. Interdisciplinary minors such as women's studies, classical studies, religious studies, comparative cultural studies, Hispanic studies, and business have specific requirements; students should consult the Undergraduate Student Services Office in the College of Liberal Arts for details. A second major may substitute for the minor. A grade of C or higher is required for a course to be counted in the minor field.

Minor in Italian: 18 hours are required

Credit	6 hours at the intermediate level:
6	ITAL 201 and ITAL 202
3	ITAL 303
9	at 300 and/or 400 level; choose from ITAL 300-302, 304-499

College and University Requirements. Other courses may qualify for the following categories. Students should consult the approved list of courses available in the Undergraduate Student Services Office in the College of Liberal Arts. The following lists incorporate University Core Curriculum requirements. No course can be counted in more than one category.

Credit	Course
3	ENGL 104 Composition and Rhetoric.
3	Communication (3 hours): One course chosen from: ENGL 203, 210, 301, 235, 236 or 241; COMM 203 or 243.
6	Literature in English (6 hours): To be selected from ENGL 203 (unless 203 is used to satisfy communication requirement), 212, 221, 222, 227, 228, 231, 232, or courses for which one of these listed courses is a prerequisite.
6	Mathematics: At least 3 hours must be in MATH (excluding 102, 103, 104, 130, 150, 165, 365, 366). Three hours may be in logic.
8	Natural Sciences: Two or more courses; minimum of one course shall include a corresponding laboratory. One course must come from: BIOL 107; BIOL 111; BIOL 101; CHEM 101, 103 /113; GEOL 101; PHYS 201, 218. The other course must come from these courses or others approved for the University Core Curriculum. See the University Core Curriculum section of this catalog.
(9)	Humanities and Visual and Performing Arts: Departmental requirements fulfill 6 hours of humanities; students must take at least 3 hours of visual and performing arts.
6	Social and Behavioral Sciences: Selected from the approved list of courses in such areas as anthropology, archaeology, economics, geography, journalism, linguistics, political science, psychology, speech communication, and sociology. See the University Core Curriculum section of the catalog.
6	Political Science: POLS 206 and 207.
6	U.S. History: Two courses in American history; no more than one may be in Texas history.
(6)	International and Cultural Diversity: To be selected from approved list. This course may also be used to satisfy any other requirement.
*2	Kinesiology: KINE 198 Health and Fitness Activity and KINE 199 Required Physical Activity.
14+	Free Electives (Additional hours in the major field may not be used as free electives.)
120	total hours

* See page 21.

Required Foreign Language Placement Test. Incoming students who intend to enroll for the first time in a French, Italian, German, Russian, or Latin course at Texas A&M University, who have previous knowledge, however acquired, of the language in which they plan to enroll, and who have no college credit in the language, must take a placement test to determine the appropriate course for their level of ability. The foreign language placement test also serves as a basis for credit by examination.

The foreign language placement test will be administered during freshman conferences along with other credit by exam tests. The test will also be offered during Fall and Spring semesters.

Students who take the Advanced Placement (AP) test or other acceptable tests which grant college-level credit in their foreign language of choice do not have to take the required foreign language placement test. In this case, the AP and Achievement test results may be used for placement.

International students whose native language is not English are exempted from satisfying the University foreign language requirement. These students are not allowed to register in those courses in their native language (101, 102) which are used to fulfill that requirement.

Curriculum in Hispanic Studies

At a time when worldwide globalization includes the demographically and culturally significant Hispanization of Texas, along with other areas of the United States, the study of the Spanish language and Hispanic culture is important to achieving an understanding of the world in which we live. Through teaching, research and service, the faculty of the Department of Hispanic Studies contribute in their work through the undergraduate curriculum to the process of globalization by fostering University and professional levels of bilingualism and biculturalism. With 450 million world-wide speakers, Spanish is not only the second language of Texas and the United States, but also an official language of the United Nations and of the European Union. Furthermore, as a linguistic presence on the internet, Spanish is second only to English. Texas is a bilingual/bicultural state in which Spanish is useful and often necessary in everyday life. In the diverse society in which we live, much personal and professional satisfaction can be gained by being bilingual and bicultural. Texas A&M University's curriculum in Spanish and courses in Hispanic Studies can help a student work towards achieving such a goal.

The Department of Hispanic Studies offers a full range of undergraduate and graduate courses. The Department recognizes the integral relationship between teaching and research, and all members of the faculty are active scholars and dedicated teachers. With major emphases in literature and language/culture, the Department offers a variety of courses in Spanish language, linguistics and culture. An undergraduate major in Spanish can show future employers and/or graduate schools that a student has achieved a certain level of linguistic ability and understanding of Hispanic cultures. The undergraduate major is designed to help students grow in their oral and written language skills as they learn more about Hispanic cultures through literature and cultural studies. This kind of study is valuable for those who plan to go into international careers or for those who plan to work with Hispanic populations in the United States. A Spanish major is useful in careers such as banking, advertising, marketing, journalism, health services, government, social welfare and public administration, and it is an excellent preparation for professional school.

The Department insists on a high level of language competence as the basis for other intellectual growth in the discipline. In addition to classes at the College Station campus, the Department sponsors summer study abroad programs for credit in Mexico and Spain. Semester and full-years study abroad programs, reciprocal exchanges or internships are available and encouraged. In general, the careful combination of the skills and knowledge from a Spanish major with other curricula can greatly enhance students' preparation for business, industry, government or the professions. Teaching certification is available to Spanish majors through the College of Education and Human Development.

After meeting the University admission requirement in foreign language, students will be required to complete, by course work or placement test, all 100- and 200-level courses in sequence before taking any upper-division (300- or 400-level) course. Once a student has received credit for a higher level language course in the lower division sequence, the student is no longer eligible to receive credit for prerequisite courses.

Spanish Bilingual/Bicultural Enhancement Initiative

The Hispanic Studies faculty recommends that Spanish language students, especially heritage speakers of Spanish and Advanced Placement (AP) students, take a healthy mixture of course work related, on the one hand, to achieving University-level linguistic competence in the language; and course work related to the Hispanic or Latino cultural experience on the other. To this end students select from courses on language, grammar and culture in spoken and written Spanish and electives which broaden the Hispanic/Latino knowledge base taught in English. A prudent and timely selection of courses can allow the student to apply course work taken in the pursuit of bilingual/biculturalism to satisfy some requirements on the student's degree plan. Many of the suggested courses will apply in the Core Curriculum, for example, in areas such as Humanities and Social Sciences. Discussions with a departmental advisor can help students to focus the best possible fit of course work with their interests and degree plan.

International Certificate Program

A certificate program in Spanish is available for students in Biomedical Science Programs. The program is administered jointly by the Department of Hispanic Studies and the College of Veterinary Medicine. In order to earn the certificate, students will be required to take (1) 6 credit hours of course work in Spanish at the 200-level, (2) 9 credit hours of course work in culture and areas studies courses, and (3) 3 credit hours in advanced Spanish course work. Students are required to study abroad and/or carry out international internships in conjunction with work toward the certificate.

Bachelor of Arts Spanish

Spanish: 33* credits. The following courses are required:

Credit	6 hours at intermediate level:
3	SPAN 201 Intermediate Spanish I and
3	SPAN 202 Intermediate Spanish II or
3	SPAN 203 Intermediate Spanish for Spanish Speakers
Credit	12 hours required at 300-level:
3	SPAN 302 Contrastive Grammar
3	SPAN 303 Composition and Conversation
3	SPAN 311 Hispanic Culture and Civilization to the 18th Century or
3	SPAN 312 Hispanic Culture and Civilization: 18th Century to Present
3	SPAN 320 Introduction to Spanish Literature

Credit 12 hours from one concentration plus 3 hours from the other; at least 9 hours required at 400-level:

A. Literature Concentration:

- 3 SPAN 331 Spanish Literature to 1700
- 3 SPAN 332 Spanish Literature from 1700 to 1936
- 3 SPAN 341 Spanish-American Literature from 1492 to 1821
- 3 SPAN 342 Spanish-American Literature from 1821 to 1935
- 3 SPAN 421 Spanish Language Poetry
- 3 SPAN 445 Cervantes
- 3 SPAN 450 Contemporary Spanish and Spanish-American Literature

B. Hispanic Studies Concentration:

- 3 SPAN 306 Business Spanish
- 3 SPAN 310 Oral Expression
- 3 SPAN 311 Hispanic Culture and Civilization to the 18th Century
or
- 3 SPAN 312 Hispanic Culture and Civilization: 18th Century to Present
- 3 SPAN 350 Phonetics
- 3 SPAN 410 Hispanic Film
- 3 SPAN 411 Contemporary Hispanic Society and Culture
- 3 SPAN 412 Hispanic Writers in the U.S.
- 3 SPAN 413 Hispanic Culture through Art

For Teaching Field:

Required Credit

- 3 SPAN 350 Phonetics
- 3 SPAN 302 Contrastive Grammar

Recommended Credit

- 3 SPAN 303 Composition and Conversation
- 3 SPAN 311 Hispanic Culture and Civilization to the 18th Century
- 3 SPAN 312 Hispanic Culture and Civilization: 18th Century to Present
- 3 SPAN 320 Introduction to Hispanic Literature

* The following restrictions apply: A maximum of 18 credits for courses at the 300-level. A minimum of 9 credits for courses at the 400-level.

Other Departmental Requirements. Spanish majors are required to complete 18 hours in supporting courses in such areas as linguistics, history, philosophy, English, political science, geography and U.S. cultures (women and/or minority groups). These courses are to be chosen from a list of recommended courses in consultation with the departmental advisor.

Spanish majors are required to complete a 10-week minimum semester-long study or experience abroad in a Spanish-speaking country. Study abroad options include University-sponsored, reciprocal, affiliated, and independent programs. Experiences abroad range from internships to volunteer opportunities. Selection of location and type of experience abroad should be made in consultation with departmental advisors.

Minor Field of Study. Spanish majors must select a minor field of study from departments or divisions within or outside of the College of Liberal Arts or in a particular area of interest (as in the case of interdisciplinary minors or career opportunity minors). The minor will consist of a minimum of 15 hours of course work; 9 hours must be in advanced (300- or 400-level) courses. A minor in a language offered by the department consists of 18 hours of course work beyond the 100-level. At least 9 of these 18 hours must be taken at Texas A&M. A minor consists of 201, 202 or 203, 302, 303, 320, and a literature elective. Of the 9 hours taken at Texas A&M, 6 hours must be 303 and the literature elective. Interdisciplinary minors such as women's studies, classical studies, religious studies, comparative cultural studies and business have specific requirements; students should consult the Undergraduate Student Services Office in the College of Liberal Arts for details. A second major may substitute for the minor. A grade of C or higher is required for a course to be counted in the minor field. **A minor must be declared before the student has completed 75 credit hours.**

College and University Requirements. Other courses may qualify for the following categories. Students should consult the approved list of courses available in the Undergraduate Student Services Office in the College of Liberal Arts. The following lists incorporate University Core Curriculum requirements. No course can be counted in more than one category.

Credit	Course
3	ENGL 104 Composition and Rhetoric.
3	Communication (3 hours): One course chosen from: ENGL 203, 210, 301, 235, 236 or 241; COMM 203 or 243.
6	Literature in English (6 hours): To be selected from ENGL 203 (unless 203 is used to satisfy communication requirement), 212, 221, 222, 227, 228, 231, 232, or courses for which one of these listed courses is a prerequisite.
6	Mathematics: At least 3 hours must be in MATH (excluding 102, 103, 104, 130, 150, 165, 365, 366). Three hours may be in logic.
8	Natural Sciences: Two or more courses; minimum of one course shall include a corresponding laboratory. One course must come from: BIOL 107; BIOL 111; BIOL 101; CHEM 101, 103/113; GEOL 101; PHYS 201, 218. The other course must come from these courses or others approved for the University Core Curriculum. See the University Core Curriculum section of this catalog.
(9)	Humanities and Visual and Performing Arts: Departmental requirements fulfill 6 hours of humanities; students must take at least 3 hours of visual and performing arts.
6	Social and Behavioral Sciences: Selected from the approved list of courses in such areas as anthropology, archaeology, economics, geography, journalism, linguistics, political science, psychology, speech communication, and sociology. See the University Core Curriculum section of the catalog.
6	Political Science: POLS 206 and 207.
6	U.S. History: Two courses in American history; no more than one may be in Texas history.
(3)	International and Cultural Diversity: To be selected from approved list. This course may also be used to satisfy any other requirement.
*2	Kinesiology: KINE 198 Health and Fitness Activity and KINE 199 Required Physical Activity.
7+	Free Electives (Additional hours in the major field may not be used as free electives.)
128	total hours

* See page 21.

Required Foreign Language Placement Test. Incoming students who intend to enroll for the first time in a Spanish course at Texas A&M University, who have previous knowledge, however acquired, of the language in which they plan to enroll, and who have no college credit in the language, must take a placement test to determine the appropriate course for their level of ability. The foreign language placement test also serves as a basis for credit by examination.

The foreign language placement test will be administered during summer freshman conferences along with other credit by exam tests. The test will also be offered on demand during Fall and Spring semesters until one week before classes start, resuming the day after the deadline for adding/dropping courses. The placement test must be taken prior to enrollment in any Spanish course.

Students who take the Advanced Placement (AP) test or other acceptable tests which grant college-level credit in their foreign language of choice do not have to take the required foreign language placement test, but may do so if they wish. In this case, the AP and Achievement test results may be used for placement.

International students whose native language is not English are exempted from satisfying the University foreign language requirement. These students are not allowed to register in those courses in their native language (101, 102) which are used to fulfill that requirement.

Curriculum in History

A major in history affords students both a broad education and valuable practical skills. The program in history encourages students to think analytically, read critically, and speak and write with incisiveness. By acquiring familiarity with people in diverse times, places and circumstances, students of history develop a sophisticated human empathy which is the key to good scholarship and good citizenship alike.

Many students rely upon a major in history as preparation for graduate study in law, business, public administration, international relations and theology. A small number pursue graduate degrees in history itself. Other history majors seek postgraduate employment in business management, advertising and public relations, government service, museum and archival work, editorial and publishing work, park interpretation and administration, non-profit organizations, and professions requiring research and bibliographic skills. By including specific education classes in the undergraduate course of study, history majors may qualify for teacher certification.

In fulfilling the requirements for a B.A. degree in History, students must meet the "General Degree Requirements" of the College of Liberal Arts listed previously and the special requirements spelled out below. A 33-hour major, the program in history includes five required courses and allows students to choose the remainder from course offerings in the history of the United States, Europe, Asia, Africa and Latin America. History elective courses (18 hours) will be chosen from three lists. Not less than 3 and not more than 9 hours should be chosen from each of the three lists. The student should plan a program of study in consultation with one of the department's undergraduate advisors.

History. 33 credits. Students must take not less than 15 credit hours at upper level for history residency requirement. A grade of C or higher is required for a course to be counted in the major field. A student must complete not less than 18 hours of course work in history at Texas A&M University.

Credit	Course
3	HIST 101 Western Civilization to 1660 or HIST 103 World History to 1500
3	HIST 102 Western Civilization Since 1660 or HIST 104 World History Since 1500
3	HIST 105 History of the United States
3	HIST 106 History of the United States
3	HIST 481 Seminar in History (Senior Seminar)
18	History electives: to be selected from any field of history at the 200-, 300- or 400-level. Not less than 3 and not more than 9 hours should be chosen from each of three prescribed lists, in American, European and World History. 12 hours must be advanced 300- and 400-level courses.

College and University Requirements. Other courses may qualify for the following categories. Students should consult their academic advisors. The following lists incorporate University Core Curriculum requirements. No course can be counted in more than one category, except as allowed in the minor field of study and the International Cultures requirement.

Credit	Course
6	Communication (6 hours): ENGL 104 and one course selected from ENGL 203, 210, 235, 236, 241, 301; COMM 203 or 243.
6	Literature in English (6 hours): ENGL 203 (unless 203 is used to satisfy the communication requirement), 212, 221, 222, 227, 228, 231, 232, or a course for which one of these listed courses is a prerequisite.
14	Foreign Language (14 hours or equivalent): Four-course sequence in French, German, Greek, Italian, Japanese, Latin, Portuguese, Russian, Spanish, unless permission is received from the department head to substitute work in another language. This will not satisfy the college humanities and visual and performing arts requirement.
6	Mathematics: At least 3 hours must be in MATH (excluding 102, 103, 104, 130, 150, 165, 365, 366). Three hours may be selected from PHIL 240, 341 or 342.
8	Natural Sciences: To be selected from natural science courses approved for the University Core Curriculum.
9	Humanities and Visual and Performing Arts: To be selected from humanities and visual and performing arts courses approved for the University Core Curriculum.
6	Social and Behavioral Sciences: To be selected from social and behavioral science courses approved for the University Core Curriculum.
6	Political Science: POLS 206 and 207.
(6)	International and Cultural Diversity: To be selected from approved list. This course may also be used to satisfy any other requirement.
*2	Kinesiology: KINE 198 Health and Fitness Activity and KINE 199 Required Physical Activity.
24	Free Electives (including 15-hour minor).
<hr/> 120	total hours

* See page 21.

Minor Field of Study. All history majors must select a minor field of study from departments or divisions within or outside of the College of Liberal Arts or in a particular area of interest (as in the case of interdisciplinary minors or career opportunity minors). The minor will consist of a minimum of 15 hours of course work, 9 hours of which must be in advanced (300- or 400-level) courses. A grade of C or higher is required for a course to be counted in the minor field. Interdisciplinary minors such as women's studies, classical studies, religious studies, and business have specific requirements; students should consult undergraduate advisors in these areas of study. A second major may substitute for the minor. Courses used to meet the minor requirements may not be used in the major. See also the statement on "Minor Field of Study" under the general requirements of the College of Liberal Arts.

Teacher Certification. Students wishing to meet certification requirements to teach history or social studies in the secondary schools of Texas must include in their programs of study HIST 101 or 103, 102 or 104, 105 and 106, and either 226 or 416. In addition, students must complete the various requirements for either a History Option II Field Plan (a further 12 hours) or a Social Studies Composite Option IV Field Plan (a further 55 hours).

In order to be admitted to the post-baccalaureate certification program (Department of Teaching, Learning and Culture—TLAC), students must also have taken INST 310 (3 hours), TEFB 322 or INST 301 (3 hours), TEFB 324 (3 hours), and pass the TExES content exam.

More complete information on the requirements for teacher certification together with other certification options can be found in the College of Education and Human Development under secondary certification. Students must also consult with, and have approval of, their field advisor in the Department of History.



Curriculum in International Studies

The International Studies (INTS) degree provides an interdisciplinary curriculum that captures the broad range of social, political, cultural and economic forces at play in an increasingly interdependent world. Students take courses in a number of different departments. These are linked by language, topic and region. INTS majors must take (1) a minimum of 20 credit hours of a foreign language at the college level; (2) 15 hours of core courses, including an introductory course and senior seminar; (3) 18 hours in one of five tracks or topic areas: International Politics and Diplomacy, International Commerce, International Environmental Studies, International Communication and Media, and International Arts and Culture; and (4) 9 hours of area studies in courses related to Latin America, Europe, North Africa and the Middle East, Africa or Asia. Class work is enhanced by a related international experience with an emphasis on cultural and language immersion. Students must spend a fall or spring semester, or an approved (prior to departure) summer program of no less than 10 weeks abroad studying in an academic program or working for internship credit in a business, government agency or non-profit organization. Upon graduation, INTS majors will have the language proficiency, analytical skills, substantive knowledge and cultural sensitivity necessary for work in government, academia or international business.

International Studies.

Core Courses: 15 credits.

Credit	Course
3	INTS 201 Introduction to International Studies
3	INTS 481 International Studies Seminar or INTS 497 Independent Honors Study or INTS 491 Research
3	POLS 331 Introduction to World Politics
3	One of the following:
	COMM 308 Research Methods in Communication
	HIST 481 Seminar in History
	POLS 209 Political Science Research Methods
	SOC 220 Methods of Social Research
	STAT 201 Elementary Statistical Inference
	STAT 303 Statistical Methods
3	One of the following:
	ANTH 205 Peoples and Cultures of the World
	GEOG 202 Geography of the Global Village
	HIST 104 World History Since 1500
	SOC 206 Global Social Trends

Tracks: 18 credits. To be chosen from the following from at least two departments.
Choose one track.

International Politics and Diplomacy Track

Credit	Course
18	<p>To be chosen from the following:</p> <p>ECON 203 Principles of Economics ECON 320 Economic Development of Europe ECON 324 Comparative Economic Systems ECON 330 Economic Development ECON 452 International Trade Theory and Policy HIST 343 Inter-American Relations HIST 444 History of Military Thought HIST 462 American Foreign Relations HIST 463 American Foreign Relations Since 1913 HIST 464 International Developments Since 1918 INTS 484 Internship POLS 324 Politics of Global Inequality POLS 328 Globalization and Democracy POLS 329 Introduction to Comparative Politics POLS 347 Politics of Energy and the Environment POLS 350 Modern Political Thought POLS 358 Comparative Judicial Politics POLS 364 Global Political Thought POLS 413 American Foreign Policy POLS 415 U.S. Foreign Policy POLS 421 Social Conflict and Political Change POLS 423 U.S.-Latin American Relations (W) POLS 424 Comparative Governmental Institutions POLS 429 Issues in World Politics POLS 432 The Politics of European Union POLS 447 National Security Policy POLS 454 Contemporary Political Ideologies POLS 456 Environmental Political Theory (W) POLS 475 Government and the Economy SOCI 325 Internationalization and Social Change SOCI 423 Globalization and Social Change</p>

International Commerce Track

Credit	Course
9	Basics of Commerce. Three courses to be chosen from the following: ACCT 209 Survey of Accounting Principles* AGECE 105 Introduction to Agricultural Economics ECON 203 Principles of Economics FINC 409 Survey of Finance Principles* INFO 209 Business Information Systems Concepts* MGMT 209 Business, Government and Society* MGMT 309 Survey of Management* MKTG 409 Introduction to Marketing*
9	The International Setting. Courses to be chosen from the following: AGECE 452 International Trade and Agriculture ECON 320 Economic Development of Europe ECON 324 Comparative Economic Systems ECON 330 Economic Development ECON 425 Organization of Industry ECON 452 International Trade Theory and Policy GEOG 304 Economic Geography INTS 484 Internship SOCI 324 Social Change SOCI 325 International Business Behavior SOCI 328 Environmental Sociology SOCI 423 Globalization and Social Change

* Courses are requirements for the minor in business.



International Communication and Media Track

Credit	Course
9	<p>Basics of Communication. Three courses to be chosen from the following:</p> <p>COMM 240 Rhetorical Criticism COMM 243 Argumentation and Debate COMM 320 Organizational Communication COMM 325 Persuasion COMM 415 New Media and Civil Society COMM 443 Communication and Conflict COMM 446 Communication, Organizations and Society ENGL 241 Advanced Composition ENGL 320 Technical Editing and Writing JOUR 203 Media Writing I* JOUR 303 Media Writing II* MKTG 409 Introduction to Marketing PSYC 346 Psychology of Language</p>
9	<p>International/Intercultural Communication. Three courses to be chosen from the following:</p> <p>COMM 330 Technology and Human Communication COMM 335 Intercultural Communication COMM 340 Communication and Popular Culture COMM 354 Political Economy of Telecommunication COMM 365 International Communication COMM 450 Media Campaigns COMM 454 Telecommunication Policy COMM 456 Telecommunication and Media Management COMM 458 Global Media INTS 484 Internship</p>

* Courses are requirements for the minor in public relations.

International Arts and Culture Track

Credit	Course
18	<p>To be chosen from the following:</p> <p>ARCH 430 History of Ancient Architecture ARCH 434 The Role of Sculpture and Painting in Ancient Architecture ARTS 149 Art History Survey I ARTS 150 Art History Survey II ARTS 350 The Arts and Civilization COMM 335 Intercultural Communication COMM 340 Communication and Popular Culture COMM 458 Global Media ARCH 249 Survey of World Architectural History I ARCH 250 Survey of World Architectural History II ENGL 222 World Literature Since 1500 GEOG 201 Introduction to Human Geography GEOG 311 Cultural Geography GEOG 402 Interpretation of Cultural Landscapes INTS 484 Internship LING 209 Introduction to Linguistics</p>

Credit	Course
	MUSC 311 Music in Early Western Culture
	MUSC 312 Music in Modern Western Culture
	MUSC 324 Music in World Cultures
	PSYC 346 Psychology of Language
	RELS 403 Primitive Religions
	THAR 201 Introduction to World Theatre
	WMST 404 Women and Culture

International Environmental Studies Track

Credit	Course
18	To be chosen from the following:
	AGEC 105 Introduction to Agricultural Economics
	AGEC 350 Environmental and Natural Resource Economics
	AGEC 414 Agricultural Market Analysis
	AGEC 452 International Trade and Agriculture
	AGLS 101 Modern Agricultural Systems and Renewable Natural Resources
	BESC 201 Introduction to Bioenvironmental Sciences
	BIOL 328 Plants and People
	BIOL 357 Ecology
	FSTC 201 Food Science
	GEOG 201 Introduction to Human Geography
	GEOG 203 Planet Earth
	GEOG 204 Economic Geography
	GEOG 311 Cultural Geography
	GEOG 324 Global Climatic Regions
	GEOG 330 Resources and the Environment
	GEOG 401 Political Geography
	GEOG 403 Historical Geography
	GEOG 410 Global Change
	GEOG 430 Environmental Justice
	GEOG 433 Geography of Communication
	GEOLOG 101 Principles of Geology
	GEOLOG 420 Environmental Geology
	INTS 484 Internship
	OCNG 251 Oceanography
	PHIL 314 Environmental Ethics
	POLS 347 Politics of Energy and the Environment
	POLS 456 Environmental Political Theory (W)
	RENRE 205 Fundamentals of Ecology
	RENRE 375 Conservation of Natural Resources
	SOCI 328 Environmental Sociology

Area Studies: 9 credits. Choose one area.

Latin America

Credit	Course
9	To be chosen from an approved list on the INTS Web site in consultation with an advisor.

Europe

Credit	Course
9	To be chosen from an approved list on the INTS Web site in consultation with an advisor.

Africa and the Middle East

Credit	Course
9	To be chosen from an approved list on the INTS Web site in consultation with an advisor.

Asia

Credit	Course
9	To be chosen from an approved list on the INTS Web site in consultation with an advisor.

Courses numbered 485 or 489 that contain significant international content can be taken in any department to meet part of the track or area requirement. Students must obtain International Studies advisor approval before taking the 485 or 489 course.

Foreign Language: 20 credits.

Placement exam to be taken upon entering program (students may place out of a maximum of 14 hours)

Students placed in 101 will take 101, 102, 201 and 202 and 9 hours at the 300- or 400-level.

Students placed in 102 will take 102, 201 and 202 and 9 hours at the 300- or 400-level.

Students placed in 201 will take 201 and 202 and 9 hours at the 300- or 400-level.

Students placed in 202 will take 202 and 9 hours at the 300- or 400-level.

Students placing out of 101, 102, 201 and 202 will take 6 hours at the 300- or 400-level.

International Experience Requirement: Must generate at least 3 hours of Texas A&M University credit; requires approval by Director of International Studies before travel.

1. Must be at least one long semester or one 10-week summer approved experience.
2. Must be taken after completion of 100- and 200-level language requirement and INTS 201.
3. Must be completed before student is eligible to enroll in INTS 481, 497 or 491.
4. Must be an immersion experience in the foreign culture and language.

The requirement can be satisfied by:

- a. An internship at a company, government agency or non-profit operation involving significant use of the foreign language. Three hours of INTS 484 elective credit can be given.
 - b. Courses taken at a foreign university. Courses may count for Texas A&M University credit with approval of the advisor of the relevant department. These courses cannot apply to the International Studies core. One course must be taken in the foreign language at the 300- or 400-level.
 - c. Selected Texas A&M University Study Abroad programs which involve intensive cultural and language immersion.
 - d. A combination of the above to equal the requirement of a long semester or a 10-week summer-approved experience.
5. Must be taken outside of the student's country of origin.
 6. Must be taken in one foreign country that matches with the foreign language and the area study requirement unless approved by the Director of International Studies before travel.

College and University Requirements (including Texas A&M University Core Curriculum Requirements). Other courses may qualify for the following categories. Students should consult the approved list of courses available in the Undergraduate Student Services Office in the College of Liberal Arts or in the International Studies Degree Program Office. The following list incorporates University Core Curriculum requirements. No course can be counted in more than one category, except as allowed in the International and Cultural Diversity requirement.

Credits	Course
3	ENGL 104 Composition and Rhetoric
3	Communication (3 hours): To be selected from ENGL 203, 210, 235, 236, 241 OR 301; COMM 203 or 243.
6	Literature in English (6 hours): To be selected from ENGL 203 (unless 203 is used to satisfy the communication requirement), 212, 221, 222, 227, 228, 231, 232 or courses for which one of these listed courses is a prerequisite.
6	Mathematics: At least 3 hours must be in MATH (excluding 102, 103, 104, 130, 150, 165, 365 and 366). Three hours also may be in logic.
6	Humanities and Visual and Performing Arts: To be selected from the approved list in the University Core Curriculum section of this catalog.
8	Natural Sciences: Two or more courses which deal with fundamental principles and in which a critical evaluation and analysis of data and process are required. A minimum of one course shall include a corresponding laboratory. See approved list in the University Core Curriculum section of this catalog.
3	Social and Behavioral Sciences: To be selected from such areas as cultural anthropology, economics, geography, psychology, and applied ethics. See approved list in the University Core Curriculum section of this catalog. INTS majors must take ECON 202 as a directed elective within the Social and Behavioral Sciences.
6	U.S. History: Two courses in U.S. history; no more than one course may be in Texas History.
6	Political Science: POLS 206 and 207.
(3)	International and Cultural Diversity: To be selected from approved list. This course may also be used to satisfy any other requirement.
9	General Electives (includes 3 hours of directed elective, ECON 202; see above)
*2	Kinesiology: KINE 198 Health and Fitness Activity and KINE 199 Required Physical Activity.
<hr/> 120	total hours

* See page 21.

Curricula in Performance Studies

Established in 1999, the Department of Performance Studies is the first department at Texas A&M solely devoted to the arts. Offering a B.A. degree in Music, a B.A. degree in Theatre Arts, and minors in both disciplines, the department encourages student-faculty interaction in research and creative activity. A significant number of courses listed in the University Core Curriculum Visual and Performing Arts requirements are available through the Department of Performance Studies.

The Bachelor of Arts in Music offers an interdisciplinary approach to the study of music with courses in composition, ethnomusicology, music history, music theory, music technology and performance, as well as classes relating to other disciplines including anthropology, journalism, philosophy, physics, theatre arts and visual arts. Course work explores a wide range of musics—Western and non-Western; past and present; transmitted by oral, written, and electronic means. Such courses examine sonic structures, notational systems (if used), styles of performance and investigate the relationship of music to other arts.

The Bachelor of Arts in Theatre Arts provides a broad-based, liberal arts education. In addition to the University and College of Liberal Arts core courses, theatre students receive training in the classroom and in an integrated theatre production program. The curriculum prepares students for professional theatre training programs and/or graduate work in the liberal and fine arts, teaching theatre in the secondary school, and a variety of careers in the professional arena or the world of business and industry.



Curriculum in Music

Music: 42 credits. An audition is required for all prospective music majors prior to admission into the Bachelor of Arts in Music degree program. For more information on auditions, please contact the Department of Performance Studies office at (979) 845-3355, or visit the Web site: <http://performancestudies.tamu.edu>. A grade of C or higher is required for a course to be counted in the major field. A student must complete 18 hours of music course work at Texas A&M University.

Credit	Course
6	MUSC 204, 205, 206, Music Theory
3 ¹	MUSC 208, 210, 212, Musicianship
2	MUSC 207, Form and Analysis
4 ²	Performance: Individual performance selected from MUSC 245/345 (Composition), 250/350 (Piano), 251/351 (Voice) or 252/352 (Band and Orchestra Instrument Performance) Ensemble performance selected from MUSC 280 (Band), 286 (Orchestra), 290 (Choir) or 281 (Small Ensembles)
3	MUSC 312 Music in Modern Western Culture
3	MUSC 316 Music and Technology
3	MUSC 324 Music in World Cultures
3	MUSC 400 Senior Seminar and Project
9	Music electives: 300- to 400-level electives. Up to 3 hours may be MUSC 200 Topics in Music
6	Two courses to be selected from the following list: ANTH 201 Introduction to Anthropology ARTS 350 The Arts in Civilization PERF 301 Performance in World Cultures PERF 326 Dance Identity and Culture in the U.S. PHIL 330 Philosophy of Art THAR 302 Dramaturgy THAR 308 Stage Management and Arts Administration

NOTES: 1. Students may substitute MUSC 214 Perspectives on World Music and MUSC 215 Fieldwork in World Music for MUSC 210 and 212.

2. At least 2 of the 4 required credits will be in Individual Performance. A student may substitute 2 Composition credits for 1 Individual performance credit and 1 Ensemble performance credit.

College and University Requirements. The following list incorporates University Core Curriculum and College of Liberal Arts requirements. No course can be counted in more than one category.

Credit	Course
6	Communication (6 hours): ENGL 104 and one course selected from ENGL 203, 210, 235, 236, 241, 301; COMM 203 or 243
6	Literature in English (6 hours): Select from ENGL 203, 212, 221, 222, 227, 228, 231, 232 (May use ENGL 203 if not used for the communication requirement).
14	Foreign Language: students will take a four-course sequence totaling 14 hours of credit in one of the languages offered by the College of Liberal Arts.
6	Mathematics: At least 3 hours must be selected from MATH 131–467 (excluding 150, 365, 366). MATH 151 is required for students planning to take PHYS 340. Three hours may be selected from PHIL 240, 341 or 342.
8	Natural Sciences: To be selected from the approved list available from the Music program Advisor.
9	Humanities and Visual and Performing Arts: To be selected from the approved list available from the Music program Advisor.
6	Social and Behavioral Sciences: To be selected from the approved list available from the Music program Advisor.
12	U.S. History and Political Science: POLS 206 and 207 and two courses in American history. To be selected from the approved list available from the Music program Advisor.
(3)	International and Cultural Diversity: To be selected from the approved list available from the Music program Advisor. This course may also be used to satisfy any other requirement. One additional International and Cultural Diversity course (3 hours) must be selected to complete the Liberal Arts ICD requirement of 6 hours.
*2	Kinesiology: KINE 198 Health and Fitness Activity and KINE 199 Required Physical Activity.
9	Free Electives: Select any course outside the major field of study (except ENGL 111: CAEN 001-099). Music courses may not be used as elective hours.
120	total hours

* See page 21.

Music Minor. Students from diverse musical backgrounds and interests are encouraged to become involved in the study and practice of the musical arts at Texas A&M, as a complement to their major fields of study. Introductory and advanced courses emphasize the interrelationships among music history, theory, ethnomusicology, composition, technology, performance and other visual and performing arts. Attendance at the numerous concerts and lectures presented each year and participation in the performing ensembles are encouraged to broaden the classroom experience. Students desiring to undertake the structured approach to the study of music may wish to consider the Music Minor Program.

Minor in Music: 18 credit hours required

Credit	Course
3	Chosen from MUSC 200 Topics in Music or MUSC 201 Music and the Human Experience
2	MUSC 204 Music Theory
1	MUSC 208 Musicianship
3	Individual/Ensemble Performance, chosen from: MUSC 245 Composition I MUSC 250 Individual Performance—Piano I MUSC 251 Individual Performance—Voice I MUSC 252 Individual Performance—Band and Orchestra Instrument Performance I MUSC 280 Ensemble Performance—Symphonic Band MUSC 281 Ensemble Performance—Small Ensembles MUSC 286 Ensemble Performance—Symphony Orchestra MUSC 290 Ensemble Performance—Choir
9	Elective courses: 9 additional credits in MUSC at the upper-level (300- or 400-level course)

NOTE: No more than 9 credits of the minor may be at the lower-level (100- or 200-level course). Students must earn grades of C or better in their minor course work.

Curriculum in Theatre Arts

The Bachelor of Arts in Theatre Arts provides a broad humanistic education in the liberal and fine arts. By means of classroom instruction and an integrated production component, the Theatre Arts student gains both a fundamental academic background and the foundations of training as a theatre artist. This preparation can lead to a career in commercial theatre, educational theatre, advanced study in a variety of related professional disciplines, or entry into a broad array of careers in public relations and communications.

Teacher Certification in Theatre Arts

For Theatre Arts Majors. Theatre arts majors desiring certification to teach theatre arts (drama) in the secondary schools of Texas also must take a minimum of 24 semester hours in a second teaching field.

For Non-Theatre Arts Majors. Students not majoring in theatre arts and desiring certification to teach theatre arts in the secondary schools of Texas must take the following theatre arts courses: THAR 102, 110, 135, 320, 381 and 382; THAR 345, 355 or 360; and an additional 6 hours of upper-level theatre arts courses to be chosen in consultation with a theatre arts academic advisor.

Production Requirements for Theatre Arts Majors

Performance and production are integral to the Theatre Arts major. The production component is designed to encourage, guide and challenge individual creative and artistic development. Theatre Arts majors are expected to actively participate in departmental productions.

Theatre Arts majors, and those seeking secondary certification in theatre arts, fill this requirement in one of three ways: (1) by enrolling in THAR 290 for one credit hour, may be repeated three times; (2) by enrolling in theatre arts courses which have a production lab component, currently THAR 135, 145, 255 and 335; (3) by participating in a minimum of one mainstage production per semester as actor, production staff member, running crew member, or promotional crew member.

Theatre Arts. No more than 33 credits in theatre arts can be applied to the degree; a minimum of 12 hours must be taken at the upper-division (300–400) level. A grade of C or higher is required for a course to be counted in the major field.

Credit	Course
3	THAR 102 Script Analysis
3	THAR 110 Acting I: Fundamentals
3	THAR 135 Technical Theatre
3	THAR 145 Basic Theatrical Design
3	THAR 320 Directing I
3	THAR 345 Scene Design, or THAR 355 Costume Design or THAR 360 Lighting Design
3	THAR 381 Theatre History and Dramatic Literature I
3	THAR 382 Theatre History and Dramatic Literature II
9	Theatre Arts Electives

College and University Requirements. Other courses may qualify for the following categories. Students should consult the approved list of courses available in the Undergraduate Student Services Office in the College of Liberal Arts. The following lists incorporate University Core Curriculum requirements. No course can be counted in more than one category.

Credit	Course
6	ENGL 104 Composition and Rhetoric: with a minimum grade of C; plus one course chosen from ENGL 203, 235, 236 or 241; COMM 203.
6	Literature in English: ENGL 212 or 412 and one course chosen from ENGL 221, 222, 227, 228, 231 or 232.
3	One course chosen from ENGL 312, 317, 340, 351, 356, 385, or 412.
14	Foreign Language (14 hours or equivalent): Four course sequence in French, German, Russian, Spanish, Italian, Japanese, Greek or Latin unless permission is received from department head to substitute work in other languages. This will not satisfy the college humanities and visual and performing arts requirements.
6	Mathematics: 3–6 hours must be selected from MATH 131–467 (excluding 150, 365, 366). Three hours may also be in logic (PHIL 240, 341, 342).
8	Natural Sciences: To be selected from the approved list available from the Theatre Arts Advisor.
12	Humanities and Visual and Performing Arts: To be selected from the approved list available from the Theatre Arts Advisor.
6	Social and Behavioral Sciences: PSYC 107 and an additional 3 hours selected from anthropology, archaeology, economics, geography, journalism, political science, psychology, speech communications and sociology. To be selected from the approved list available from the Theatre Arts Advisor.
12	U.S. History and Political Science: POLS 206 and 207 and two courses in American history.
(6)	International and Cultural Diversity: To be selected from the approved list available from the Theatre Arts Advisor. May also be used to satisfy any other requirement.
*2	Kinesiology: KINE 198 Health and Fitness Activity and KINE 199 Required Physical Activity.
12	Free electives
<hr/> 120	total hours

* See page 21.

Minor in Theatre Arts: 18 credit hours required

Credit	Course
3	THAR 102
3	THAR 110 Acting I: Fundamentals
3	THAR 381 Theatre History and Dramatic Literature I
3	THAR 382 Theatre History and Dramatic Literature II
6	THAR Elective courses approved by the Theatre Arts Advisor

Curriculum in Philosophy

The Greek philosopher Socrates once said that the unexamined life is not worth living. For more than 2,000 years, philosophy has been the source of the most intensely reflective, influential and argued versions of that examination. The concerns of philosophy range from the arts, the methods and foundations of the sciences, politics, education, and religion to the complex questions relating to the meaning of reality, truth, values and the significance of human history. The study of philosophy is an essential dimension of a well-educated person.

Philosophy seeks to establish standards of evidence, provide rational methods of resolving conflicts, and create techniques for evaluating ideas and arguments. Philosophy develops the capacity to see the world from the perspective of other individuals and other cultures; it enhances one's ability to perceive the relationships among the various fields of study; and it deepens one's sense of the meaning and variety of human experience.

Toward these ends the program in philosophy at Texas A&M is structured to provide students with the skills necessary to appreciate more fully the central concerns of human existence and develop abilities in problem-solving, communication, persuasion, writing, and critical thinking.

Students, along with parents and friends, often assume that the only undergraduates who major in philosophy are those who intend to pursue graduate degrees in philosophy, theology and law. The breadth of skills developed, however, makes the study of philosophy appropriate for students entering professional fields such as medicine, business and education, and for those preparing for graduate work in the humanities or the social sciences.

It should be stressed that the non-academic value of a field of study must not be viewed mainly in terms of its contribution to obtaining one's first job after graduation. Students are understandably preoccupied with getting their first job, but even from a narrow vocational point of view it would be short-sighted to concentrate on that at the expense of developing potential for success and advancement once hired. Factors leading to initial employment are not necessarily those that lead to promotions or beyond a first position. This is so because the needs of many employers alter with changes in social and economic patterns. It is therefore crucial to see beyond the specifics of a job description.

As this suggests, there are people trained in philosophy in just about every field. They have gone into not only such professions as teaching, medicine, and law, but also into computer science, management, publishing, sales, government service, criminal justice, public relations, and other fields.

Philosophy. 30 credits minimum; no more than 33 credits in philosophy can be applied to the degree. Students choose at least one course from each category in philosophy. A grade of C or higher is required for a course to be counted in the major field.

Credit	Course
(3)	PHIL 240 (Introduction to Logic), 341 (Symbolic Logic), or 342 (Symbolic Logic II)
3	PHIL 305 (Philosophy of Natural Science), 307 (Philosophy of Social Science), or 351 (Theory of Knowledge)
3	PHIL 320 (Philosophy of Mind), 331 (Philosophy of Religion), or 361 (Metaphysics)
3	PHIL 330 (Philosophy of Art), 332 (Social/Political Philosophy), or 381 (Ethical Theory)
3	PHIL 410 (Classical Philosophy)
3	PHIL 413 (Modern Philosophy)
3	PHIL 414 (19th Century Philosophy), 418 (Phenomenology/Existentialism), or 419 (Current Continental Philosophy)
3	PHIL 415 (Classical American Philosophy), 416 (Recent British/American Philosophy), or 424 (Philosophy of Language)
*6 (9)	Philosophy Electives: to be selected from any philosophy courses, including the above.

* All majors must take at least one logic course. If a logic course is used to fulfill part of the University requirement in logical/mathematical reasoning, one additional philosophy course must be taken to fulfill the departmental requirement of 30 credits.



College and University Requirements. Other courses may qualify for the following categories. The following lists incorporate University Core Curriculum requirements. No course can be counted in more than one category.

Credit	Course
3	ENGL 104 Composition and Rhetoric.
3	Communication (3 hours): One course chosen from: ENGL 203, 210, 301, 235, 236 or 341; COMM 203 or 243.
6	Literature in English (6 hours): To be selected from ENGL 203 (unless 203 is used to satisfy the communication requirement), 212, 221, 222, 227, 228, 231, 232, or courses for which one of these listed courses is a prerequisite.
14	Foreign Language (14 hours or equivalent): Four-course sequence in French, German, Russian, Spanish, Italian, Japanese, Greek, or Latin unless permission is received from the department head to substitute work in other language. This will not satisfy the College humanities and visual and performing arts requirement.
6	Mathematics: At least 3 hours must be in MATH (excluding 102, 103, 104, 130, 150, 165, 365, 366). Three hours may be in logic.
8	Natural Sciences: Two or more courses, minimum of one course shall include a corresponding laboratory. One course must come from: BIOL 107; BIOL 111; BIOL 101; CHEM 101, 103/113; GEOL 101; PHYS 201, 218. The other course must come from these courses or others approved for the University Core Curriculum. See the University Core Curriculum section of this catalog.
9	Humanities and Visual and Performing Arts: Selected from the approved list of courses in anthropology, architecture, classical studies, art history, environmental design (architectural history), English, French, German, history, humanities (religious studies), history of landscape architecture, linguistics, modern languages, music, Russian, speech communication, Spanish, theatre arts. See the University Core Curriculum section of this catalog.
6	Social and Behavioral Sciences: Selected from the approved list of courses in such areas as anthropology, archaeology, economics, geography, journalism, political science, psychology, speech communication, and sociology. See the University Core Curriculum section of this catalog.
6	Political Science: POLS 206 and 207.
6	Two courses in U.S. history.
(6)	International and Cultural Diversity: To be selected from approved list. These courses may also be used to satisfy any other requirement.
*2	Kinesiology: KINE 198 Health and Fitness Activity and KINE 199 Required Physical Activity.
21	Electives (including minor hours; philosophy courses may not be used as elective hours.)
120	total hours

* See page 21.

Curricula in Political Science

Political science is the study of governments, the processes by which government officials and institutions make public policies and the effects of those policies on society. The governments of all nations—and all levels of government such as those for cities and states as well as national governments—are subjects for study in the discipline. Political scientists also devote a great deal of research to the political attitudes and behavior of citizens and of those individuals who hold official government positions. Political science also examines the relations among the nations of the world. Finally, political science poses such fundamental questions as how governments ought to be organized and what government policies best serve citizens' interests.

Course work in political science educates citizens about the character of government in the United States and other countries and about historical and contemporary issues of politics and public policy. Political science courses also illustrate how governmental processes can be subjected to scientific investigation, and they raise normative questions about the quality of government, the law, journalism, higher education and the private sector. Political science courses also help develop analytical abilities and written and oral communication skills.

Undergraduate Courses. The Department of Political Science offers courses in all facets of the discipline: American Government, International Relations, Comparative Politics, Law and Politics, Political Theory, and Public Administration and Policy.

American Government. American government involves the study of a variety of topics that range from the study of the Presidency and Congress to such topics as public opinion, mass media and politics, interest groups, political parties, campaigns and elections, voting behavior, American state and local governments, urban politics and women in politics.

International Relations. International relations involve the study of relations between the governments of the world. Courses are offered in world politics, American foreign relations and national security policy.

Comparative Politics. This area of political science allows students to develop an in-depth understanding of foreign governments and politics. Courses are offered in Western European governments, Latin American governments, Asian governments, Russia and the former Soviet states, and in the politics of inequality and globalization.

Law and Politics. While this area of political science is often of primary interest to students interested in going to law school, it also offers students the opportunity to study law and the courts within political environments. Courses are offered in U.S. Constitution law, the courts, politics and law, jurisprudence, women and the law, and comparative legal systems.

Political Theory. The study of political theory will provide the student with an understanding of the fundamental relationships between governments and people. Courses range from the study of Greek antiquity to contemporary political ideologies.

Public Administration and Policy. This area of political science encompasses the study of public administration and the role of public policy in American politics. Study in this area will provide the student with the opportunity to understand the fundamentals of administration within a political environment. Courses are offered in bureaucracy and administration, state and local finance, urban administration and government and the economy.

Five-Year Joint Degree Program

The Political Science Department, in conjunction with the Bush School of Government and Public Service, also offers a joint degree program that enables students to receive both their Political Science undergraduate degree and a Master of Public Service and Administration (MPSA) degree in five years. Students admitted into this program will be enrolled in Bush School graduate courses with an undergraduate classification for the fall of their fourth year and will be re-classified as degree seeking master's degree students upon completing 116 credit hours, typically in the following semester. These credit hours must include all specific course prerequisites either for a Bachelor of Arts or Bachelor of Science degree in Political Science, as well as the courses required by the College of Liberal Arts and by Texas A&M University for an undergraduate degree. Students will be required to complete the same two-year, 48 hour curriculum as other students admitted to the Bush School's MPSA program.

Honors Program

The Department of Political Science participates actively in the University honors program. Honors courses are available in all areas of political science. In addition, students may graduate with honors distinction in political science. Honor students also are offered individual instruction under POLS 497. Students interested in the Department's Honors Program should contact the Political Science Undergraduate Programs Office.

Certificate in European Union Politics

The Certificate in European Union Politics is an initiative of the European Union Center and the Department of Political Science. Both interdisciplinary and international in its orientation, the Certificate program offers students seeking a Bachelor of Arts or Bachelor of Science degree at Texas A&M University the opportunity to combine courses, intermediate level foreign language skills, other relevant experiences on campus, and a study abroad.

Certificate requirements include 18 semester hours of course work including an approved study abroad program. The 18 semester hours of course work can be accommodated within the regular undergraduate curriculum. Students are encouraged to begin planning as freshmen to avoid the addition of extra hours to the degree plan. Certificate requirements are specified in a current brochure available in the Department of Political Science's Undergraduate Program Office, Allen Building, room 2024.

Successful completion of the program will be indicated on the student's transcript. Each student will also receive a program certificate upon graduation from Texas A&M University.



Certificate in Comparative Study of National Politics

The Certificate in Comparative Study of National Politics is a means of enhancing undergraduate education through a focused combination of courses and study abroad. Administered by the Political Science Department, the program is open to all Texas A&M University undergraduates, regardless of major. If you are interested in gaining background for post-graduate studies in comparative politics or comparative public policy, for a career in the U.S. Foreign Service or international aid work, or for job recruitment in areas such as international business, marketing or law, this certificate program may be for you.

This certificate program requires 18 hours of course work, including a capstone course involving comparative politics research. It also requires participation in a study abroad program. The 18 semester hours of course work can be accommodated within the regular undergraduate curriculum. Students are encouraged to begin planning as freshmen to avoid the addition of extra hours to the degree plan. Certificate requirements are specified in a current brochure available in the Department of Political Science's Undergraduate Programs Office, Allen Building, room 2024.

Successful completion of the program will be indicated on the student's transcript. Each student will receive a program certificate upon graduation from Texas A&M.

The Certificate in International Relations

The Certificate in International Relations is a means of enhancing undergraduate education through a focused combination of courses, an internship and language development. Administered by the Political Science Department, the program is open to all Texas A&M University undergraduates, regardless of major. If you are interested in gaining background for post-graduate studies in international relations; for a career in the U.S. Foreign Service, international intelligence or law enforcement, or as a military officer; or for job recruitment in areas such as international law for banking, this certificate program may be for you.

This certificate requires 18 hours of course work, including a capstone course involving international relations research. It also requires participation in an internship program. The 18 semester hours of course work can be accommodated within the regular undergraduate curriculum. Students are encouraged to begin planning as freshmen to avoid the addition of extra hours to the degree plan. Certificate requirements are specified in a current brochure available in the Department of Political Science's Undergraduate Programs Office, Allen Building, room 2024.

Successful completion of the program will be indicated on the student's transcript. Each student will receive a program certificate upon graduation from Texas A&M.

Certificate in Law, Politics and Society

The Certificate in Law, Politics and Society is a means of enhancing undergraduate education through a focused combination of courses and individualized research instruction. Administered by the Political Science Department, the program is open to all Texas A&M University, regardless of major. If you are interested in developing an intellectually-rigorous, research-oriented foundation for post-graduate studies focusing on the politics of law, courts and legal systems or for preparation for law school and the legal profession, this certificate program may be for you.

This certificate requires 18 hours of course work, including a capstone course involving doctrinal, empirical or comparative research into important socio-legal questions. The 18 semester hours of course work can be accommodated within the regular undergraduate curriculum. Students are encouraged to begin planning as freshmen to avoid the addition of extra hours to the degree plan. Certificate requirements are specified in a current brochure available in the Department of Political Science's Undergraduate Programs Office, Allen Building, room 2024.

Successful completion of the program will be indicated on the student's transcript. Each student will receive a program certificate upon graduation from Texas A&M.

Certificate in Foundations of Political Theory

The Certificate in Foundations of Political Theory is a means of enhancing undergraduate education through a focused combination of courses, independent study and program participation. Administered by the Political Science Department, the program is open to all Texas A&M University undergraduates, regardless of major. Students may choose one of two areas of concentration: history of political theory, or analytic political theory. If you are interested in gaining background for post-graduate studies in law, social science, history or political theory, or for a fulfilling career that builds on your analytical and expressive skills, this certificate may be for you.

This certificate requires 18 hours of course work, including an introductory course in political theory and a capstone senior research course on a relevant topic. It also requires frequent participation in program activities such as lectures and conferences. The 18 semester hours of course work can be accommodated within the regular undergraduate curriculum. Students are encouraged to begin planning as freshmen to avoid the addition of extra hours to the degree plan. Certificate requirements are specified in a current brochure available in the Department of Political Science's Undergraduate Programs Office, Allen Building, room 2024.

Successful completion of the program will be indicated on the student's transcript. Each student will receive a program certificate upon graduation from Texas A&M.

Certificate in Race, Ethnicity, and Gender Politics

The Certificate in Race, Ethnicity, and Gender Politics is a means of enhancing undergraduate education through a focused program of courses and attendance at relevant lectures. Administered by the Political Science Department, the program is open to all Texas A&M University undergraduates, regardless of major. If you are interested in gaining background for post-graduate studies in law, social science, history, public policy, or for a fulfilling career that builds on your analytical and expressive skills, this certificate program may be for you.

The program requires 18 hours of course work and attendance at a number of relevant university lectures. Students are encouraged to begin planning as freshmen to avoid the addition of extra hours to the degree plan. Certificate requirements are specified in a current brochure available in the Department of Political Science's Undergraduate Programs Office, Allen Building, room 2024.

Successful completion of the program will be indicated on the student's transcript. Each student will receive a program certificate upon graduation from Texas A&M.

Teacher Certification

Students desiring certification to teach civics or government in secondary schools in Texas must meet special additional requirements.

More complete information on requirements for teacher certification may be found in the College of Education and Human Development section under secondary certification.

Bachelor of Arts

Political Science. 33 credits. No more than 33 credits in political science may be applied to the degree. Students must complete POLS 206, 207 and 209 and 24 political science elective hours. A grade of C or higher is required for a course to be counted in the major field.

Credits	Course
3	POLS 206 American National Government.
3	POLS 207 State and Local Government.
3	POLS 209 Introduction to Political Science Research. Students must complete POLS 209 before taking more than six hours of 300- or 400-level courses in Political Science.
24	Electives Distribution Requirement: In addition to the required courses in American Government (POLS 206 and 207), students must complete one course in at least two of the following three areas of Political Science: Political Theory—POLS 303, 349, 350, 359, 364, 369, 454, 455, 456, 462; Comparative Governments—POLS 311, 312, 322, 323, 324, 326, 328, 329, 338, 352, 365, 421, 424, 432; International Relations—POLS 331, 413, 415, 423, 429, 447.

College and University Requirements. Other courses may qualify for the following categories. Students should consult the approved list of courses available in the Undergraduate Student Services Office in the College of Liberal Arts. The following lists incorporate University Core Curriculum requirements. No course can be counted in more than one category.

Credits	Course
3	ENGL 104 Composition and Rhetoric.
3	Communication (3 hours): To be selected from ENGL 203, 210, 301, 235, 236 or 241; COMM 203 or 243.
6	Literature in English (6 hours): To be selected from ENGL 203 (unless 203 is used to satisfy the communication requirement), 212, 221, 222, 227, 228, 231, 232 or courses for which one of these listed courses is a prerequisite.
14	Foreign Language (14 hours or equivalent): Four course sequence in French, German, Russian, Spanish, Italian, Japanese, Greek or Latin unless permission is received from the department head to substitute work in other languages. This will not satisfy the college humanities and visual and performing arts requirements.
6	Mathematics: At least 3 hours must be in MATH (excluding 102, 103, 104, 130, 150, 165, 365 and 366). Three hours also may be in logic.
9	Humanities and Visual and Performing Arts: 9 hours to be selected from the approved list in the University Core Curriculum section of this catalog.

Credits	Course
8	Natural Sciences: Two or more courses which deal with fundamental principles and in which a critical evaluation and analysis of data and processes are required. A minimum of one course shall include a corresponding laboratory. See approved list in the University Core Curriculum section of this catalog.
6	Social and Behavioral Sciences: To be selected from such areas as cultural anthropology, economics, geography, psychology, and applied ethics. See approved list in the University Core Curriculum section of this catalog.
6	U.S. History and Political Science: HIST 105 and 106 or other courses in American and Texas history, except that courses pertaining solely to Texas history may not comprise more than 3 hours.
(6)	International and Cultural Diversity: To be selected from approved list. This course may also be used to satisfy any other requirement.
*2	Kinesiology: KINE 198 Health and Fitness Activity and KINE 199 Required Physical Activity.
24	Free Electives: Students may choose 9 hours of free electives. Remaining hours must be approved by the departmental advisor. (Political science courses may not be used as elective hours.)
<hr/> 120	total hours

* See page 21.

Bachelor of Science

Political Science. 33 credits. No more than 33 credits in political science may be applied to the degree. Students must complete POLS 206, 207, 209 and 24 political science elective hours.

Credits	Course
3	POLS 206 American National Government.
3	POLS 207 State and Local Government.
3	POLS 209 Introduction to Political Science Research. Students must complete POLS 209 before taking more than 6 hours of 300- or 400-level courses in political science.
24	Electives Distribution Requirement: In addition to the required courses in American Government (POLS 206 and 207) students must complete one course in at least two of the following three areas of political science. Political Theory—POLS 303, 349, 350, 359, 364, 369, 454, 455; Comparative Governments—POLS 311, 312, 322, 323, 324, 326, 328, 329, 338, 352, 365, 421, 424, 432; International Relations—POLS 331, 413, 415, 423, 429, 447.

Departmental Requirements

Credits	Course
3-4	Quantitative Skills: POLS 309 or MATH 152
8	Foreign Language: A student must complete two semesters of 100-level language courses (in the same language) or the equivalent. A student who has completed two years or more of high school language must still qualify through examination or additional course work at the college level.

Political Science "Science Experience": In order to matriculate with this degree, the student must have completed a *bona fide* "science experience" within political science. This requirement may be met by (a) writing an honors thesis using scientific methodology, (b) completing an independent study employing scientific methodology, (c) completing a course specifically designed to engage the student in a scientific project, (d) completing a substantial, scientific project in any political science course [requires a letter from the instructor describing the project and explaining how it fulfills the requirement]. In all cases, students should consult with an undergraduate advisor in political science *prior to* engaging in any of the latter activities to determine whether it will actually fulfill this requirement. Credit hours associated with completing this requirement count toward the maximum hours in the major.



College and University Requirements. Other courses may qualify for the following categories. Students should consult the approved list of courses available in the Undergraduate Student Services Office in the College of Liberal Arts. The following lists incorporate University Core Curriculum requirements. No course can be counted in more than one category.

Credits	Course
3	ENGL 104 Composition and Rhetoric.
3	Communication (3 hours): To be selected from ENGL 203, 210, 301,235, 236 or 241; COMM 203 or 243.
6	Literature in English (6 hours): To be selected from ENGL 203 (unless 203 is used to satisfy the communication requirement), 212, 221, 222, 227, 228, 231, 232 or courses for which one of these listed courses is a prerequisite.
7	Mathematics: MATH 151 and PHIL 240
6	Statistics: STAT 307 and either STAT 301 or 303. (Note: only one of STAT 301 or 303 should be taken for credit.)
9	Humanities and Visual and Performing Arts: 9 hours to be selected from the approved list in the University Core Curriculum section of this catalog.
8	Natural Sciences: Two or more courses which deal with fundamental principles and in which a critical evaluation and analysis of data and processes are required. A minimum of one course shall include a corresponding laboratory. See approved list in the University Core Curriculum section of this catalog.
6	Social and Behavioral Sciences: To be selected from such areas as cultural anthropology, economics, geography, psychology, and applied ethics. See approved list in the University Core Curriculum section of this catalog.
6	U.S. History and Political Science: HIST 105 and 106 or other courses in American and Texas history, except that courses pertaining solely to Texas history may not comprise more than 3 hours.
(6)	International and Cultural Diversity: To be selected from approved list. This course may also be used to satisfy any other requirement.
*2	Kinesiology: KINE 198 Health and Fitness Activity and KINE 199 Required Physical Activity.
19-21	Free Electives: The number of non-POLS elective hours depends on whether POLS 309 is taken in lieu of MATH 152. A student may freely choose 9 hours of free electives. The remaining hours must be approved by the departmental advisor. (Political science courses may not be used as elective hours.)
<hr/> 120	total hours

* See page 21.

Curricula in Psychology

Students majoring in psychology may earn either the Bachelor of Arts or Bachelor of Science degree. The psychology course requirements for the two degrees are identical; they differ with respect to the requirements in other disciplines. For example, the B.A. degree requires courses in a foreign language and extra humanities hours, whereas the B.S. degree requires additional hours in the physical and biological sciences. The two degrees are offered to allow students to complete their non-psychology course of study in fields of greatest interest to them. Thus, students who have stronger interests in the sciences would probably pursue the B.S. degree, while those with stronger interests in foreign language and the humanities would pursue the B.A. degree.

Both degrees provide students with the necessary curriculum requirements to pursue graduate study in psychology in most institutions, as well as other professional fields such as law. Students planning to apply to medical schools are advised to select the B.S. degree program.

Students who qualify for the University Honors Program should contact the Department of Psychology about the department's own honors program which places an emphasis on small classes and independent research experience.

A non-psychology minor is optional for psychology majors. If chosen, a minor must consist of 15–18 credit hours, no more than 9 of which may be lower division and must be declared before the student completes 75 credit hours. No more than 6 hours from the minor may be used to fulfill other Core requirements. A grade of C or higher is required if a course is to be counted in the major or minor field. A psychology minor is available for non-psychology majors. A neuroscience minor is available to both psychology and non-psychology majors. For more information about Psychology undergraduate programs, please visit the Department Web site at psychology.tamu.edu.

Bachelor of Arts (120 hour minimum)

Psychology. 33 hours. No more than 33 hours in psychology may be applied to the degree. A grade of C or higher is required if a course is to be counted in the major field. Enrollment in PSYC 107, then the PSYC 203–204 sequence during freshman and sophomore years is strongly recommended.

Credits	Course
3	PSYC 107 Introduction to Psychology
3	PSYC 203 Elementary Statistics for Psychology
3	PSYC 204 Experimental Psychology
6	Choose two: PSYC 306, 307, 315, 330
6	Choose two: PSYC 311, 319, 320, 335, 340, 345
12	Psychology electives. May include additional courses from above lists. No more than a combined maximum of 6 hours of 484, 485, or 485H are permitted.

Other Departmental, College and University Requirements. The following requirements incorporate College and University requirements, but in some cases (noted) are more stringent. No course can be counted in more than one category.

Credits	Course
	Communication:
3	1. ENGL 104.
3	2. ENGL 210, 235, 236, 241, 301 (departmental requirement).
6	3. Two courses chosen from among ENGL 203, 212, 221, 222, 227, 228, 231, 232.
14	4. Foreign Language. Four-course sequence in French, German, Russian, Spanish, Italian, Japanese, Greek or Latin.
	Mathematics:
6	MATH 131–467 (except MATH 150, 365, 366); PHIL 240, 341, 342.
12	Humanities and Visual and Performing Arts (9 hours college requirement + 3 hours department requirement): To be selected from the approved list of courses in such areas as anthropology, architecture, history, humanities, visual and performing arts, literature, philosophy, geography and theatre arts. See approved list available from the Undergraduate Advising Office in the Department of Psychology.
6	Social and Behavioral Sciences: To be selected from the approved list of courses in such areas as cultural anthropology, geography, political science, sociology, applied ethics and economics. Courses in psychology may not be used to satisfy this requirement. See the approved list in the Undergraduate Advising Office in the Department of Psychology.
8	Natural Sciences: Two or more science courses (at least one of which shall include a corresponding laboratory) must be selected from the approved list of science requirements in the University Core Curriculum. For a copy of the Core list, see the University Core Curriculum section of this catalog or the Undergraduate Advising Office in the Department of Psychology.
12	U.S. History and Political Science: POLS 206 and 207; HIST 105 and 106 or other courses in American and Texas history, except courses pertaining solely to Texas history may not comprise more than 3 hours.
6	International and Cultural Diversity: To be selected from approved list in the University Core Curriculum section of this catalog. This course may also be used to satisfy any other requirement.
*2	Kinesiology: KINE 198 Health and Fitness Activity and KINE 199 Required Physical Activity.
15–18	Minor Field of Study: A minor is not required. Electives: Sufficient elective hours (not in psychology) to bring the total credit hours to 120. No more than 9 hours of any combination of military science, naval science, aerospace studies and physical activity may be counted.
(36)	Residency Requirement: Complete a minimum of 36 hours of 300- and 400-level course work at Texas A&M.
120	hour minimum

* See page 21.

Bachelor of Science (120 hour minimum)

Psychology. 33 hours. No more than 33 hours in psychology may be applied to the degree. A grade of C or higher is required if a course is to be counted in the major field. Enrollment in PSYC 107, then the PSYC 203–204 sequence during the freshman and sophomore years is strongly recommended.

Credits	Course
3	PSYC 107 Introduction to Psychology
3	PSYC 203 Elementary Statistics for Psychology
3	PSYC 204 Experimental Psychology
6	Select two: PSYC 306, 307, 315, 330
6	Select two: PSYC 311, 319, 320, 335, 340, 345
12	Psychology electives. May include additional courses from above lists. No more than a combined maximum of 6 hours of 484, 485 or 485H are permitted.

Other Departmental, College and University Requirements. The following requirements incorporate College and University requirements, but may be more stringent (noted).

Credits	Course
	Communication:
3	1. ENGL 104.
3	2. ENGL 210, 235, 236, 241, 301 (departmental requirement).
6	3. Two courses chosen from among ENGL 203, 212, 221, 222, 227, 228, 231, 232.
	Mathematics:
6	MATH 131–467 (except MATH 150, 365, 366); PHIL 240, 341, 342.
9	Humanities and Visual and Performing Arts: To be selected from the approved list of courses in such areas as anthropology, architecture, history, humanities, arts, literature, philosophy, geography and theatre arts. See approved list in the Undergraduate Advising Office in the Department of Psychology.
6	Social and Behavioral Sciences: To be selected from the approved list of courses in such areas as cultural anthropology, geography, political science, sociology, applied ethics and economics. Courses in psychology may not be used to satisfy this requirement. See the approved list in the Undergraduate Advising Office in the Department of Psychology.
21	Natural Sciences: Two or more science courses (at least one of which shall include a corresponding laboratory) must be selected from the approved list of science requirements in the University Core Curriculum section of the catalog. An additional 13 hours must be taken from the University Core Curriculum list and/or from the department list, available from the Undergraduate Advising Office in the Department of Psychology.
6	International and Cultural Diversity: To be selected from approved list. This course may also be used to satisfy any other requirement.
12	U.S. History and Political Science: POLS 206 and 207; HIST 105 and 106 or other courses in American and Texas history, except courses pertaining solely to Texas history may not comprise more than 3 hours.
*2	Kinesiology: KINE 198 Health and Fitness Activity and KINE 199 Required Physical Activity.
15–18	Minor Field of Study: A minor is not required.
	Electives: Sufficient elective hours (not in Psychology) to bring the total number of hours to 120. No more than 9 hours of any combination of military science, naval science, aerospace studies and physical activity may be counted.
(36)	Residency Requirement: Complete a minimum of 36 hours of 300- and 400-level course work at Texas A&M.
120	hour minimum

Curricula in Sociology

Sociology is the scientific study of society. The discipline examines all aspects of human behavior and, in particular, interpersonal relationships and the development of social structures.

The Department of Sociology offers courses in such areas as the family, race and ethnic relations, demography, social stratification and inequality, social psychology, complex organizations, community, environment, criminology, the sociology of religion, global sociology and social change.

Sociological training is useful in a broad variety of occupations. Our course work provides an understanding of the determinants of individual opinions and beliefs, organizational behavior, social trends and world events. These skills are critical to marketing, law, human resources, journalism, government and strategic management. Sociology is the best form of training for entry into the helping professions, and an outstanding generalized preparation for business and industry.

Teacher Certification

Students desiring certification to teach sociology in secondary schools of Texas must complete a social studies composite totaling 76 hours with a sociology emphasis. Students must complete 33 hours in sociology; 9 hours in political science; 6 hours in economics; 10 hours in geography; and 18 hours in history.

Sociology majors desiring certification must include the following among their sociology courses: one of SOCI 317, 323 or 403; one of SOCI 316 or 424; and SOCI 411. Students should consult an undergraduate Sociology advisor as early as possible to review the requirements of the social studies composite.

In addition to the social studies composite, students must also take: EDTC 305 and 345; INST 210; COMM 203; TEFB 201, 322, 323, 324, 401, 404, 406, 407 and 425. More complete information on requests for teacher certification may be found in the College of Education and Human Development section under secondary certification.

Bachelor of Arts (120 hour minimum)

Sociology. 33 hours minimum; no more than 33 hours of SOCI can be applied to the degree. The following SOCI courses are required. A grade of C or higher is required for a course to be counted in the major field. No more than 3 hours of 484 credit may be applied to the Bachelor of Arts degree in Sociology.

Credit	Course
3	SOCI 205 Principles of Sociology
3	SOCI 220 Methods of Social Research
3	SOCI 230 Classical Sociological Theory
3	SOCI 420 Advanced Methods of Social Research
3	SOCI 430 Contemporary Sociological Theory
18	Sociology electives

College and University Requirements. Other courses may qualify for the following categories. Students should consult the approved list of courses available in the Undergraduate Student Services Office in the College of Liberal Arts or from departmental advisors. The following lists incorporate University Core Curriculum requirements. No course may be counted in more than one category.

Credit	Course
6	Communication: 1. ENGL 104 (C or better required for credit). 2. One course from ENGL 203, 210, 301, 235, 236 or 241; COMM 203 and 243.
6	Literature in English (6 hours): To be selected from ENGL 203 (unless 203 is used to satisfy the communication requirement), 212, 221, 222, 227, 228, 231, 232 or courses for which one of these listed courses is a prerequisite.
14	Foreign Language: Four-course sequence in French, German, Russian, Spanish, Italian, Greek or Latin, or another language if approved by the department head.
6	Mathematics: At least 3 hours must be in MATH (excluding 102, 103, 104, 130, 150, 165, 365, 366). 3 hours may be in logic.
8	Natural Sciences: Two or more courses; minimum of one course shall include a corresponding laboratory. The list of acceptable courses is available from the departmental office or the Undergraduate Student Services Office in the College of Liberal Arts.
9	Humanities and Visual and Performing Arts: To be selected from the approved list available in the Undergraduate Student Services Office in the College of Liberal Arts or from departmental advisors.
6	Social and Behavioral Sciences: To be selected from the approved list available in the Undergraduate Student Services Office in the College of Liberal Arts or from departmental advisors.
12	U.S. History and Political Science: 1. POLS 206 and 207 (6 hours) 2. Two courses in American history, one of which may be Texas history (6 hours).
(3)	International and Cultural Diversity: To be selected from approved list. This course may also be used to satisfy any other requirement.
*2	Kinesiology: KINE 198 Health and Fitness Activity and KINE 199 Required Physical Activity.
18	Free Electives (Sociology courses may not be used as elective hours).
120	hour minimum

* See page 21.

Minor Field of Study. Sociology majors are not required to select a minor field of study. If chosen, the minor must consist of 15–18 hours, no more than 9 of which may be lower division. No more than 6 hours from the minor may be used to fulfill other requirements. A grade of C or higher is required if a course is to be counted in the minor field.

Bachelor of Science (120 hour minimum)

Sociology. 33 hours; minimum no more than 33 hours of SOCI can be applied to the degree. The following SOCI courses are required. A grade of C or higher is required if a course is to be counted in the major field. No more than 3 hours of 484 credit may be applied to the Bachelor of Science degree in Sociology.

Credit	Course
3	SOCI 205 Principles of Sociology
3	SOCI 220 Methods of Social Research
3	SOCI 230 Classical Sociological Theory
3	SOCI 420 Advanced Methods of Social Research
3	SOCI 430 Contemporary Sociological Theory
18	Sociology electives

College and University Requirements. Other courses may qualify for the following categories. Students should consult the approved list of courses available in the Undergraduate Student Services Office in the College of Liberal Arts or from departmental advisors. The following lists incorporate University Core Curriculum requirements. No course may be counted in more than one category.

Credit	Course
6	Communication: 1. ENGL 104 (C or better required for credit). 2. One course from ENGL 203, 210, 301, 235, 236 or 241.
6	Literature in English: To be selected from ENGL 203 (unless 203 is used to satisfy the communication requirement), 212, 221, 222, 227, 228, 231, 232 or courses for which one of these listed courses is a prerequisite.
6	Mathematics: At least 3 hours must be in MATH (excluding 102, 103, 104, 130, 150, 165, 365, 366); 3 hours may be in logic.
8	Natural Sciences: Two or more courses, minimum of one course shall include a corresponding laboratory. The list of acceptable courses is in the University Core Curriculum section of this catalog.
9	Humanities and Visual and Performing Arts: To be selected from the approved list in the University Core Curriculum section of this catalog.
6	Social and Behavioral Sciences: To be selected from the approved list in the University Core Curriculum section of this catalog.
12	U.S. History and Political Science: 1. POLS 206 and 207 (6 hours) 2. Two courses in American history, one of which may be Texas history (6 hours).
(3)	International and Cultural Diversity: To be selected from approved list. This course may also be used to satisfy any other requirement.
15	Additional Science Requirements: 12 hours of approved B.S. courses from list available in the Undergraduate Student Services Office in the College of Liberal Arts or from departmental advisors.
*2	Kinesiology: KINE 198 Health and Fitness Activity and KINE 199 Required Physical Activity.
18	Free Electives.
120	hour minimum

* See page 21.

Minor Field of Study. Sociology majors are not required to select a minor field of study. If chosen, the minor must consist of 15–18 hours, no more than 9 of which may be lower division. No more than 6 hours from the minor may be used to fulfill other requirements. A grade of C or higher is required if a course is to be counted in the minor field.

Certificate in Global Sociology

The Certificate in Global Sociology gives students concentrated educational experience in international sociological perspectives. This certificate program is open to all Texas A&M sociology majors. The certificate indicates meritorious completion of the appropriate courses.

All students in this certificate program must complete the following requirements:

- a. SOCI 206 Global Social Trends
- b. Students must complete three additional courses from the following list:
 - SOCI 207 Introduction to Gender and Society
 - SOCI 312 Population and Society
 - SOCI 313 Sociology of the Military
 - SOCI 322 Industrial Sociology
 - SOCI 324 Social Change
 - SOCI 325 International Business Behavior
 - SOCI 328 Environmental Sociology
 - SOCI 329 Pacific Rim Business Behavior
 - SOCI 330 Sociology of Nutrition
 - SOCI 340 Post-Soviet Societies
 - SOCI 350 Islamic Societies
 - SOCI 370 International Migration
 - SOCI 423 Internationalization and Social Change
 - SOCI 484 Field Practicum*
 - SOCI 489 Special Topics in Sociology (see undergraduate advisor)*
- c. International Experience: Each student must ordinarily complete one semester abroad, either through one of Texas A&M's regular programs (such as the Santa Chiara, Italy program) or another approved study abroad program, international internship or similar academic experience in another country. With the permission of the undergraduate advisor, a student may substitute appropriate overseas work or experience. Course credit from courses taken during study abroad may sometimes count toward the three required courses in part (b), with the approval of the undergraduate advisor.
- d. Language: A minimum of two years (four courses) at the college level of a non-English modern language is required, normally taken prior to the study abroad or other international experience. The language should be appropriate to the student's overall program.
- e. A cumulative GPR of 3.0 or above must be earned in courses counting toward the certificate.
- f. Transfer courses, independent studies and credit by exam cannot substitute for the required courses unless approved by the undergraduate advisor for certificate purposes.

* Credit contingent on appropriateness of subject matter as determined by undergraduate advisor.

Certificate in Sociology of Race and Ethnicity

The Certificate in Sociology of Race and Ethnicity gives students 12 hours of intensive training in a broad range of issues related to diversity and ethnic dynamics. This certificate program is open to all Texas A&M sociology majors. The certificate indicates meritorious completion of the appropriate courses.

All students in this certificate program must complete the following requirements:

- a. SOCI 317 Racial and Ethnic Relations
- b. Students must complete three additional courses from the following list:
 - SOCI 323 Sociology of African Americans
 - SOCI 370 Sociology of Migration
 - SOCI 403 Sociology of Latinos
 - SOCI 419 Social Class in Contemporary Society
 - SOCI 484 Field Practicum*
 - SOCI 489 Special Topics in Sociology*
- c. A cumulative GPR of 3.0 or above must be earned in courses counting towards the certificate.
- d. Transfer courses, independent studies and credit by exam cannot substitute for the required courses unless approved by the undergraduate advisor for certificate purposes.

* Credit contingent on appropriateness of subject matter as determined by undergraduate advisor.



Certificate in Sociology of Gender

The Certificate in Sociology of Gender prepares students for graduate studies in gender-related issues or for work in which gender issues are important. This course of study will also help the student to be a knowledgeable and responsible citizen in a society which has become increasingly committed to establishing gender equality. Students may, if they wish, combine this certificate with a minor in Women's Studies. This certificate program is open to all Texas A&M sociology majors. The certificate indicates meritorious completion of the appropriate courses.

All students in this certificate program must complete the following requirements:

- a. SOCI 207 Introduction to Gender and Society or SOCI 316 Sociology of Gender
- b. Students must take three additional courses from the following list:
 - SOCI 207 Introduction to Gender and Society
 - SOCI 312 Population and Society
 - SOCI 315 The Marriage Institution
 - SOCI 316 Sociology of Gender
 - SOCI 322 Industrial Sociology
 - SOCI 424 Women and Work
 - SOCI 484 Field Practicum*
 - SOCI 489 Special Topics in Sociology*
- c. A cumulative GPR of at least 3.0 must be earned in courses counting toward the certificate.
- d. Transfer courses, independent studies and credit by exam cannot substitute for the required courses unless approved by the undergraduate advisor for certificate purposes.

* Credit contingent on appropriateness of subject matter as determined by undergraduate advisor.



TEXAS A&M
UNIVERSITY

A black and white photograph of a bronze statue of a man with a beard and mustache, wearing a suit and tie. The statue is in the foreground, looking slightly to the left. In the background, there is a large, domed building, likely the Texas State Capitol, partially obscured by trees and foliage.

COLLEGE OF SCIENCE

★ 2008–2009 UNDERGRADUATE CATALOG ★

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College of Science

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Associate Dean for Diversity	Sherry J. Yennello, B.S., M.S., Ph.D.
Assistant Dean for Finance and Administration	Julie B. Allen, B.B.A.

General Statement

Nature, its origins and its evolution, its strengths and its frailties, its order and its perceived disarray, constitutes the realm of study classified as science. Scientists search for interconnecting relationships and traits of order to understand the nature of our universe. Each new discovery provides additional knowledge and frequently enables the solution of previously perplexing questions. Often technology is able to transform scientific discovery into applications which are beneficial to our everyday living. Technology would be impoverished were it not for the new knowledge continually being sought by scientists. At the same time, science could not progress without the advances in instrumentation and techniques generated by technology. Thus, a symbiotic relationship exists between science and technology, a relationship which permeates the courses and programs in the college.

The departments of the College of Science are organized to respond to the needs of students for both general and specialized education in science in offering the Bachelor of Science and the Bachelor of Arts degrees in Biology, Chemistry, Mathematics and Physics. The former degree permits heavy emphasis in selected subject matter and closely allied fields, whereas the latter degree is designed for the student who desires a more broadly based education while still specializing in one of the sciences. Additionally, the college offers a Bachelor of Science degree in Applied Mathematical Science, a joint program between the Departments of Mathematics and Statistics.

For this reason, many students select a degree program in science to complete their prerequisite courses for professional study programs. The early admissions option to professional schools of dentistry or medicine in the zoology degree program provides the opportunity for a student to receive a degree in zoology if they are successful in gaining admission to a professional study program in medicine or dentistry prior to completion of a regular four-year degree program. To receive the degree, they must complete all requirements under this program and successfully complete their first year of medical or dental school.

In addition to the Departments of Biology, Chemistry, Mathematics, Physics and Statistics, the College of Science includes the Cyclotron Institute, a research institute that emphasizes fundamental studies of nuclear science in which both undergraduate and graduate students participate. The College of Science offers M.S. and Ph.D. programs in all departments.

General Degree Requirements

Degree requirements for science majors are organized into: (1) general requirements, including University Core Curriculum requirements and College of Science requirements; (2) requirements of the major field of study; (3) requirements of the minor field of study for those students completing a B.A. degree; and (4) electives.

With the exception of physical activity and general elective requirements, courses taken to satisfy degree requirements must be taken for letter grades.

Students are responsible for selecting the courses in their degree plan and assuring they abide by Texas A&M University Student Rules in meeting all degree requirements. Each department has faculty advisors who should be consulted in developing degree programs.

I. **General Requirements:** General requirements include those which are required in every degree program at the University. Please refer to these requirements defined in the University Core Curriculum and graduation requirements in computer science and foreign language sections of this catalog. Special guidelines should be noted in the following categories:

A. U.S. History and Political Science (12 hours)

1. Political Science (6 hours) This requirement may be met through POLS 206 and 207.

2. U.S. History (6 hours) Two courses in U.S. history will fulfill this requirement. Students seeking teacher certification must complete HIST 105 and 106.

NOTE: Three hours in history and three hours of political science may be substituted by successfully completing the required four semesters of upper-level ROTC curriculum.

B. Foreign Language

1. The B.A. in Biology requires successful completion of at least a two-semester sequence at the University level of a foreign language. The course sequence must be in the same language. (All other degrees must meet those found in graduation requirements in computer science and foreign language.)

C. The International and Cultural Diversity portion of the University Core Curriculum may be fulfilled by 6 hours from the courses listed on page 20. These courses may be in addition to other University Core Curriculum requirements, or if a course in this category satisfies another area of the Core, it can be used to meet both requirements.

II. **Major Field of Study:** Each department sets its own requirements for the major. At least 12 semester hours in the major must be completed in advanced courses (300- or 400-level) in residence at Texas A&M.

III. **Minor Field of Study:** The B.A. degree requires a minor field of study or an area of emphasis for students pursuing teacher certification. A minor requires 15–18 semester hours in one discipline. Six of these hours must be advanced (300- or 400-level) courses. Students must contact the department offering the minor to determine course requirements. Students pursuing a B.S. degree may select an optional minor. Contact the department offering the minor to determine course requirements.

IV. Electives: Electives should be chosen to enhance the student's degree program and/or complete professional school prerequisites if not contained in required courses in the degree plan. Elective courses must be above the minimum level required in other areas of the degree program. For example, MATH 102, 103 and 150 are not acceptable because they are below the minimum requirement of calculus. Also, introductory courses to another field of study such as BIMS 101 and AGLS 101 will not count toward degree requirements. Lower-level and upper-level ROTC courses are not acceptable as electives. Please consult an advisor when selecting electives.

Curricular Options

Honors Program. The College of Science participates in the University Honors Program designed to offer the superior student special opportunities for academic work of a range and depth appropriate to his or her capabilities and greater intellectual interests. For further information, refer to the section regarding the University Honors Program on page 164.

Cooperative Education Program. Cooperative education enables students to gain practical work experience and a salary while completing academic requirements. During the four-year academic program, co-op students complete two to four periods of work away from campus, gaining experience through on-the-job training and thus improving their opportunities for future employment. The Cooperative Education Office provides additional information about this program.

Minor Field of Study. Each department in the College of Science offers a minor. Students interested in pursuing a minor in a field in the College should contact the department offering the minor.

Summer Internships. A number of programs are available throughout the country which offer summer employment to students interested in specific fields of study and training. Each departmental advisor has information pertaining to these programs.

Integrated Fast Track Bachelor's and Master's Degrees. The Department of Mathematics provides the opportunity for ambitious and talented students to earn a bachelor's and a master's degree within a five year period. Eligible students earn graduate credit during their undergraduate study which allows them to complete this option. Interested students should contact the Mathematics Department if interested in this program.

Preparation for Professional Studies

Students interested in gaining admission to professional study programs in the health professions may do so through any course of study. Prerequisite course requirements may be completed as part of a regular degree program or through electives. Advising for students preparing for health profession careers is available, regardless of major, through the Office of Professional School Advising, Room 203, Academic Building, (979) 847-8938.

Medicine and Dentistry. Curricula in biology, chemistry, mathematics and physics within the College of Science readily accommodate the required courses needed for admission to professional studies in medicine and dentistry. Admission to medical and dental schools require the following prerequisites:

Chemistry:	101 or 103, 113; 102 or 104, 114; 227, 237, 228, 238
Biology:	111, 112 and two advanced biological sciences courses
Physics:	201, 202 or 208 or 218, 219
One semester of calculus:	MATH 131, 151 or 171 or STAT 302
English:	6 hours

Early Admission Program. The College of Science offers two methods of awarding a baccalaureate degree to students who gain admission to professional school prior to completion of their degree. The **Baccalaureate Degree Option for Students Granted Early Admission to Medical/Professional Programs** is available to all students regardless of their major. Information on this program can be found on page 29.

The early admission option in the zoology degree program allows the student who is accepted to medical or dental school the opportunity to receive a degree in zoology after three years of undergraduate study and the successful completion of their first year of medical or dental school. The prerequisites for professional school admission are contained within this program as well as additional courses necessary to receive a diploma.

Most students complete a four-year program prior to acceptance to professional school and thus it is advised a degree program leading to a standard baccalaureate degree be selected.

Veterinary Medicine. Please refer to the Admission Requirements—Professional Curriculum listed in the College of Veterinary Medicine and Biomedical Sciences.

Other Allied Health Programs. There are many allied health fields students may prepare for through degree programs in the College of Science. Prerequisite requirements for admission should be completed as part of a degree granting program.

Teacher Certification. The Secondary Provisional Teaching Certificate may be obtained in conjunction with a major in the College of Science. Requirements for teacher certification are described in the College of Education and Human Development section under secondary teacher certification. Interested students should contact the teacher certification advisor in the Department of Teaching, Learning and Culture.

International and Cultural Diversity Requirement

Texas A&M University requires its students to meet an International and Cultural Diversity requirement as part of the University's Core Curriculum. Meeting this requirement will require the careful selection of courses. The student is directed to page 20 of this catalog for detailed information regarding this requirement and also is encouraged to seek the advice of the student's academic advisor.

Curriculum in Applied Mathematical Sciences

Many advances in technology and business are achieved by people applying technical knowledge from statistics, computing science, finance, economics and mathematics. The curriculum in applied mathematical sciences provides study in all of these areas, with ample electives available to allow further in-depth study of any of these areas. In fact, there are six emphases in this curriculum: Applied Mathematics, Statistics, Actuarial Science, Economics, Biological Science and Scientific Computing. The Finance emphasis includes actuarial science. An Integrated Fast Track combined baccalaureate/graduate degree program is also offered.

A student completing this program is prepared to enter employment with analytical and quantitative tools relevant to technological industries and/or modern financial markets. On the other hand, with the appropriate electives chosen, the student is prepared to enter quantitatively oriented graduate schools. All advising for this degree option is done through the Undergraduate Program Office in the Department of Mathematics.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ENGL 104 Comp. and Rhetoric ¹	(3-0)	3	HIST 105 History of the U.S.....	(3-0)	3
MATH 171 Analytic Geometry and Calculus.....	(4-0)	4	MATH 172 Calculus	(4-0)	4
Computer science elective ²		4	Computer science elective ²		4
Science ³		4	Science ³		4
*KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>	*KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>
		16			16

SOPHOMORE YEAR

ECON 202 Prin. of Economics or			MATH 323 Linear Algebra I.....	(3-0)	3
ECON 203 Prin. of Economics ⁴	(3-0)	3	PHYS 218 Mechanics.....	(3-3)	4
HIST 106 History of the U.S.....	(3-0)	3	POLS 206 American Natl. Govt.....	(3-0)	3
MATH 220 Fund. of Discrete Math.	(3-0)	3	STAT 212 Principles of Statistics II	(3-0)	3
MATH 221 Several Variable Calculus.....	(4-0)	4	English literature elective ⁵		<u>3</u>
STAT 211 Principles of Statistics I.....	(3-0)	<u>3</u>			16
		16			

JUNIOR YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
MATH 308 Differential Equations.....	(3-0)	3	MATH 417 Numerical Analysis I ⁸	(3-3)	4
MATH 409 Advanced Calculus I.....	(3-0)	3	PHYS 208 Electricity and Optics.....	(3-3)	
POLS 207 State and Local Govt.....	(3-0)	3	or		
Emphasis hours ⁵		3	OCNG 451 Math. Model of Ocean Climate...	(3-2)	4
Elective hours ⁷		<u>3</u>	Emphasis hours ⁶		3
		15	Elective hours ⁷		<u>3</u>
					14

SENIOR YEAR

ENGL 210 Sci. and Technical Writing		
or		
ENGL 301 Technical Writing.....	(3-0)	3
Emphasis hours ⁶		18
Elective hours ^{7,8}		<u>6</u>
		27

total hours 120

- NOTES:**
1. ENGL 104 and 210 or 301 satisfy the communication requirement for the University Core Curriculum.
 2. Select 8 hours from CPSC 110, 111, 206 or 211.
 3. Freshman science courses are to be selected from BIOL 111; BIOL 112; CHEM 101/111 or CHEM 103/113; CHEM 102/112 or CHEM 104/114. Any 8 hours of these science courses satisfy the science requirement for the University Core Curriculum.
 4. Satisfies the 3 hours of the social and behavioral sciences requirement for the University Core Curriculum.
 5. Select 3 hours of English literature which fulfill the humanities requirement for the University Core Curriculum.
 6. Students must choose either the mathematics emphasis, the statistics emphasis, the actuarial science emphasis, the economics emphasis, the scientific computing emphasis, or the biological science emphasis. Students following the *applied mathematics* emphasis must take MATH 410; MATH 415 or 433; one of MATH 412, 414, 442 or 470; and 15 hours as follows: 9 hours chosen from 400-level mathematics courses; 6 hours chosen from 400-level mathematics or statistics courses, 210-level (or above) computer science courses, or 400-level industrial engineering courses. Students following the *statistics* emphasis must take STAT 407; STAT 408; STAT 414; and 15 hours as follows: 3 hours of 400-level industrial engineering courses; 6 hours chosen from 400-level mathematics or statistics courses; and 6 hours chosen from 400-level mathematics, 400-level statistics, 210-level (or above) computer science courses, or 400-level industrial engineering courses. Students following the *actuarial science* emphasis must take MATH 325; MATH 425; STAT 414; and 15 hours as follows: 6 hours chosen from 400-level mathematics, 400-level statistics, 210-level (or above) computer science courses, or 400-level industrial engineering courses; and 9 hours chosen from 300-level (or above) economics courses, or finance courses, or ECMT 463. The choice of the latter 9 hours must be approved by the student's undergraduate advisor, and no more than 6 hours can be chosen from industrial engineering courses. Students may not receive credit for CPSC 442 (due to its overlap with MATH 417). Students following the *economics* emphasis must take ECMT 463; ECON 323, 459; ISEN 420; and MATH 325, 425. An additional 4 hours of MATH at the 400- or 600-level (excluding MATH 401 and 403 and MATH 601) must also be taken. Students following the *computing science* emphasis must take MATH 417 or CPSC 442 and CPSC 211, 311, 441, and 433. An additional 12 hours from math at the 400 or 600 level (excluding MATH 401, 403 and 601) or CPSC at the 300 and 400 level, or ISEN 420 or ISEN 421 is also required. Students following the *biological science* emphasis should consult a departmental advisor.
 7. Electives will be chosen after consultation with the student's advisor. Three hours must be selected from the approved University Core Curriculum list for visual and performing arts. In addition, 6 hours of courses must be in the area of international and cultural diversity. These may be in addition to other University Core Curriculum courses, or if a course in this category satisfies another area of the Core, it can be used to meet both requirements. Students desiring teacher certification should consult the requirements for certification before registering for electives.
 8. The economics option for the applied mathematical sciences degree requires that MATH 411 or STAT 414 be taken instead of MATH 417 as a four credit course, students pursuing the economics option will need to take one additional hour of free electives. MATH 417 may be taken as a math elective. Students following the computing science option may take CPSC 442 instead of MATH 417.

* See page 21.

Curricula in Biology

No one really knows what the world will be like 50 years from now, but it is certain that biologists will be at the forefront of science attempting to find solutions to many of the world's problems and to find answers to intriguing questions about animals, plants and microbes at the molecular, cellular, organismal and ecosystem levels. Biologists will be concerned with pollution of the environment, cause and cure of disease, population control, recurring food shortages, preservation of species and many other aspects resulting from the impact of technological changes on life forms. Those who are astounded by the array of living things on the earth and who seek challenging, creative work should consider a career in biology or in a biology-related field. The Department of Biology offers five distinct four-year curricula which lead to the baccalaureate degree. These are the Bachelor of Arts in Biology, Bachelor of Science in Biology, Bachelor of Science in Molecular and Cell Biology, Bachelor of Science in Microbiology and Bachelor of Science in Zoology. The curricula are designed to maximize postbaccalaureate opportunities in: (1) **professional schools** of medicine, veterinary medicine and dentistry; (2) **allied health schools** of physical and occupational therapy, physician assistant programs, optometry, pharmacy, and nursing; (3) **graduate education** leading to teaching and research careers in universities, in industry or in state or national agencies; (4) **teaching** at junior high or high school levels and (5) **jobs** in biotechnology, research laboratories, pharmaceutical companies and field biology. The Department of Biology degree plans will enable students to complete all entrance requirements for graduate and professional schools as well as medical technology, pharmacy, optometry, nursing, physical therapy, and other paramedical and health support fields.

Advising

Because some careers in biology require advanced and/or specialized training, it is essential to take advantage of advising opportunities. In the Department of Biology, there are professional advisors in the Biology Undergraduate Programs Office. The advisor may be consulted prior to each registration period and as the student needs. Questions regarding registration, degree checks, transfer of courses, advanced placements and other academic matters are handled in the Office of Undergraduate Programs. Students with special interests in graduate study should consult the graduate advisor. Information concerning entrance to professional schools of medicine, dentistry and other health related fields is available from the Office of Professional School Advising.

Requirements for all Baccalaureate Degrees in the Department of Biology

Each student seeking a baccalaureate degree in the Department of Biology is required to master a common body of knowledge in science. In addition, the student must take courses essential to a liberal education. **Students will note that the first two years of all curricula offered by the Department of Biology are similar.** Notes that explain the superscripts are located after the B.S. curriculum in **Zoology**. Electives must include the 6 hours of international and cultural diversity courses required for graduation. Students must also take at least two writing-intensive courses in biology. Other requirements for graduation are listed in the Texas A&M University Student Rules and this catalog.

Students in the Department of Biology must make a grade of C or better in BIOL 111 and 112. Additionally, students may have only one D in courses within the major used to satisfy required or directed electives for a given degree plan. It is strongly suggested that the freshman and sophomore level biology, chemistry and physics courses be completed before enrolling in any junior or senior level science.

Human Biology Track. This track is for students interested in pursuing professional schools including medical, dental and allied health programs (e.g., nursing, occupational therapy, optometry, pharmacy, physical therapy and physician assistant). The focus of the science courses on human biology will better prepare these students for their chosen fields. Suggested courses include:

Social and Behavioral Sciences:	PSYC 107 and PSYC 306 or SOCI 205 and SOCI 425
Humanities:	PHIL 480
Biology Electives:	BIOL 318, 319, 320, 343, 344, 388, 454, 456
Free Electives:	HLTH 335, 354; PLAN 370; and any course listed above
International and Cultural Diversity:	HLTH 236; 334

Education Track. This track is for students wishing to acquire state certification to teach at the secondary level upon graduation. Students should seek advice from the advisors within their department and from the College of Education and Human Development, as well as from the advisor in charge of their teaching option. The intention is to make the best possible use of social science, humanity, free and directed electives, thereby condensing as many of the certification requirements as possible into the degree plan. Suggested courses include:

Social and Behavioral Sciences:	SOCI 317
Humanities:	ENGL 361 and any other English literature course
Communication:	ENGL 210 or 301
Biology Electives:	BIOL 301 or 328; 318, 335, 466
Free Electives:	EDTC 305, 345; INST 301; COMM 203; TEED 323, 406

Marine Biology Track. This track is for students requiring a more rigorous and in-depth foundation in biological courses that apply to marine environments and ecosystems. This degree plan is ideal for students who intend to pursue graduate studies in marine biology or serve as field biologists at national seashores or sanctuaries. A minimum of twenty hours is required to fulfill this requirement, to be chosen from the following:

Biology Electives:	BIOL 335, 440; and at least three hours of related ZOOLOGICAL research or field experience 484, 485 or 491 (or any combination)
Free Electives:	OCNG 251, 401 or 420; WFSC 311, 425

Ecology/Environmental Track. This track is particularly designed for students interested in environmental consulting, environmental protection and ecosystem evaluation. This degree plan can be adapted to focus on particular areas or populations within an ecosystem. A minimum of 18 hours is required to fulfill this requirement, to be chosen from the following:

Communication:	ENGL 210 or 301
Biology Electives:	BIOL 335, 440; or MEPS 313/315
Free Electives:	CHEM 315/318; ENTO 201; PLPA 301/303 or WFSC 311, 401 or 402

Quantitative Biology Track. This track is for students interested in applying quantitative approaches, including mathematical, statistical, and computational techniques, to fundamental problems in biology. Because courses for this track are still being developed in conjunction with the Departments of Mathematics and Statistics, students should check with their advisor for new quantitative biology courses:

Mathematics:	MATH 171; MATH 172
Electives:	BIOL 289; MATH 308

Liberal Education Requirements of the University, College or State

	Cr
ENGL 104 Composition and Rhetoric	3
American history ¹	6
Communication elective	3
Humanities elective	3
Kinesiology	2
Political science	6
Social and behavioral sciences elective	3
Visual and performing arts elective	3
International and cultural diversity electives ⁸	0-6
	<hr/> 29-35

See footnotes on page 545.

Biology Minor Requirements

A minor in Biology should represent course work taken in the discipline beyond courses that might be used to satisfy core curriculum science requirements (8 credits). Therefore, though Biology 111 and 112 are prerequisites to all of the listed courses, they are not considered part of the minor program. The course work (16-18 credits listed represents various sub-disciplines within the field of Biology and would give the student an overall knowledge base fitting a Minor in Biology.

Two laboratory courses must be chosen when selecting courses from items C, D and E below. Students must have a C average in all courses taken for a minor in Biology, Biology 491 and 485 credits will not be allowed to count for the minor nor used in the Biology GPA calculation.

- A. Molecular Cell Biology (3 credits)
BIOL 213—Requires BIOL 112; CHEM 227 or concurrent enrollment
- B. Genes, Ecology and Evolution (3 credits)
BIOL 214—Requires BIOL 111 and 112
- C. Biology Botany Course (3–4 credits)
Choose one from the following:
 - BIOL 301 (4 credits)
 - BIOL 304 (4 credits)
 - BIOL 328 (3 credits)
 - BIOL 453 (4 credits)
- D. Biology Microbiology Course (3–4 credits)
Choose one from the following:
 - BIOL 351 (4 credits)
 - BIOL 460 (3 credits)
- E. Biology Zoology Course (3–4 credits)
Choose one from the following:
 - BIOL 318 (4 credits)
 - BIOL 335 (4 credits)
 - BIOL 388 (4 credits)
 - BIOL 466 (3 credits)

Neuroscience Minor Requirements

15 Credits as Distributed Below

A minor in Neuroscience is considered an interdisciplinary minor with course selections in the Departments of Biology, Psychology, Philosophy and Veterinary Integrative Biosciences. Please be aware that each course selection below may have prerequisite requirements that must be met. The course work (15 credits) listed represents various sub-disciplines within the field of Neuroscience and would give the student an overall knowledge base fitting a minor in Neuroscience. No grade below a C is acceptable to meet minor requirements.

1. 9–15 hours may be selected from PHIL 320; PSYC 311, 335; VIBS 450, 451; BIOL 434, 435
2. UP to 6 hours may be selected from BIOL 485, 491; PSYC 485; VIBS 485, 490

Research experiences must be approved by Neuroscience faculty.

Bachelor of Arts

The B.A. degree in Biology, through the availability of a large number of electives, gives students maximum flexibility in earning a biology degree. The 15 hour minor requirement, including 6 hours of advanced courses in a discipline other than biology provides students with the opportunity to include significant course work in area such as foreign language, business, education, or social sciences. The B.A. program is recommended for students who intend to pursue further education in areas such as allied health professions, professional schools, or plan to complete requirements for teacher certification.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
BIOL 111 Introductory Biology	(3-3)	4	BIOL 112 Introductory Biology	(3-3)	4
CHEM 101 Fund. of Chemistry I.....	(3-0)	3	CHEM 102 Fund. of Chemistry II.....	(3-0)	3
CHEM 111 Fund. of Chemistry I Lab.....	(0-3)	1	CHEM 112 Fund. of Chemistry II Lab	(0-3)	1
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	HIST 105 History of the U.S. ¹	(3-0)	3
MATH 166 Topics in Contemporary Mathematics IP	(3-0)	3	MATH 131 Mathematical Concepts— Calculus ³	(3-0)	3
* KINE 198 Health and Fitness Activity.....	(0-2)	1	* KINE 199 Required Physical Activity.....	(0-2)	1
		<u>15</u>			<u>15</u>

SOPHOMORE YEAR

BIOL 213 Molecular Cell Biology	(3-0)	3	BIOL 214 Genes, Ecology and Evolution.....	(3-0)	3
CHEM 227 Organic Chemistry I.....	(3-0)	3	CHEM 228 Organic Chemistry II	(3-0)	3
CHEM 237 Organic Chemistry Lab. I	(0-3)	1	CHEM 238 Organic Chemistry Lab. II.....	(0-3)	1
HIST 106 History of the U.S. ¹	(3-0)	3	PHYS 202 College Physics	(3-3)	4
PHYS 201 College Physics	(3-3)	4	Communication elective		3
		<u>14</u>			<u>14</u>

JUNIOR YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
BICH 410 Comp. Biochemistry I.....	(3-0)	3	BICH 411 Comp. Biochemistry II	(3-0)	3
BICH 412 Biochemistry, Lab. I.....	(0-3)	1	BIOL 357 Ecology	(3-0)	3
BIOL 351 Fund. of Microbiology			POLS 207 State and Local Govt. ⁵	(3-0)	3
or			STAT 302 Statistical Methods	(3-0)	3
GENE 302 Genetics.....		4	Language ⁴		<u>4</u>
POLS 206 American Natl. Govt.....	(3-0)	3			16
Language ⁴		<u>4</u>			
		15			

SENIOR YEAR

Social and behavioral sciences elective.....		3	Biology elective		3
Visual and performing arts elective		3	Humanities elective ⁶		3
Biology elective ⁹		3	Electives		<u>9</u>
Electives ⁷		<u>7</u>			15
		16			

total hours 120

Communication elective: ENGL 203, 210, 235, 236, 241, 301; COMM 203, 205, 243

Biology elective: Any 300-400 level BIOL, BOTN, MICR, ZOOL. Two courses in the degree plan must be writing intensive courses in the major designated by the department in the schedule of classes.

Electives: Minor required with 15-18 hours in one field.

Must also incorporate International and Cultural Diversity requirement (6 hours) into electives.

See footnotes on page 545.

* See page 21.



Bachelor of Science

The B.S. degree in Biology is designed for students to obtain a comprehensive, solid foundation in the major branches of Biology combined with a suitable measure of individual flexibility. It provides the opportunity for extensive study across the breadth of biological disciplines, ranging from molecular and cellular biology to ecology and evolution. This degree plan is recommended for students preparing for graduate programs in biological sciences or any professional programs in health and medical sciences such as medical, dental or veterinary schools. Please refer to page 536 for areas of emphasis.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
BIOL 111 Introductory Biology	(3-3)	4	BIOL 112 Introductory Biology	(3-3)	4
CHEM 101 Fund. of Chemistry I.....	(3-0)	3	CHEM 102 Fund. of Chemistry II	(3-0)	3
CHEM 111 Fund. of Chemistry I Lab.....	(0-3)	1	CHEM 112 Fund. of Chemistry II Lab.....	(0-3)	1
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	HIST 105 History of the U.S. ¹	(3-0)	3
MATH 166 Topics in Contemporary Mathematics IP ³	(3-0)	3	MATH 131 Mathematical Concepts— Calculus ⁵	(3-0)	3
* KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>	* KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>
		15			15

SOPHOMORE YEAR

BIOL 213 Molecular Cell Biology	(3-0)	3	BIOL 214 Genes, Ecology and Evolution.....	(3-0)	3
CHEM 227 Organic Chemistry I.....	(3-0)	3	CHEM 228 Organic Chemistry II	(3-0)	3
CHEM 237 Organic Chemistry Lab. I	(0-3)	1	CHEM 238 Organic Chemistry Lab. II.....	(0-3)	1
HIST 106 History of the U.S. ¹	(3-0)	3	PHYS 202 College Physics	(3-3)	4
PHYS 201 College Physics	(3-3)	<u>4</u>	Communication elective		<u>3</u>
		14			14

JUNIOR YEAR

BICH 410 Comp. Biochemistry I.....	(3-0)	3	BICH 411 Comp. Biochemistry II	(3-0)	3
BICH 412 Biochemistry. Lab. I.....	(0-3)	1	POLS 207 State and Local Govt. ⁵	(3-0)	3
BIOL 351 Fund. of Micro.....	(3-4)	4	Biology elective	(3-0)	3
GENE 302 Principles of Genetics	(3-3)	4	Electives ⁷		<u>6</u>
POLS 206 American Natl. Govt.....	(3-0)	3			15
STAT 302 Statistical Methods.....	(3-0)	<u>3</u>			
		18			

SENIOR YEAR

Biology electives ⁹	8	Biology electives ⁹	6
Humanities elective.....	3	Visual and performing arts elective ⁶	3
Social and behavioral sciences elective.....	<u>3</u>	Electives	<u>6</u>
	14		15

total hours 120

Communication elective: ENGL 203, 210, 235, 236, 241, 301; COMM 203, 205, 243

Biology elective: Any 300–400 level BIOL, BOTN, MICR, ZOOL, MEPS course; VIBS 343, 443; any 400 level GENE course. Two courses in biology electives must be writing intensive courses in the major designated by the department in the schedule of classes.

Must also incorporate International and Cultural Diversity requirement (6 hours) into electives.

See footnotes on page 545.

* See page 21.

Curriculum in Molecular and Cell Biology

Students who select Molecular and Cell Biology as their major will receive a strong background in the cellular and molecular aspects of biology with particular emphasis on eukaryotes. The major provides an excellent foundation for a career in biotechnology, genetic engineering, M.D./Ph.D. programs or basic biological research.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
BIOL 111 Introductory Biology	(3-3)	4	BIOL 112 Introductory Biology	(3-3)	4
CHEM 101 Fund. of Chemistry I.....	(3-0)	3	CHEM 102 Fund. of Chemistry II.....	(3-0)	3
CHEM 111 Fund. of Chemistry I Lab.....	(0-3)	1	CHEM 112 Fund. of Chemistry II Lab.....	(0-3)	1
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	HIST 105 History of the U.S. ¹	(3-0)	3
MATH 166 Topics in Contemporary Mathematics II ³	(3-0)	3	MATH 131 Mathematical Concepts— Calculus ³	(3-0)	3
* KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>	* KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>
		15			15

SOPHOMORE YEAR

BIOL 213 Molecular Cell Biology.....	(3-0)	3	BIOL 214 Genes, Ecology and Evolution.....	(3-0)	3
CHEM 227 Organic Chemistry I.....	(3-0)	3	CHEM 228 Organic Chemistry II.....	(3-0)	3
CHEM 237 Organic Chemistry Lab. I.....	(0-3)	1	CHEM 238 Organic Chemistry Lab. II.....	(0-3)	1
HIST 106 History of the U.S. ¹	(3-0)	3	PHYS 202 College Physics	(3-3)	4
PHYS 201 College Physics	(3-3)	<u>4</u>	Communication elective		3
		14	Elective		<u>3</u>
					17

JUNIOR YEAR

BICH 410 Comp. Biochemistry I.....	(3-0)	3	BICH 411 Comp. Biochemistry II	(3-0)	3
GENE 302 Genetics.....	(3-3)	4	BICH 414 Biochemical Techniques.....	(0-6)	2
POLS 206 American Natl. Govt.....	(3-0)	3	BICH 431 Molecular Genetics	(3-0)	3
STAT 302 Statistical Methods	(3-0)	3	BIOL 351 Fund. of Microbiology	(3-4)	4
Visual and performing arts elective		<u>3</u>	Humanities elective ⁶		<u>3</u>
		16			15

SENIOR YEAR

BIOL 413 Cell Biology	(3-0)	3	Biology electives ⁹	3
BIOL 414 Developmental Biology.....	(3-0)	3	Molecular cell biology elective ⁹	3
BIOL 423 Cell Biology Lab.....	(0-3)	1	Social science elective	3
POLS 207 State and Local Govt. ⁵	(3-0)	3	Electives	<u>5</u>
Molecular cell biology elective ⁹		<u>4</u>		14
		14		

total hours 120

Communication elective: ENGL 203, 210, 235, 236, 241, 301; COMM 203, 205, 243

Biology elective: Any 300-400 level BIOL, BOTN, MICR, ZOOL. Two courses in the degree plan must be writing intensive courses in the major designated by the department in the schedule of classes.

Molecular and cell biology electives: BICH 432, 489; BIOL 430, 466, 485, 489, 491; CHEM 323, 324; GENE 450; MICR 360, 406, 410, 424, 438, 445, 454; ZOOL 344.

Must also incorporate International and Cultural Diversity requirement (6 hours) into electives.

See footnotes on page 545.

* See page 21.

Curriculum in Microbiology

The degree program in Microbiology is designed to provide a comprehensive education in the biology of microorganisms. A graduate of this program will have a thorough grounding in the classical areas of microbial physiology and biochemistry, microbial genetics and developing areas like the molecular biology of microorganisms. The curriculum provides excellent training toward a career in any one of many areas of industrial microbiology and public health services. It is also an ideal preparation for advanced study or professional school in medicine, dentistry and other related fields, especially medical technology and biotechnology.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
BIOL 111 Introductory Biology	(3-3)	4	BIOL 112 Introductory Biology	(3-3)	4
CHEM 101 Fund. of Chemistry I.....	(3-0)	3	CHEM 102 Fund. of Chemistry II	(3-0)	3
CHEM 111 Fund. of Chemistry I Lab.....	(0-3)	1	CHEM 112 Fund. of Chemistry II Lab.....	(0-3)	1
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	HIST 105 History of the U.S. ¹	(3-0)	3
MATH 166 Topics in Contemporary Mathematics II ³	(3-0)	3	MATH 131 Mathematical Concepts— Calculus ³	(3-0)	3
* KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>	* KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>
		15			15

SOPHOMORE YEAR

BIOL 213 Mol. Cell Biology	(3-0)	3	BIOL 214 Genes, Ecology and Evolution.....	(3-0)	3
CHEM 227 Organic Chemistry I.....	(3-0)	3	BIOL 351 Fund. of Micro.....	(3-3)	4
CHEM 237 Organic Chemistry Lab. I.....	(0-3)	1	CHEM 228 Organic Chemistry II	(3-0)	3
HIST 106 History of the U.S. ¹	(3-0)	3	CHEM 238 Organic Chemistry Lab. II.....	(0-3)	1
PHYS 201 College Physics	(3-3)	<u>4</u>	PHYS 202 College Physics	(3-3)	<u>4</u>
		14			15

JUNIOR YEAR

BICH 410 Comp. Biochem. I.....	(3-0)	3	BICH 411 Comp. Biochem. II	(3-0)	3
GENE 302 Genetics	(3-3)	4	BICH 414 Biochemical Techniques.....	(0-6)	2
STAT 302 Statistical Methods	(3-0)	3	BIOL 406 Bacterial Genetics.....	(3-0)	3
Visual and performing arts elective		3	POLS 206 American Natl. Govt.....	(3-0)	3
Elective		<u>3</u>	Humanities elective ⁶		<u>3</u>
		16			14

SENIOR YEAR

BIOL 438 Bacterial Physiology.....	(2-6)	4	Communications elective.....		3
POLS 207 State and Local Govt. ⁵	(3-0)	3	Microbiology electives ⁹		6
Biology elective ⁹		3	Social and behavioral sciences elective.....		3
Microbiology electives ⁹		<u>4</u>	Electives ⁷		<u>5</u>
		14			17

total hours 120

Communication elective: ENGL 203, 210, 235, 236, 241, 301; COMM 203, 205, 243

Microbiology electives: Any 300- or 400-level MICR course.

Biology electives: Any 300- or 400-level BIOL, BOTN, MICR, ZOOL; any 400-level BESC, BICH, CHEM, GENE; or AGRO 405, 455; CHEM 315/318, 323, 324; DASC 326/327; PPHY 313/315; VTPB 487; VTPB 406. Two BIOL/MICR elective courses must be university-approved writing-intensive courses.

Must also incorporate International and Cultural Diversity requirement (6 hours) into electives.

See footnotes on page 545.

* See page 21.

Curriculum in Zoology

The Zoology degree program is designed to expose students to all aspects of the study of animals. Following foundation courses on the principles of vertebrate and invertebrate zoology, students may select from a broad range of classes in animal biology, ranging from cellular and developmental biology, physiology, and anatomy to ecology and evolution. Graduates enter into advanced studies in zoology, specialized zoological fields in agriculture and renewable resources, or such professional fields as medicine, veterinary medicine, dentistry and other health-related areas.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
BIOL 111 Introductory Biology	(3-3)	4	BIOL 112 Introductory Biology	(3-3)	4
CHEM 101 Fund. of Chemistry I.....	(3-0)	3	CHEM 102 Fund. of Chemistry II.....	(3-0)	3
CHEM 111 Fund. of Chemistry I Lab.....	(0-3)	1	CHEM 112 Fund. of Chemistry II Lab.....	(0-3)	1
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	HIST 105 History of the U.S. ¹	(3-0)	3
MATH 166 Topics in Contemporary Mathematics II ³	(3-0)	3	MATH 131 Mathematical Concepts— Calculus ³	(3-0)	3
* KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>	* KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>
		15			15

SOPHOMORE YEAR

BIOL 213 Molecular Cell Biology.....	(3-0)	3	BIOL 214 Genes, Ecology and Evolution.....	(3-0)	3
CHEM 227 Organic Chemistry I.....	(3-0)	3	CHEM 228 Organic Chemistry II.....	(3-0)	3
CHEM 237 Organic Chemistry Lab. I.....	(0-3)	1	CHEM 238 Organic Chemistry Lab. II.....	(0-3)	1
HIST 106 History of the U.S. ¹	(3-0)	3	PHYS 202 College Physics	(3-2)	4
PHYS 201 College Physics	(3-3)	<u>4</u>	Communication elective		<u>3</u>
		14			14



JUNIOR YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
BICH 410 Comp. Biochemistry I.....	(3-0)	3	BICH 411 Comp. Biochemistry II	(3-0)	3
BICH 412 Biochemistry Lab. I	(0-3)	1	BIOL 335 Invertebrate Zoology	(3-3)	4
BIOL 318 Chordate Anatomy	(3-3)	4	BIOL 388 Animal Physiology.....	(3-3)	4
STAT 302 Statistical Methods.....	(3-0)	3	POLS 206 American Natl. Govt.....	(3-0)	3
Zoology directed elective ⁹		3	Humanities elective ⁶		3
Visual and performing arts elective		3			17
		<u>17</u>			

SENIOR YEAR

Zoology directed elective ⁹	4	POLS 207 State and Local Govt. ⁵	(3-0)	3
Zoology specialization ⁹	6	Social and behavioral sciences elective.....		3
Electives ⁷	4	Zoology specialization ⁹		4
	<u>14</u>	Elective		4
				<u>14</u>

total hours 120

Communication elective: ENGL 203, 210, 235, 236, 241, 301; COMM 203, 205, 243

Zoology directed electives: BIOL 357/358; GENE 302; or ZOOL 344

Zoology specializations:

Development: BIOL 413/423, 414, 430; GENE 431; ZOOL 344, 434/435

Ecology/Evolution: BIOL 357/358, 440, 466; ENTO 313; GENE 412; WFSC 311, 315, 401, 402, 422

Physiology and neuroscience: BIOL 413; GENE 431; MICR 454; WFSC 422; ZOOL 405, 434/435

Pre-veterinary medicine: GENE 302; MICR 351; NUTR 303; any elective previously listed

General zoology: any courses listed above or any 300-400 level BIOL or MICR or any 400 level GENE

Two courses in the degree plan must be writing-intensive courses designated by the department in the schedule of classes.

Must also incorporate International and Cultural Diversity requirement (6 hours) into electives.

See footnotes on this page.

* See page 21.

Notes for Preceding Curricula in Biology, Molecular and Cell Biology, Microbiology, and Zoology

- Students seeking teacher certification must take HIST 105 and 106. Other students may choose HIST 105 and 106 or any 6 hours of U.S. history courses (3 hours may be in Texas history).
- In order to qualify for the secondary provisional teaching certificate, see requirements listed in the College of Education and Human Development section under secondary certification.
- Students enrolled in the B.A. program must take calculus and may take logical reasoning (PHIL 240, 341, 342) or MATH 166 to complete the mathematics requirement. Students enrolled in B.S. Microbiology, and Zoology programs are required to take two semesters of mathematics with a minimum of one semester of calculus. MATH 102, 103 or 150 cannot be used for credit. Students in any degree program are encouraged to take MATH 171 and 172 or MATH 151 and 152 to satisfy the MATH requirement.
- The foreign language requirement for the B.A. degree can be fulfilled only by completing two semesters of conversational courses in one of the following: French, German, Italian, Japanese, Latin, Russian or Spanish.
- Students successfully completing the required four semesters of upper-level ROTC courses may substitute these courses for 3 hours of American history and 3 hours of political science.
- Skills courses in a student's native language cannot be used to satisfy the humanities requirement of the University Core Curriculum.
- The international and cultural diversity portion of the University Core Curriculum may be fulfilled by 6 hours of the courses listed on page 20. These courses may be in addition to other University Core Curriculum requirements, or if a course in this category satisfies another area of the Core, it can be used to meet both requirements.
- To be chosen in consultation with an academic advisor.
- Two courses in the major must be designated as writing intensive.

**Bachelor of Science in Zoology
Early Admission Option to Professional Schools
of Dentistry or Medicine**

Although most medical and dental schools require a minimum of three years of undergraduate college work before considering an application to their programs, the vast majority of entering medical and dental students have four years of college work and a bachelor's degree. The number of students accepted prior to completion of the baccalaureate degree is very low. Therefore, most students interested in a career in medicine or dentistry are encouraged to pursue a four-year undergraduate curriculum. Exceptional students who gain admission to medical or dental school after three years of undergraduate work will qualify for a B.S. degree in Zoology upon successful completion of the first year of professional school and the program of courses outlined below.

Any student may qualify for the B.S. degree in Zoology from Texas A&M University by completing the curriculum below and at least one full year of acceptable work at an accredited American medical or dental school.

Students wishing to enter the Texas A&M program in medicine should consult The Texas A&M University System Health Science Center Catalog for the preprofessional course requirements.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
BIOL 111 Introductory Biology	(3-3)	4	BIOL 112 Introductory Biology	(3-3)	4
CHEM 101 Fund. of Chemistry I.....	(3-0)	3	CHEM 102 Fund. of Chemistry II.....	(3-0)	3
CHEM 111 Fund. of Chemistry I Lab.....	(0-3)	1	CHEM 112 Fund. of Chemistry II Lab.....	(0-3)	1
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	HIST 105 History of the U.S. ²	(3-0)	3
MATH 166 Topics in Contemporary Mathematics II ¹	(3-0)	3	MATH 131 Mathematical Concepts— Calculus ¹	(3-0)	3
* KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>	* KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>
		15			15

SUMMER SESSION

POLS 206 American Natl. Govt.....	(3-0)	3
POLS 207 State and Local Govt.....	(3-0)	<u>3</u>
		6

SOPHOMORE YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
BIOL 213 Molecular Cell Biology	(3-0)	3	BIOL 388 Prin. of Animal Physiology	(3-3)	4
CHEM 227 Organic Chemistry I.....	(3-0)	3	CHEM 228 Organic Chemistry II	(3-0)	3
CHEM 237 Organic Chemistry Lab. I	(0-3)	1	CHEM 238 Organic Chemistry Lab. II.....	(0-3)	1
HIST 106 History of the U.S. ²	(3-0)	3	PHYS 202 College Physics	(3-3)	4
PHYS 201 College Physics	(3-3)	<u>4</u>	Communication elective	(3-0)	<u>3</u>
		14			15

SUMMER SESSION

Humanities elective.....	(3-0)	3
Social and behavioral sciences elective.....	(3-0)	<u>3</u>
		6

JUNIOR YEAR

BICH 410 Comp. Biochem. I.....	(3-0)	3	BICH 411 Comp. Biochemistry II	(3-0)	3
BIOL 318 Chordate Anatomy	(3-3)	4	BIOL 344 Embryology	(3-3)	4
GENE 302 Genetics	(3-3)	4	Electives ³		6
or			Visual and performing arts elective		3
GENE 320 Biomedical Genetics.....	(3-0)	3	Writing intensive course in major ⁴		<u>1-3</u>
STAT 302 Statistical Methods	(3-0)	3			17-19
Elective		<u>4</u>			
		17-18			

total hours 105-106

Suggested electives: (Free) BICH 431; BIOL 319, 320, 351, 405, 413, 414, 434, 436; PLAN 370; VAPH 343.

Social and behavioral sciences: PSYC 306, 307; SOCI 425.

Humanities: CLAS 215; PHIL 480.

- NOTES: 1. Students in any degree program may substitute MATH 171 and 172 or MATH 151 and 152 for MATH 166 and 131. MATH 150 cannot be used for credit.
2. Students may choose HIST 105 and 106 or any 6 hours of U.S. history courses (3 hours may be in Texas history).
3. Biology electives in the Early Admissions Option may be chosen from a wide variety of courses; however, Fundamentals of Microbiology (BIOL 351) and Histology (VAPH 343) are strongly recommended.
4. To be chosen in consultation with an academic advisor.

* See page 21.

Curricula in Chemistry

An understanding of chemistry is critical to an understanding of life and its associated activities. Chemistry and chemical principles profoundly influence the way we live, communicate and interact with one another so it is little wonder that a strong background in chemistry provides a solid foundation for a variety of careers of major importance in the twenty-first century. Chemistry is uniquely positioned at the crossroad between the biological and physical sciences. By exploiting their understanding of both realms, chemists and other professionals with strong backgrounds in chemistry have made, and continue to make, major contributions to improve the human condition. Major technological and biological discoveries almost always depend on a fundamental understanding of chemistry and the pursuit of these discoveries, as a way to improve the world in which we live, drives those who seek to be a part of the process.

The Department of Chemistry offers course work and research in all the major areas of chemistry, organized into programs leading to the degrees of Bachelor of Arts and Bachelor of Science. Both degree programs are suitable as terminal degree programs as well as for preparation for more advanced study in chemistry and related areas or as preparation for many professional programs in a variety of career fields. The B.S. program is more rigorous with respect to required mathematics, physics and chemistry courses. It is particularly appropriate for those students who plan a career in the chemical industry or who intend to pursue advanced degrees in chemistry, biochemistry, chemical physics or forensics. An attractive number of free electives in this degree program allows students to take courses in interdisciplinary focus areas. The B.A. program offers the greatest degree of flexibility for students who see chemistry as a springboard into a related career field such as medicine, pharmacy, law, science writing, teaching or business for example. Chemistry majors are counseled by Ph.D. chemistry faculty advisors fully familiar with the many options available in the chemistry and other departments, so as to optimize each student's program of study to meet individual needs. The Department of Chemistry Web site www.chem.tamu.edu provides additional information about the degree plans, advising, and career opportunities for chemistry majors.

Although students may choose a variety of electives and/or minors in either the B.A. or B.S. degree programs, the following chemistry tracks have been developed to guide students in choosing electives.

Chemistry Tracks

In addition to the traditional B.S. degree (which allows for optional minors) and the traditional B.A. degree (minor required), the Department of Chemistry offers five tracks to guide students in their selection of electives for particular career paths in biological chemistry, environmental chemistry, chemical education, medicine, dentistry and pharmacy. A traditional minor requires that all minor courses must be taken from the same department and approved by the department granting the minor. These tracks provide the student an opportunity to replace a traditional minor with a broad spectrum of elective courses focused, not in a single department, but in an area of emphasis. A list of the recommended elective courses for each track may be obtained from the Office of the Undergraduate

Advisor in Room 104 Chemistry Building or from the Department of Chemistry Web site at www.chem.tamu.edu. The approved tracks are:

Biological Chemistry Track for the B.S. Degree

The biological chemistry track has been designed for students interested in pursuing graduate study in biological chemistry, biochemistry, pharmacology or related fields or a career in the pharmaceutical industry. Students who wish to enter an M.D./Ph.D. program or medical, dental or pharmacy school will, in most cases, need to take an additional advanced biology course beyond those recommended for this track and should check the admission requirements for these programs with the Office of Professional School Advising. Courses in biology, biochemistry, genetics and statistics are recommended as electives.

Biological Chemistry or Medical, Dental, Pharmacy School Track for the B.A. Degree

Many students planning to enter medical, dental, or pharmacy school prefer a bachelor of arts degree that contains a large number of elective courses which may be used to satisfy pre-professional school requirements. With that in mind, this track recommends an effective way to use some of the available free electives in the B.A. chemistry program to satisfy the pre-professional requirements for these programs. Courses in anatomy, biochemistry, biology, genetics, and microbiology are recommended. Additional free electives, of which there will be many, may be used to strengthen the student's program of study in a manner decided by the student and the academic advisor.

Environmental Chemistry Track for the B.S. Degree

Chemistry plays a major role in most environmental issues and this track recommends electives in a broad spectrum of courses designed to prepare students to address environmental problems from a variety of perspectives. Electives may be chosen from recommended courses in atmospheric sciences, bioenvironmental science, biology, geography, geology, microbiology and oceanography.

Environmental Chemistry Track for the B.A. Degree

This environmental chemistry track contains a very large number of elective courses and provides even greater opportunity for students to select electives which provide for a career focus in environmental chemistry. The large number of electives makes it possible for students to combine interests in environmental issues with other interests such as business, law, and politics. Electives may be chosen from recommended courses in atmospheric sciences, bioenvironmental science, biology, geography, geology, geosciences, microbiology and oceanography.

Chemical Education Track

The chemical education track provides the student an opportunity to obtain secondary teacher certification in addition to completion of the requirements for a degree in chemistry. Many students who plan to become high school chemistry teachers or to pursue a master's degree in chemical education will find this track attractive. Students must complete the requirements for secondary teacher certification as defined by the College of Education and Human Development (consultation with the College of Education and Human Development is required).

Cooperative Education Program in Chemistry

Under suitable circumstances, chemistry majors may participate in a cooperative education program in which the student alternates periods of attendance at the University with periods of employment in industry. This year-round cooperative program of college study and industrial experience is educationally enriching and meaningful, and also has the benefit of providing substantial financial assistance to the student without unduly prolonging the completion of the B.S. or B.A. degree program.

Bachelor of Arts

The Bachelor of Arts program, through the availability of a generous number of electives, gives the student a firm and broadly based foundation in chemistry, with the option of pursuing other educational objectives involving specialization in at least one other field in depth. This objective is accomplished by means of the B.A. program flexibility and by the inclusion of a minor area of study in another discipline or completion of a track as outlined above. Additional elective hours allow further diversification.

The B.A. degree offers somewhat more flexibility than the B.S. program, in terms of tailoring a program of study which combines chemistry with an interest in subject areas such as biochemistry, biology, business, computer science, education, forensics, medicine or physics. Although the B.A. program may in any specific case turn out to be a somewhat less technical curriculum, it meets the needs of many students who plan to use chemistry as a springboard to a career in chemical sales, marketing, law, technical writing, teaching at a pre-college level, science journalism, etc., to name only a few possibilities.

A B.A. degree in Chemistry coupled with a minor in Biology, or completion of a biological chemistry track, is excellent preparation for a variety of careers in the health-related disciplines. In particular, a B.A. degree in Chemistry is excellent and proven preparation for medical and dental schools, and affords the superior student the opportunity to maintain flexibility for a broad spectrum of medical or dental careers.

Although not required for the B.A. program, abundant research opportunities are available to students. The B.A. program also permits and encourages non-technical elective courses.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
CHEM 100 Horizons in Chemistry	(1-0)	1	CHEM 102 Fund. of Chemistry II	(3-0)	3
CHEM 101 Fund. of Chemistry I.....	(3-0)	3	and		
and			CHEM 112 Fund. of Chemistry Lab. II.....	(0-3)	1
CHEM 111 Fund. of Chemistry Lab I.....	(0-3)	1	or		
or			CHEM 104 Chemistry of the Elements	(3-0)	3
CHEM 103 Structure and Bonding	(3-0)	3	and		
and			CHEM 114 Qualitative Analysis.....	(0-3)	1
CHEM 113 Physical and Chemical Prin.....	(0-3)	1	HIST 106 History of the U.S. ¹	(3-0)	3
ENGL 104 Comp. and Rhetoric	(3-0)	3	MATH 152 Engr. Mathematics II.....	(3-2)	
HIST 105 History of the U.S. ¹	(3-0)	3	or		
MATH 151 Engr. Mathematics I	(3-2)		MATH 172 Calculus	(4-0)	4
or			Elective ²		3
MATH 171 Analytic Geom. and Calculus	(4-0)	<u>4</u>	* KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>
		15			15

SOPHOMORE YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
CHEM 227 Organic Chemistry I ³	(3-0)	3	CHEM 228 Organic Chemistry II ³	(3-0)	3
CHEM 231 Tech. of Organic Chemistry.....	(1-3)	2	CHEM 234 Org. Synth. and Anly. IV ⁶	(1-6)	3
PHYS 201 College Physics			PHYS 202 College Physics		
or			or		
PHYS 218 Mechanics.....	(3-3)	4	PHYS 208 Electricity and Optics.....	(3-3)	4
POLS 207 State and Local Govt.....	(3-0)	3	POLS 206 American Natl. Govt.....	(3-0)	3
Elective ²		3	Elective ²		<u>3</u>
* KINE 198 Health and Fitness Activity.....	(0-2)	1			<u>16</u>
		<u>16</u>			

JUNIOR YEAR

CHEM 315 Quantitative Analysis.....	(3-0)	3	CHEM 325 Physical Chemistry Lab. I.....	(0-3)	1
CHEM 318 Quantitative Analysis Lab.....	(0-3)	1	CHEM 328 Physical Chemistry II.....	(3-0)	3
CHEM 327 Physical Chemistry I.....	(3-0)	3	Electives ²		<u>12</u>
Electives ²		<u>9</u>			<u>16</u>
		<u>16</u>			

SENIOR YEAR

CHEM 326 Physical Chemistry Lab. II.....	(0-3)	1	Advanced chemistry elective ⁴	(3-0)	3
CHEM 481 Seminar ⁵	(1-0)	1	Electives ²		<u>9</u>
Advanced chemistry elective ⁴		3			<u>12</u>
Electives ²		<u>9</u>			
		<u>14</u>			

total hours 120

- NOTES: 1. Students may substitute any 6 hours of American history courses approved by the Department of History to fulfill this requirement, but no more than 3 hours may be in Texas history. Students seeking teacher certification must take HIST 105 and 106.
2. These electives must include 12 hours which meet the humanities (3 hours), visual and performing arts (3 hours), social and behavioral sciences (3 hours), and communication (3 hours) requirements of the University Core Curriculum. In addition, 6 hours of courses must be in the area of international and cultural diversity. These may be in addition to the previous 12 hours of University Core Curriculum courses, or if a course in this category satisfies another area of the Core, it can be used to meet both requirements. Additional elective hours must be used to complete a required minor approved by the granting department or student must satisfy the requirements of one of the approved chemistry track programs. B.A. chemistry majors may take CHEM 485 or 491 as elective courses. The total hours of CHEM 485 and 491 taken on a graded (A-F) basis may not exceed 9. Additional hours of these courses may be taken on a satisfactory/unsatisfactory basis. A maximum of 6 hours of these courses may be included on the degree plan. Electives should be chosen in consultation with the chemistry advisor.
3. This is a special section of the course for chemistry majors.
4. The advanced chemistry electives must be selected from CHEM 317 and 320, 362, 415, 446, 462, 464, 466, 470, and BICH 410, 411, 440, 441.
5. This is a designated W course.
6. Approval as a W course is pending.

* See page 21.

Bachelor of Science

The B.S. program in Chemistry is arranged so that a student obtains a comprehensive, solid foundation in all of the major branches of chemistry, combined with a suitable measure of individual flexibility. The latter objective is met in part by a strong emphasis on involving the undergraduate B.S. chemistry major in exciting, innovative, state-of-the-art research programs. Most students in the B.S. program become involved in research during their junior year, and continue this until graduation. Students frequently receive research scholarships and fellowships which include opportunities for summer research programs. It is not uncommon for an undergraduate chemistry major to be a coauthor of scientific publications in major research journals before graduation.

Undergraduate chemistry research activities involve substantial use of modern scientific equipment, including major instrumentation. The student involved in this activity also gains considerable insight into the profession by means of substantial individual contact with chemistry department faculty.

The B.S. degree in Chemistry is the appropriate program for students planning advanced degree programs in chemistry, biochemistry, forensics, chemical physics, and other fields. Students planning careers in chemical industry should also choose the B.S. degree in Chemistry. Students may wish to choose electives suggested in the biological or environmental chemistry tracks. This degree program satisfies fully the accreditation requirements of the American Chemical Society.⁵

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
CHEM 100 Horizons in Chemistry	(1-0)	1	CHEM 102 Fund. of Chemistry II.....	(3-0)	3
CHEM 101 Fund. of Chemistry I.....	(3-0)	3	and		
and			CHEM 112 Fund. of Chemistry Lab. II.....	(0-3)	1
CHEM 111 Fund. of Chemistry Lab. I.....	(0-3)	1	or		
or			CHEM 104 Chemistry of the Elements.....	(3-0)	3
CHEM 103 Structure and Bonding	(3-0)	3	and		
and			CHEM 114 Qualitative Analysis.....	(0-3)	1
CHEM 113 Physical and Chemical Prin.....	(0-3)	1	HIST 106 History of the U.S. ¹	(3-0)	3
ENGL 104 Comp. and Rhetoric	(3-0)	3	MATH 152 Engr. Mathematics II.....	(3-2)	
HIST 105 History of the U.S. ¹	(3-0)	3	or		
MATH 151 Engr. Mathematics I.....	(3-2)		MATH 172 Calculus	(4-0)	4
or			PHYS 218 Mechanics	(3-3)	<u>4</u>
MATH 171 Analytic Geom. and Calculus.....	(4-0)	<u>4</u>			15
		15			

SOPHOMORE YEAR

CHEM 227 Organic Chemistry I ³	(3-0)	3	CHEM 228 Organic Chemistry II ³	(3-0)	3
CHEM 231 Tech. of Organic Chemistry	(1-3)	2	CHEM 234 Organic Synth. and Anly. IV ⁸	(1-6)	3
MATH 221 Several Variable Calculus.....	(4-0)		CHEM 362 Descrip. Inorganic Chemistry	(3-0)	3
or			Advanced mathematics elective ⁴		3
MATH 253 Engr. Mathematics III	(3-2)	4	Elective ²		3
PHYS 208 Electricity and Optics.....	(3-3)	4	* KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>
* KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>			16
		14			



JUNIOR YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
CHEM 315 Quantitative Analysis	(3-0)	3	CHEM 325 Physical Chemistry Lab. I.....	(0-3)	1
CHEM 327 Physical Chemistry I.....	(3-0)	3	CHEM 328 Physical Chemistry II	(3-0)	3
CHEM 433 Adv. Inorganic Lab	(0-6)	2	POLS 207 State and Local Govt.....	(3-0)	3
POLS 206 American Natl. Govt.....	(3-0)	3	Electives ²		<u>9</u>
Electives ²		<u>3</u>			<u>16</u>
		14			

SENIOR YEAR

CHEM 326 Physical Chemistry Lab II.....	(0-3)	1	CHEM 434 Analytical Instrum. Lab.	(0-6)	2
CHEM 415 Analytical Chemistry.....	(3-0)	3	CHEM 481 Seminar ⁷	(1-0)	1
CHEM 491 Research ⁶		4	CHEM 491 Research ⁶		3
Advanced Chemistry Elective ⁵	(3-0)	3	Advanced chemistry elective ⁵	(3-0)	3
Electives ²		<u>4</u>	Electives ²		<u>6</u>
		15			<u>15</u>

total hours 120

- NOTES: 1. Students may substitute any 6 hours of American history courses approved by the Department of History to fulfill this requirement, but no more than 3 hours may be in Texas history. Students seeking teacher certification must take HIST 105 and 106.
2. These electives must include 12 hours of courses which meet the humanities (3 hours), visual and performing arts (3 hours), social and behavioral sciences (3 hours) and communication (3 hours) requirements of the University Core Curriculum. In addition, 6 hours of courses must be in the area of international and cultural diversity. These may be in addition to the previous 12 hours of University Core Curriculum courses, or if a course in this category satisfies another area of the Core, it can be used to meet both requirements. Electives should be chosen in consultation with the chemistry advisor. Electives recommended in the various track programs should be strongly considered.
3. This is a special section of the course for chemistry majors.
4. Students should choose MATH 304, 308, STAT 211 or another MATH or STAT course approved by the chemistry advisor.
5. The advanced chemistry electives must be selected from CHEM 446, 462, 464, 466, 470, and BICH 410, 411 440, 441 or PHYS 309. Students wishing to complete an American Chemical Society certified degree program must take at least one semester of biochemistry (i.e. BICH 410 or 440). Graduate-level courses are encouraged for qualified students.
6. The total hours of CHEM 485 and 491 taken by B.S. chemistry majors on a graded (A–F) basis may not exceed 15. Additional hours of these courses may be taken on a satisfactory/unsatisfactory basis.
7. This is a designated W course.
8. Approval as W course is pending.

* See page 21.

Curricula in Mathematics

The Department of Mathematics offers curricula which lead to the following undergraduate degrees: Bachelor of Science in Applied Mathematical Sciences, Bachelor of Arts in Mathematics and Bachelor of Science in Mathematics. An Integrated Fast Track combined baccalaureate/graduate degree program is also offered.

The curriculum for the B.S. in applied mathematics includes courses in economics, industrial engineering, statistics, computer science and mathematics. The curriculum also requires a concentration in either applied mathematics, statistics or actuarial sciences. A student completing this program is prepared to enter employment with analytical and quantitative tools relevant to modern technological industries and/or modern financial markets. On the other hand, with the appropriate electives chosen, the student is prepared to enter quantitatively oriented graduate programs. The curriculum for the B.S. in Applied Mathematical Sciences can be found under Applied Mathematical Sciences within the College of Science in this catalog. Advising for this degree option is done through the Undergraduate Program Office in the Department of Mathematics.

The B.A. degree in Mathematics is intended for students who are interested in a traditional liberal arts education in mathematics. A minor field of study must be chosen for this degree.

The B.S. in Mathematics provides the student with an in-depth study of both science (physics, chemistry, biology) and mathematics.

With carefully chosen electives in education, any one of the above three degree plans can lead to teacher certification. Students interested in teacher certification may find the B.A. degree plan the most suitable since this degree plan offers the greatest flexibility for the inclusion of teacher certification courses.

Bachelor of Arts

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	CPSC 206 Structured Programming in C.....	(3-2)	4
MATH 170 Freshman Math. Lab.....	(0-2)	1	MATH 170 Freshman Math. Lab.....	(0-2)	1
MATH 171 Analytic Geometry and Calc.....	(4-0)	4	MATH 172 Calculus	(4-0)	4
HIST/POLS elective		3	HIST/POLS elective		3
Science elective ¹		4	Science elective ¹		4
		15			16

SOPHOMORE YEAR

MATH 220 Fund. of Discrete Mathematics...	(3-0)	3	MATH 323 Linear Algebra I	(3-0)	3
MATH 221 Several Variable Calculus.....	(4-0)	4	MATH 308 Differential Equations.....	(3-0)	3
STAT 211 Principles of Statistics I.....	(3-0)	3	CORE elective.....		3
CORE elective.....		3	HIST/POLS elective		3
HIST/POLS elective		3	Minor elective ²		3
		16			15

JUNIOR YEAR

MATH 409 Advanced Calculus I.....	(3-0)	3	MATH elective ³	3
PHYS 218 Mechanics	(3-3)	4	MATH elective ³	3
Free elective.....		3	Minor elective ²	3
Minor elective ²		3	Minor elective ²	3
* KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>	Free elective.....	<u>3</u>
		14		15

SENIOR YEAR

CORE elective.....	3	CORE elective.....	3
Free elective.....	3	Free elective.....	3
MATH elective ³	3	Free elective ³	1
MATH elective ³	3	MATH elective ³	3
Minor elective ²	<u>3</u>	Minor elective ²	3
	15	* KINE 199 Required Physical Activity.....	(0-2) <u>1</u>
			14
		total hours	120

- NOTES:**
1. Freshman science courses are to be selected from BIOL 111; BIOL 112; CHEM 101/111 or CHEM 103/113; CHEM 102/112 or CHEM 104/114. Any 8 hours of these science courses satisfies the natural sciences requirement for the University Core Curriculum.
 2. A 15–18-hour minor field of study should be chosen in conference with a departmental advisor. Three hours of electives must be chosen from the approved University Core Curriculum list for social and behavioral sciences. In addition, 6 hours of courses must be in the area of international and cultural diversity. These may be in addition to other University Core Curriculum courses, or if a course in this category satisfies another area of the Core, it can be used to meet both requirements. Students desiring teacher certification should consult the requirements for certification before registering for electives.
 3. Nine of the twelve hours of math elective courses are to be from any 400- or 600-level MATH, excluding MATH 401 and 601. The last three hours can be from any 400- or 600-level MATH (excluding MATH 401 or 601), any 400-level STAT, CPSC 210 or higher, or any 400-level ISEN, excluding any 485 course in any department without permission of a departmental advisor. Students wishing to be certified must take MATH 403 and 467. Students who plan to attend graduate school are encouraged to take MATH 416, 447 and at least one 600-level course.

* See page 21.



Bachelor of Science

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	CPSC 206 Structured Programming in C.....	(3-2)	4
MATH 170 Freshman Math. Lab.....	(0-2)	1	MATH 170 Freshman Math. Lab.....	(0-2)	1
MATH 171 Analytic Geometry and Calc.....	(4-0)	4	MATH 172 Calculus	(4-0)	4
HIST/POLS elective		3	HIST/POLS elective		3
Science elective ¹		4	Science elective ¹		4
		<u>15</u>			<u>16</u>

SOPHOMORE YEAR

MATH 220 Fund. of Discrete Mathematics...	(3-0)	3	MATH 308 Differential Equations.....	(3-0)	3
MATH 221 Several Variable Calculus.....	(4-0)	4	MATH 323 Linear Algebra I	(3-0)	3
HIST/POLS elective		3	PHYS 218 Mechanics	(3-3)	4
Science elective ²		4	CORE elective ³		3
* KINE 198 Health and Fitness Activity.....	(0-2)	1	HIST/POLS elective		3
		<u>15</u>			<u>16</u>

JUNIOR YEAR

MATH 409 Advanced Calculus I	(3-0)	3	MATH 410 Advanced Calculus II		
MATH 415 Modern Algebra I	(3-0)	3	or		
CORE elective ³		3	MATH 446 Topics in Analysis I.....	(3-0)	3
Free elective.....		3	MATH 416 Modern Algebra II		
Science elective ²		<u>3</u>	or		
		<u>15</u>	MATH 423 Linear Algebra II.....	(3-0)	3
			PHYS 208 Electricity and Optics	(3-3)	
			or		
			OCNG 451 Math. Model of Ocean Climate...	(3-3)	4
			CORE electives ³		3
			* KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>
					<u>14</u>

SENIOR YEAR

CORE elective ³		3	CORE elective ³		3
Free elective.....		1	CORE elective ³		3
MATH elective ⁴		3	MATH elective ⁴		3
MATH elective ³		4	MATH elective ⁴		3
Science elective ²		<u>3</u>	MATH elective ⁴		<u>3</u>
		<u>14</u>			<u>15</u>

total hours 120

- NOTES:**
1. Freshman science courses are to be selected from BIOL 111, BIOL 112; CHEM 101/111 or CHEM 105/113; CHEM 102/112 or CHEM 104/114. Any 8 hours of these science courses satisfy the science requirement of the University Core Curriculum.
 2. Science electives should be chosen from biology, biochemistry, chemistry, genetics or physics courses after consultation with the student's advisor. At least 6 hours must be 200-level or above.
 3. Three elective hours must be chosen from the approved University Core Curriculum list for visual and performing arts. An additional 3 elective hours must be chosen from the approved University Core Curriculum list for social and behavioral sciences. In addition, 6 hours of courses must be in the area of international and cultural diversity. These may be in addition to other University Core Curriculum courses, or if a course in this category satisfies another area of the Core, it can be used to meet both requirements. Students desiring teacher certification should consult the requirements for certification before registering for electives.
 4. Sixteen hours must be chosen from any 400- or 600-level MATH (excluding MATH 401, 403 and 601). Students are required to take at least one of the following: MATH 427, 431, 436, 439. Students are encouraged to take MATH 414, 442 or 470. Students who plan to attend graduate school are encouraged to take MATH 416, 447 and at least one 600-level course. Departmental permission is required to take MATH 485 or to enroll in a 600-level MATH course.

Curricula in Physics

Physics seeks to understand the fundamental workings of nature, from the constituents of matter deep within the nuclei of atoms, to the most distant galaxies of our expanding universe, to everyday phenomena of emergent complexity, self-organization and chaos. The resulting basic physical knowledge provides a firm foundation for innovations and is often the driving force of advanced technology. Lasers, compact disks, global positioning devices, magnetic resonance imaging machines and gigabit storage media were all made possible by key advances in physics.

Physicists have a curiosity that thrives on the challenge of solving problems. Consistent with this, the physics program at Texas A&M strives to teach analytical thinking and quantitative problem-solving skills. This enables students to work productively in physics, in areas closely related to physics, and in a wide variety of areas outside of physics proper. Physicists can be found in almost any discipline that requires complex problem-solving skills. Some engage in cutting-edge research to increase our basic knowledge of the universe. Some apply new-found knowledge to make practical advances in the fields of science, medical science and engineering. Still others use their knowledge to advocate, advise, inform, instruct and administrate as lawyers, consultants, journalists/writers, teachers and managers.

The Department of Physics offers two undergraduate degree programs, a Bachelor of Arts and a Bachelor of Science. The Department of Physics also offers the graduate degrees of Master of Science and Doctor of Philosophy. Highly qualified undergraduates are encouraged to take courses in the graduate program as part of their degree program.

The B.A. curriculum provides the student with a firm foundation in physics and with the flexibility to choose from a large number of elective courses, thus permitting the student to explore other interests. Except for those students pursuing teacher certification, some of these elective courses are chosen to satisfy the requirements of a minor field of study. The student can, therefore, customize his or her program of study in preparation for a career in any science-related or science-required field, from intellectual property law and science reporting to physics teaching. Although not required for the B.A. program, students have the opportunity to become directly involved in any of the active research programs in the Physics Department.

The B.S. curriculum is more rigorous in its physics and mathematics course requirements and is designed primarily for students who wish to pursue an advanced degree in physics or employment as a professional physicist in an industrial setting. Because physics forms the basis of many other sciences such as chemistry, material science, oceanography, nano-engineering and geophysics, the B.S. program is an excellent preparation for advanced degrees in these fields. In addition, physicists are increasingly applying their talents to molecular biology, biochemistry and medicine. An important part of the B.S. program is student participation in experimental or theoretical research with physics faculty.

The Texas A&M Department of Physics has strong research groups in the areas of Applied Physics, Astronomy and Astrophysics, Atomic Physics (including Molecular Physics and Quantum Optics), Condensed Matter Physics (Liquids and Solids), Elementary Particle Physics and Nuclear Physics. During the course of their undergraduate experience at Texas A&M, physics majors have the opportunity to work with faculty in all of these areas. The Astronomy program, although a recent addition, is very active. Presently, at the undergraduate level, the Physics Department offers two survey courses in astronomy, ASTR 101 (Basic Astronomy) and ASTR 314 (Survey of Astronomy) and an astronomy laboratory, ASTR 102 (Observational Astronomy).

Bachelor of Arts

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	CHEM 107 Gen. Chem. for Engr. Students ...	(3-3)	4
HIST 105 History of the U.S. ¹	(3-0)	3	HIST 106 History of the U.S. ¹	(3-0)	3
MATH 171 Analytic Geom. and Calculus.....	(4-0)	4	MATH 172 Calculus.....	(4-0)	4
PHYS 101 Freshman Physics Orientation.....	(1-0)	1	PHYS 208 Electricity and Optics.....	(3-3)	<u>4</u>
PHYS 218 Mechanics.....	(3-3)	<u>4</u>			15
		15			

SOPHOMORE YEAR

MATH 221 Several Variable Calculus.....	(4-0)	4	MATH 311 Topics in Applied Mathematics I.....	(3-0)	3
MATH 308 Differential Equations.....	(3-0)	3	PHYS 225 Electronic Circuits.....	(3-3)	4
PHYS 221 Optics and Thermal Physics.....	(3-0)	3	PHYS 309 Modern Physics.....	(3-0)	3
POLS 206 American Natl. Govt.....	(3-0)	3	Elective ²		3
* KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>	* KINE 198 Health and Fitness Activity.....	(0-2)	<u>1</u>
		14			14

JUNIOR YEAR

PHYS 302 Adv. Mechanics.....	(4-0)	4	PHYS 327 Experimental Physics.....	(2-3)	3
PHYS 304 Adv. Elect. and Mag. I.....	(3-0)	3	PHYS 412 Quantum Mechanics I.....	(3-0)	3
POLS 207 State and Local Govt.....	(3-0)	3	Communication elective ³		3
Humanities elective ¹		3	Social and behavioral sciences elective ¹		3
Elective ²		<u>2</u>	Electives ²		<u>3</u>
		15			15

SENIOR YEAR

PHYS 420 Concepts, Conn., and Comm. ⁶	(1-0)	1	PHYS 401 Computational Physics ⁴	(3-0)	3
Physics elective ⁵		3	PHYS 491 Research ⁶		1
Electives ²		<u>12</u>	Visual and performing arts elective ⁴		3
		16	Electives ²		<u>9</u>
					16
					total hours 120

- NOTES: 1. Any course in this category from the approved University Core Curriculum list of courses.
2. A minor field must be selected in conference with the student's advisor. In addition, 6 hours of courses must be in the area of international and cultural diversity. These may be in addition to other University Core Curriculum courses, or if a course in this category satisfies another area of the Core, it can be used to meet both requirements.
3. To be selected from ENGL 203, 210, 235, 236, 241 and 301.
4. To register for PHYS 401 a student must be able to program in a high level language, such as FORTRAN or C. This prerequisite can be satisfied by taking CPSC 206 or the equivalent.
5. Any 300- or 400-level physics elective, except 306, 307 and the writing intensive courses 420 and 491.
6. Approved W course designation.

* See page 21.

Bachelor of Science

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
ENGL 104 Comp. and Rhetoric.....	(3-0)	3	CHEM 107 Gen. Chem. for Engr. Students ...	(3-3)	4
HIST 105 History of the U.S. ¹	(3-0)	3	HIST 106 History of the U.S. ¹	(3-0)	3
MATH 171 Analytic Geom. and Calculus	(4-0)	4	MATH 172 Calculus	(4-0)	4
PHYS 101 Freshman Physics Orientation	(1-0)	1	PHYS 208 Electricity and Optics	(3-3)	4
PHYS 218 Mechanics	(3-3)	4			15
		<u>15</u>			

SOPHOMORE YEAR

MATH 221 Several Variable Calculus.....	(4-0)	4	MATH 311 Topics in Applied Mathematics I	(3-0)	3
MATH 308 Differential Equations.....	(3-0)	3	PHYS 225 Electronic Circuits	(3-3)	4
PHYS 221 Optics and Thermal Physics	(3-0)	3	PHYS 309 Modern Physics.....	(3-0)	3
POLS 206 American Natl. Govt.	(3-0)	3	POLS 207 State and Local Govt.....	(3-0)	3
Humanities elective ¹		<u>3</u>	Communication elective ²		<u>3</u>
		16			16

JUNIOR YEAR

MATH 412 Theory of Partial Differential Equations	(3-0)	3	MATH 407 Complex Variables	(3-0)	3
PHYS 302 Adv. Mechanics	(4-0)	4	PHYS 305 Adv. Elec. and Magn. II	(3-0)	3
PHYS 304 Adv. Elect. and Magn. I	(3-0)	3	PHYS 327 Exptl. Physics	(2-3)	3
Social and behavioral sciences elective ¹		3	PHYS 412 Quantum Mechanics I	(3-0)	3
* KINE 198 Health and Fitness Activity.....	(0-2)	1	Electives ³		<u>3</u>
		<u>14</u>			15

SENIOR YEAR

PHYS 408 Thermodynamics and Statistical Mechanics	(4-0)	4	PHYS 401 Computational Physics ⁴	(3-0)	3
PHYS 414 Quantum Mechanics II	(3-0)	3	PHYS 425 Physics Lab	(0-6)	2
PHYS 420 Concepts, Conn., and Comm. ⁶	(1-0)	1	PHYS 485 Directed Studies		2
PHYS 426 Physics Lab.	(0-6)	2	PHYS 491 Research ⁶		1
Visual and performing arts elective ¹		3	Physics elective ⁵		3
Elective ³		<u>2</u>	Electives ³		2
		15	* KINE 199 Required Physical Activity.....	(0-2)	<u>1</u>
					14

total hours 120

- NOTES: 1. Any course in this category from the approved University Core Curriculum list of courses.
 2. To be selected from ENGL 203, 210, 235, 236, 241 and 301.
 3. Electives should be chosen in consultation with the student's advisor. If the student has not fulfilled the 6 hours international and cultural diversity requirement of the University Core Curriculum with courses used to meet other areas of the Core, they must fulfill this requirement with 6 of their elective hours.
 4. To register for PHYS 401 a student must be able to program in a high level language, such as FORTRAN or C. This prerequisite can be satisfied by taking CPSC 206 or the equivalent.
 5. Any 400-level physics elective, except the writing intensive courses 420 and 491.
 6. Approved W course designation.

* See page 21.

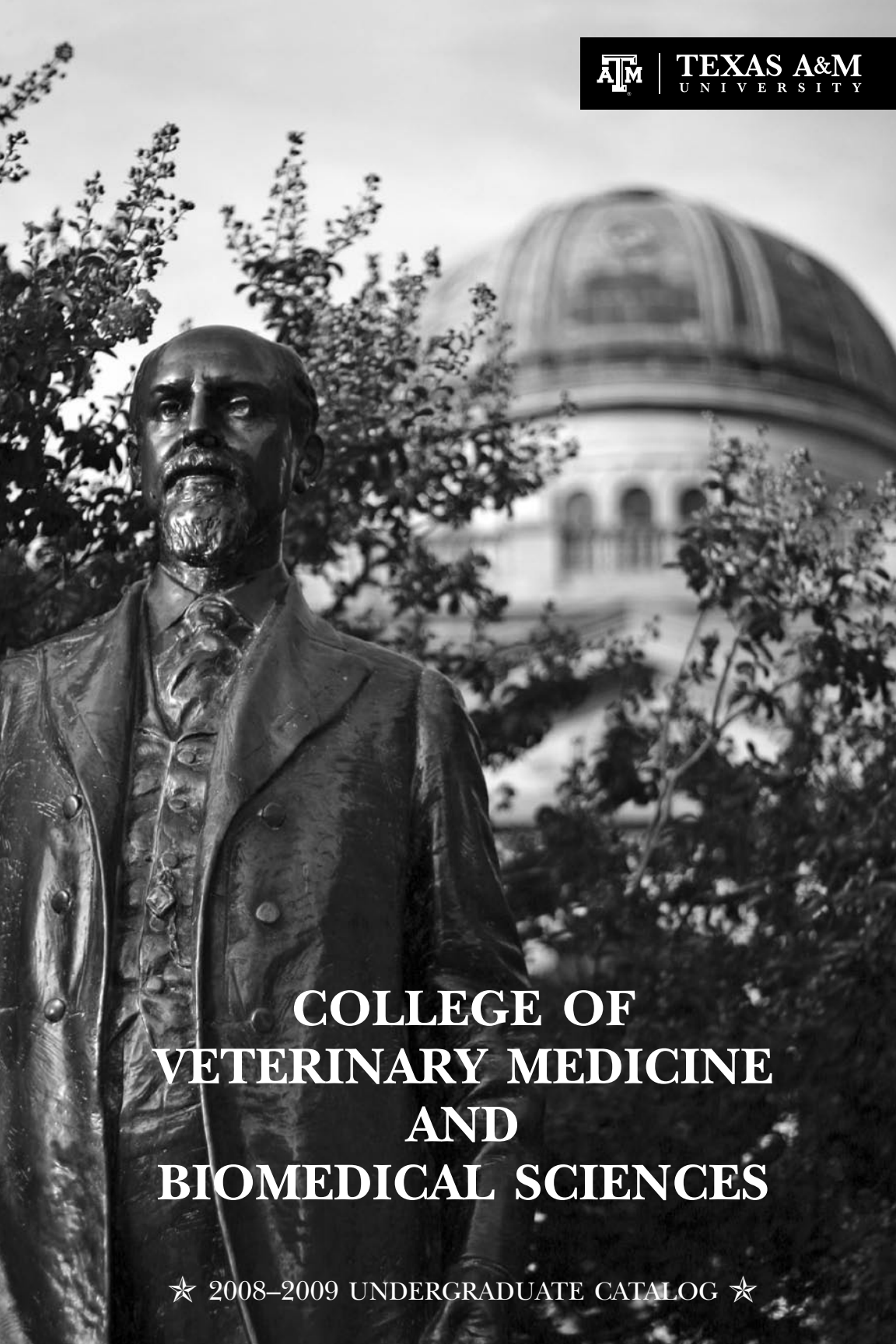
Curriculum in Statistics

The science of statistics deals with the collection and summarization of data, design of experiments and surveys, measurement of the magnitude of variation in both experimental and survey data, estimation of population parameters with measures of their accuracy and precision, tests of hypotheses about populations and studies of the relationships between two or more variables. While the ideal of science is to achieve a systematic interrelationship of facts, scientific methods must be a pursuit of this ideal by experimentation, observation and logical arguments from various accepted postulates. Thus, the science of statistics is a set of scientific principles and methodologies that are useful in reaching conclusions about populations and processes when the available information is both limited and variable. Hence, statistical principles are useful in all the sciences, both physical and social. Many practical applications of statistics are found in a wide variety of fields, including biology, education, social sciences, engineering, business, government and agriculture.

The Department of Statistics offers training in statistics leading to degrees of Master of Science and Doctor of Philosophy, and together with the Department of Mathematics jointly sponsors the Bachelor of Science degree in applied mathematical sciences. This undergraduate curriculum provides the student with a firm foundation in mathematics, statistics and computing science. Additionally, the undergraduate applied mathematical sciences major will acquire in-depth knowledge in at least one of these three areas. This B.S. degree is designed primarily for students who desire either to enter graduate studies in applied mathematics or statistics, or to seek employment in industry or government.



TEXAS A&M
UNIVERSITY

A black and white photograph of a bronze statue of a man with a beard and mustache, wearing a suit and tie. The statue is in the foreground, and in the background, a large domed building is visible through some foliage.

**COLLEGE OF
VETERINARY MEDICINE
AND
BIOMEDICAL SCIENCES**

★ 2008–2009 UNDERGRADUATE CATALOG ★

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College of Veterinary Medicine and Biomedical Sciences

Administrative Officers

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Associate Dean for Professional Programs	Kenita Rogers, B.S., D.V.M., M.S.
Associate Dean for Research and Graduate Programs	vacant
Associate Dean for Undergraduate Education	Evelyn Tiffany-Castiglioni, B.S., Ph.D.
Associate Dean for Homeland Security	L. Garry Adams, B.S., D.V.M., Ph.D.
Assistant Dean of Biomedical Science.....	Frank H. Landis, B.S., M.Ed., Ph.D.
Assistant Dean for Finance and Admissions	Charles R. Vrooman, B.A., M.B.A.
Director of Student Services for Professional Programs.....	Leslie A. Fiechtner, B.B.A., M.S.

General Statement

The College of Veterinary Medicine and Biomedical Sciences consists of five academic departments: Veterinary Integrative Biosciences, Veterinary Large Animal Clinical Sciences, Veterinary Pathobiology, Veterinary Physiology and Pharmacology, and Veterinary Small Animal Clinical Sciences. Each department is administered by a department head, who is responsible to the Dean of Veterinary Medicine and Biomedical Sciences for all programs assigned or developed in the department, including teaching, research, extension and service.

A Veterinary Medical Teaching Hospital and Field Service Clinic are operated within the College to provide clinical laboratories for the veterinary medical educational program.

An extensive research program in animal health and disease is conducted by the faculty and staff of the college, and a substantial number of the teaching faculty members are engaged in research.

A veterinary extension program carries research information to veterinarians, animal owners, and others in the state and nation with the least possible delay. The faculty makes research information available to the students in the classroom and laboratories in a timely manner.

The typical land-grant institutional mandate of teaching, research, patient care and service provides the organizational framework necessary to meet the dynamics in the ever-changing field of veterinary medicine.

Graduate programs leading to the Master of Science and Doctor of Philosophy degrees are available in the departments of the College of Veterinary Medicine and Biomedical Sciences as well as clinical specialty residency training programs. These programs are designed to provide effective training in the areas of professional specialization. The programs are research oriented but sufficiently flexible to permit intensive training in many areas of special interest.

Admission Requirements—Professional Curriculum

The admission recommendations and requirements are reconsidered annually out of phase with this undergraduate catalog. The student is encouraged to contact the College of Veterinary Medicine and Biomedical Sciences for the most updated specific information concerning professional veterinary medical program admissions. Also, visit our Web site at www.cvm.tamu.edu.

There is no separate curriculum in preveterinary medicine; therefore, a student entering Texas A&M University, who is interested in a career in veterinary medicine, must choose a specific course of study offered by one of the colleges of the University.

The student should select a curriculum in which the preprofessional course recommendations listed below can be completed as well as pursue a degree in another field in the event that admission into the professional curriculum in veterinary medicine is not achieved.

Counsel for students who wish to qualify for the professional curriculum in veterinary medicine is available in the College of Veterinary Medicine and Biomedical Sciences regardless of the curriculum in which the student is registered. Students currently attending Texas A&M University are encouraged to contact the Office of Professional School Advising for more information.

Preprofessional Course Requirements

The minimal number of college or university credits required for admission into the professional curriculum is 73 semester hours. Applicants must have completed or have in progress approximately 57 credit hours during the semester they make application. Because there is no specific degree associated with the preprofessional study plan, students are encouraged to pursue a specific degree program that meets his/her individual interest. To be eligible for the Bachelor of Science degree at Texas A&M University, certain requirements must be met (see University Core Curriculum requirements). We strongly encourage that courses be chosen with a counselor at the applicant's institution, or through contact with an academic advisor at the College of Veterinary Medicine and Biomedical Sciences, Texas A&M University, (979) 862-1169.

The following areas of study are required as appropriate preprofessional course preparation:

Animal Science. Knowledge and experience in working with animals are critical to become a successful veterinarian. While the professional curriculum is almost totally devoted to the understanding of animals, animal contact, experience and handling should also be major considerations in the preveterinary training period. Applicants are expected to be familiar with animal systems and behavior. For those interested in food supply veterinary medicine, general agricultural knowledge should also be a consideration. To obtain this experience, applicants should either register for course work based on their background, interest and needs or involve themselves in practical animal operations. Formal training in animal systems and animal behavior is highly desirable and encouraged if available at the applicant's institution.

The following courses are required as preparation for entry into the veterinary medical program. It is anticipated that highly motivated students will exceed these minimal course requirements.

Life Sciences Category	Credit Hours	Courses that Meet Requirements
General Biology with lab	4	BIOL 111
General Microbiology with lab	4	BIOL 351 or VTPB 405
Genetics	3	GENE 301 or GENE 320
Animal Nutrition or Feeds and Feeding	3	ANSC 318 or 320 or NUTR 303 (ANSC 303)
General Animal Science	3	ANSC 107
Chemical/Physical Sciences and Mathematics Category	Credit Hours	Courses that Meet Requirements
Inorganic Chemistry with lab	8	CHEM 101/111 and 102/112
Organic Chemistry with lab	8	CHEM 227/237 and 228/238
Calculus or Statistics	3	MATH 131 or 142 or 151 or STAT 301 or 302 or 303
Physics	8	PHYS 201 and 202
Biochemistry	5	BICH 410/411
Non-sciences Category	Credit Hours	Courses that Meet Requirements
Composition and Rhetoric	3	ENGL 104
Literature	3	Any 3-hour literature course
Communication	3	COMM 203 or 315 or 325
Technical Writing	3	ENGL 210 or 301

Additional Credits. In addition to the 61 credit hours required above, the applicant must complete a minimum of 12 additional credits. Applicants should keep in mind their degree program, the University Core Curriculum requirements for a baccalaureate degree from Texas A&M, and their personal career goals in making these choices. We strongly encourage that these choices be made in concert with a qualified counselor at the applicant's institution.

Additional Preprofessional Course Recommendations

A required preprofessional course must have a final grade of C or better.

Students may take the preprofessional required courses at any accredited institution of higher education. However, the course must be equivalent in subject content and credits to its counterpart at Texas A&M University.

To be a qualified applicant, 57 semester hours of the preprofessional course requirements must be completed or in progress during the fall semester in which application is made. *All preprofessional required courses must be completed by the end of the spring semester.*

Formal Application

Applications are available online at www.cvm.tamu.edu/dcvm/admissions/application.shtml after May 1 of each year and must be submitted on or before October 1 in order to receive consideration for the succeeding fall class. Additional application information may be obtained by calling the Dean's Office at (979) 862-1169 or on the Web site www.cvm.tamu.edu.

Grade Point Ratio

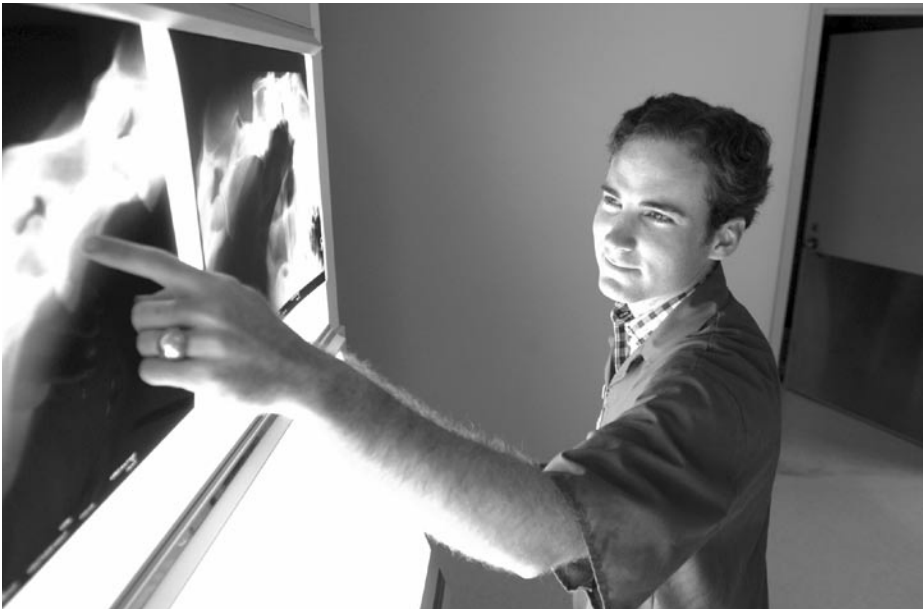
The applicant must have an overall grade point ratio of 2.90 or better or a 3.10 grade point ratio or better over the last 45 semester credits completed (A=4.0 grade points).

Graduate Record Examination (GRE)

Applicants must file a GRE score with Texas A&M University before September 30. Failure to do so may disqualify the applicant for consideration during the current cycle. Please refer to our Web site at www.cvm.tamu.edu for further information.

International and Cultural Diversity Requirement

Texas A&M University requires its students to meet an International and Cultural Diversity requirement as part of the University's Core Curriculum. Meeting this requirement will require the careful selection of courses. The student is directed to page 20 of this catalog for detailed information regarding this requirement and also is encouraged to seek the advice of the student's academic advisor.



Professional Curriculum in Veterinary Medicine

The professional curriculum seeks to deliver to the veterinary medical profession a student fully equipped to begin a medical career in the arts and sciences of animal health and disease. Emphasis on professional specialization is reserved for graduate programs.

Veterinary medicine encompasses the full scope of the technology of animal health and disease, including the arts and sciences of disease prevention, diagnosis, prognosis and therapy. The professional curriculum begins at the basic level and systematically moves to the clinical application.

Graduates are qualified to formulate and implement programs for disease control and prevention in domestic farm animals, poultry, pet animals, zoo animals, fur-bearing animals, laboratory animals and wildlife. They are equipped to administer and advise in public health problems arising from intertransmission of diseases between humans and lower animals and are capable of performing animal disease regulatory duties for governmental agencies. They are also oriented for professional careers in the armed forces.

The degree of Doctor of Veterinary Medicine is awarded to the student upon successful completion of the professional curriculum in veterinary medicine. In addition to the DVM degree, the student must take and pass the NAVLE and state licensing examinations to practice clinical veterinary medicine.

Bachelor of Science in Veterinary Science

Many students in the professional veterinary medical curriculum hold a bachelor's degree or other advanced degree. Others have accumulated considerable credit toward a bachelor's degree and are encouraged to seek completion of these degrees at their undergraduate institution or major department. In some instances, the undergraduate institution may recognize some course work in the professional curriculum as partial fulfillment of requirements for the bachelor's degree.

For those students not receiving or possessing a baccalaureate degree in another major, the Bachelor of Science in veterinary science may be sought upon satisfactory completion of the preprofessional requirements, the University Core Curriculum requirements and the first two regular semesters of required courses in the professional curriculum in veterinary medicine. The student makes application for the Bachelor of Science degree to be conferred anytime following the close of the second semester of the professional curriculum, and provided he or she meets all other University requirements for the degree.

Academic Regulations

Each professional student, upon registering, will receive a copy of the *College of Veterinary Medicine and Biomedical Sciences Professional Student Handbook* which contains the college's policies on grading, promotion, dismissal, probation, grievance procedures, withdrawal, personal conduct and the honor code. Because matriculation in veterinary medicine is a privilege and not a right, the faculty retains the prerogative to request withdrawal of any student who does not attain adequate academic performance or who does not exhibit the personal qualifications prerequisite to the practice of veterinary medicine. These criteria shall apply at all times during the curriculum. Academic performance will not be the only factor in determining admission, promotion, graduation or request for withdrawal.

Scholastic Deficiency

An average grade of C and passing grades in all courses in the professional curriculum are the minimal scholastic achievements considered to be satisfactory. When a student's scholastic performance falls below the minimal satisfactory level in any term, scholastic probation may be imposed or the student may be dropped from the professional curriculum or placed on scholastic suspension from the University.

Scholastic probation is conditional permission for a student to continue in the professional curriculum under the conditions of the probation while working to remove any deficiencies. A student's failure to meet the conditions of scholastic probation may result in dismissal from the professional curriculum or suspension from the University at the end of any term for which scholastic probation is imposed. The terms of the probation are determined by the Academic Progress Committee for the year of the curriculum in which scholastic deficiency occurs. A student who fails any course prescribed in the professional curriculum or who otherwise fails to achieve satisfactory scholastic progress may be dropped from the curriculum for cause.

Readmission

A student in the professional curriculum who voluntarily withdraws, or who is dropped from the rolls of the University or from the professional veterinary curriculum for cause, forfeits his or her standing and must apply for readmission and be approved before being re-enrolled by policies and procedures of the College of Veterinary Medicine and Biomedical Sciences.

NOTE: While every effort is made to assure accuracy and timeliness of this publication, the College of Veterinary Medicine and Biomedical Sciences is not responsible for any misrepresentation which might arise through error in the preparation of this catalog, or through failure to give notice of changes in its requirements, policies, tuition and fees, course offerings and other matters affecting students or applicants. The provisions of this catalog do not constitute an irrevocable contract between any student or applicant for admission into the professional curriculum of the College of Veterinary Medicine and Biomedical Sciences.

Professional Curriculum in Veterinary Medicine

The professional curriculum in veterinary medicine is a four-year program. During the first three years, classes are scheduled on a semester basis. The fourth-year curriculum consists of 30 weeks of Basic Core Rotations, 12 weeks of elective clinical rotations or career alternative electives, 4 weeks of externship and 2 weeks of vacation. The fourth-year curriculum allows students to choose a species directed career, i.e., large animal or small animal, mixed animal or a career alternative track.

FIRST YEAR

Semester 1	(Th-Pr)	Cr	Semester 2	(Th-Pr)	Cr
VIBS 910 Gross Anatomy I	(2-6)	4	VIBS 912 Gross Anatomy II	(1-8)	4
VIBS 911 Microscopic Anatomy I	(2-6)	4	VIBS 913 Microscopic Anatomy II	(2-6)	4
VMID 912 Clinical Correlates I	(0-2)	1	VIBS 926 Intro. to Public Health Concepts ...	(1-0)	1
VMID 981 Professional Development	(1-0)	1	VMID 913 Clinical Correlates II	(0-2)	1
VTPB 910 Veterinary Immunology	(2-0)	2	VTPB 911 Veterinary Microbiology	(3-2)	4
VTPP 910 Physiology I	(5-2)	6	VTPP 912 Physiology II	(5-2)	6
	(12-16)	18		(12-20)	20

SECOND YEAR

Semester 3	(Th-Pr)	Cr	Semester 4	(Th-Pr)	Cr
VMID 921 Clinical Correlates III.....	(1-2)	2	VIBS 930 Public Health III.....	(4-0)	4
VMID 950 Nutrition	(2-0)	2	VMID 923 Surgery/Anesthesiology	(3-2)	4
VTPB 920 Parasitology	(3-4)	5	VMID 924 Intro. to Diagnostic Imaging.....	(1-0)	1
VTPB 922 Pathology I.....	(5-2)	6	VTPB 913 Infectious Diseases.....	(2-0)	2
VTPP 924 Pharm./Toxicology I.....	(4-2)	5	VTPB 923 Pathology II.....	(5-2)	6
		<u>(15-10)</u>	VTPP 925 Pharm./Toxicology II	(2-2)	3
		20	VTPP 926 Pharm./Toxicology III.....	(2-2)	3
				<u>(19-8)</u>	23

THIRD YEAR

Semester 5	(Th-Pr)	Cr	Semester 6	(Th-Pr)	Cr
VLCS 954 Large Animal Medicine.....	(5-4)	6	VLCS 930 Adv. Equine Med. and Surgery	(3-0)	3
VMID 925 Diagnostic Imaging Interp. I.....	(2-0)	2	VLCS 931 Adv. Ruminant Medicine and Surgery	(2-0)	2
VMID 935 Surgery I.....	(2-4)	3	VLCS 932 Adv. Ruminant Herd Health and Production.....	(2-0)	2
VMID 952 Clinics I ²	(0-4)	1	VMID 922 Clinical Correlates IV.....	(1-2)	2
VSCS 954 Small Animal Medicine I.....	(5-4)	6	VMID 926 Diagnostic Imaging Interp. II	(2-0)	2
VSCS/VLCS 953 Clinical Skills ³	(0-4)	1	VMID 936 Surgery II ³	(1-2)	2
(Dept) 948 Elective	(1-0)	1	VMID 943 Practice Management.....	(2-0)	2
		<u>Variable⁴</u>	VMID 952 Clinics I ²	(0-4)	1
		20	VSCS 955 Small Animal Medicine II.....	(6-4)	6
			VSCS/VLCS 953 Clinical Skills.....	(0-4)	1
			(Dept.) 948 Elective	(1-0)	1
				<u>Variable⁶</u>	24

minimum of 17 credit hours

- NOTES: 1. There will be one 4 hour lab per week. This lab will be shared equally between the VLCS 954 and VSCS 954 courses.
2. Students will spend one month per semester in required clinical rotations. During that month they will spend 8 hours per week for a total of 32 contact hours for the month. Additional elective clinic rotations (maximum of 2 additional) may be completed in the Veterinary Medical Teaching Hospital or with local practitioners on a space available basis.
3. Students will spend one month per semester in required skills modules (one each SA and LA). During that month they will spend 4 hours multiplied by one day per week for a total of 16 contact hours.
4. 13 hours lecture–4 hours lab for a minimum of 17 core credit hours. Additional hours may be taken in the form of electives (1 credit hour each) or elective clinic rotations (1 credit hour each). A minimum of 14 hours of electives must be taken by the end of the third year.
5. Surgery II will run for half the semester with remaining time used for electives or clinic rotations.
6. 10 hours lecture–5 hours lab for a minimum of 15 core credit hours. Students are required to take VSCS 955. VLCS 930/931/932 are optional; if taken, these hours count towards the required minimum of 15 hours of electives.

FOURTH YEAR

The fourth-year curriculum consists of 30 weeks of basic core rotations, 12 weeks of elective clinical rotations or career alternative electives, 4 weeks of externship and 2 weeks of vacation for 46 credit hours. The fourth-year curriculum allows students to choose a species directed career, i.e., large animal, small animal, mixed animal or an alternative career elective.

BASIC CORE ROTATIONS*

Small Animal Clinic (10 weeks)

Small Animal Medicine and
Surgery I and II
Medicine 5 (Community Practice)
Surgery 1 (General)
Small Animal Emergency/Critical Care

Large Animal Clinic (10 weeks)

Food Animal Medicine and Surgery
Equine Medicine and Surgery I and II
Field Services—General
Large Animal Emergency/Critical Care

Anesthesiology (4 weeks)

Large Animal
Small Animal

Radiology (2 weeks)

Large Animal
Small Animal

Laboratory Services (4 weeks)

Clinical Pathology/Necropsy
Clinical Microbiology and Parasitology

AVAILABLE ROTATIONS*

Small Animal Medicine

Dermatology/Dentistry
Internal Medicine/Cardiology
Internal Medicine/Oncology
Internal Medicine/Canine
Internal Medicine/Feline
Community Practice
Neurology/Neurosurgery
Small Animal Behavior
Zoological Medicine and Surgery

Small Animal Surgery

General
Orthopedic
Soft Tissue
Ophthalmology

Large Animal Clinic

Food Animal Medicine and Surgery
Equine Medicine
Equine Surgery
Food Animal Theriogenology
Equine Theriogenology
Food Animal Field Service
Equine Field Service
TDCJ (Prison Rotation)
Zoological Medicine and Surgery

Anesthesiology

Radiology

Laboratory Services

Alternative Career Electives on or off Texas A&M campus

Externship

Vacation

* All rotations are two weeks.

College of Veterinary Medicine and Biomedical Sciences
Major in
Biomedical Sciences

1. A Biomedical Sciences (BIMS) major will be admitted into the upper-level courses according to the following criteria:
 - a. Completion of a set of Common Body of Knowledge (CBK) courses (35 hours to include BIOL 111 and 112; CHEM 101/111, 102/112, 227, 237, 228 and 238; PHYS 201 and 202; and MATH 131) with a grade of C or better in each course. Normally, for admission to BIMS upper-level courses, a student may have attempted a CBK course no more than twice.
 - b. A minimum of 55 completed semester hours with a cumulative resident Grade Point Ratio (GPR) of 2.5 or better.

Process: Each student upon completing 55–65 semester credit hours must have a degree audit to verify upper-level eligibility.

2. The Biomedical Sciences Program will continue to accept changes of major into BIMS according to current Texas A&M University policy, but restrict changes of major into the upper-level courses (BIMS) according to the criteria listed in item 1. Students in other majors requesting a change of major to the BIMS program must also fulfill the criteria in item 1. In addition, the dean must verify availability of resources necessary to insure the student's full-time enrollment in required upper-level courses prior to admission to upper-level status. If such courses are not available, the student will be denied admission to Biomedical Science.
3. To enter BIMS upper-level courses, transfer students must have:
 - a. A minimum GPR of 2.5 in CBK courses with a grade of C or better in each completed course.
 - b. At least 55 semester credit hours with a minimum cumulative GPR of 2.5.
 - c. Transfer students admitted under another major and wishing to change into BIMS must complete one semester of graded course work at Texas A&M University with a cumulative resident GPR of 2.5.
4. Students seeking readmission will be considered on a case-by-case basis, according to current catalog policy. No quotas will be placed on readmission; however, the decision to readmit will be dependent on resource availability and University policy.
5. Any BIMS student admitted to upper-level courses who then falls below the 2.5 GPR requirement will not be considered in good academic standing in their major and will be placed on college probation. All Biomedical Sciences majors must follow established probation rules for the Biomedical Sciences Program.
6. The Dean, Director or Department Head will reserve the right to waive CBK or GPR requirements within the criteria established in *Texas A&M University Student Rules*.
7. No courses other than KINE 199, BIMS 481, 484 and 489, and 285/485s can be taken S/U to be used in the degree plan.

8. BIMS probation is determined at the end of the Spring semester. Students not meeting acceptable GPA requirements (2.5 majors) or (2.0 area of concentration and for BIMS minors) will be required to attend Texas A&M University that summer and repeat courses as needed to raise their GPA.
9. Students may only attempt CVM courses a total of three (3) times.

Curricula in Biomedical Sciences for Majors

Applied Science Option

Biomedical Sciences is a broad field of applied biology that is directed toward understanding health and disease. The curriculum is designed to provide a strong four-year education that emphasizes versatility of the graduate in the biological and medical sciences. A highly effective counseling program assists the students with the development of an individualized approach and course package that orients and prepares the students for entry into the medical and allied health field of their choice. Such an approach enhances their educational experiences, improves their placement in professional programs, and facilitates their entry into the biomedical science job market.

Biomedical Sciences graduates enter professional programs in human medicine, veterinary medicine, dentistry, osteopathy, podiatry, optometry, and pharmacy. Some become medical technologists, physician assistants, nurses, and laboratory and research technicians. Others pursue radiation technology, hospital administration, and a wide variety of health-related fields. Many Biomedical Sciences students continue their education in graduate schools and specialize in various biology- and medicine-related disciplines. Other graduates are employed by clinical practices, industrial companies, government agencies, private foundations, public schools, colleges and certain aspects of business. Positions are available in pharmaceutical and drug marketing, research equipment manufacture and sales, food safety, biomedical research, disease control, zoonoses and epidemiology, laboratory animal care, zoo and aquatic animal supervision, health-related inspection and regulatory work. The B.S. in Biomedical Sciences is also awarded to students who complete the three year Early Admission Option to Professional Schools and one year of professional school.

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
BIMS 101 Intro. to Biomedical Science	(1-0)	1	BIOL 112 Introductory Biology II	(3-3)	4
BIOL 111 Introductory Biology I.....	(3-3)	4	CHEM 102 Fund. of Chemistry II.....	(3-0)	3
CHEM 101 Fund. of Chemistry I.....	(3-0)	3	CHEM 112 Fund. of Chemistry II Lab.....	(0-3)	1
CHEM 111 Fund. of Chemistry I Lab.....	(0-3)	1	ENGL 104 Comp. and Rhetoric.....	(3-0)	3
HIST 105 History of the U.S.	(3-0)	3	MATH 131 Mathematical Concepts—		
Social and behavioral sciences elective ²		<u>3</u>	Calculus	(3-0)	3
		15	* KINE 199 Required Physical Activity ¹	(0-2)	<u>1</u>
					15

SOPHOMORE YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
CHEM 227 Organic Chemistry I.....	(3-0)	3	CHEM 228 Organic Chemistry II.....	(3-0)	3
CHEM 237 Organic Chemistry Lab. I.....	(0-3)	1	CHEM 238 Organic Chemistry Lab. II.....	(0-3)	1
MATH 166 Topics in Contemporary Mathematics II.....	(3-0)	3	HIST 106 History of the U.S.....	(3-0)	3
PHYS 201 College Physics.....	(3-3)	4	PHYS 202 College Physics.....	(3-3)	4
POLS 206 American Natl. Govt.....	(3-0)	3	POLS 207 State and Local Govt.....	(3-0)	3
VAPA elective ²		<u>3</u>	Humanities elective ²		<u>3</u>
		17			17

JUNIOR YEAR

BICH 410 Comprehensive Biochemistry I.....	(3-1)	3	BICH 411 Comprehensive Biochemistry II....	(3-0)	3
BIMS 320 Biomedical Genetics.....	(3-0)	3	BIMS 481 Sem. in Biomed. Sci. (W course)...	(1-0)	1
VIBS 305 Biomedical Anatomy.....	(2-4)	4	VTPB 405 Biomedical Microbiology.....	(3-5)	5
** BIMS directed elective ²		3	** BIMS directed elective ²		3
* KINE 198 Health and Fitness Activity ¹	(0-2)	<u>1</u>	Communication elective ²		<u>3</u>
		14			15

SENIOR YEAR

BIMS 481 Sem. in Biomed. Sci. (W course)...	(1-0)	1	VTPB 423 Biomedical Physiology I.....	(3-3)	4
STAT 302 Statistical Methods.....	(3-0)	3	** BIMS directed electives ²		<u>10</u>
** BIMS directed electives ²		6			14
Free elective ²		<u>3</u>			
		13			

total hours 120

In satisfying the required 24 hours of BIMS directed electives and free electives, all 285/485 courses may not exceed 6 credit hours and all 489 courses may not exceed 6 credit hours. A 489 course used as a free elective may not exceed 3 hours. A 491 course may not exceed 3 hours credit.

- NOTES:**
1. No more than 1 semester credit hour of KINE 198 and KINE 199 or their equivalents may be used in satisfying the requirements of this option, including for free elective.
 2. Must be chosen in consultation with academic advisor.
 3. Check with your academic advisor to take the correct required writing courses.

* See page 21.

**BIMS directed electives: Courses that constitute the major in the applied science option are those offered by the College of Veterinary Medicine and Biomedical Sciences and those approved for biomedical science electives. A student may choose 24 semester credits from the following partial list of courses: BIMS 289, 452, 470, 484, 489, 492; VTPB 301, 303, 406, 407, 408, 409, 410, 412, 421, 438, 452, 454, 487; VTPB 424, 425, 427, 429, 431; VIBS 204, 343, 409, 443, 450, 451; VLCS 409; Additional CVM courses: 489 Honors sections and 485 (Directed Studies). A complete list of all BIMS directed electives may be obtained from a BIMS advisor.

International Certificate in Cultural Competency and Communications in Spanish

Students who complete this certificate will be functionally bilingual and able to perform linguistically in a culturally sensitive manner within the biomedical environment. A required study abroad will allow students to gain experiential knowledge, expanding their cultural sensitivities and functionality in a foreign environment. Because of limited resources, the program will have a cap on the number of students admitted. All courses in the program must be completed with grade of C or better. The certificate will be awarded upon completion of a B.S. degree in Biomedical Science. To earn the certificate, students are required to complete:

1. A minimum of 9 hours of Spanish credit to include:
SPAN 201^a
SPAN 202
SPAN 300/400 level course of the student's choice
2. A minimum of 6 credit hours of area studies from an approved course list.^b
3. A capstone course: VTPB 303 for 3 hours.^c
4. An International Experience approved by the Biomedical Science Program.^d

NOTES: a. SPAN 221 and 222 are acceptable substitutions, when taken abroad, for 201 and 202.

b. The certificate was designed with the student's required Texas A&M Core Curriculum in mind. Many of the courses on the approved list will count as a humanities, visual and performing arts, or social and behavioral sciences. It is up to the student to compare the two lists and to work with their academic advisor to choose courses appropriate to their degree plan.

c. It is suggested that students enroll in this course after the completion of at least SPAN 202 or equivalent.

d. This requirement may be satisfied by an approved study abroad program, an international internship, or a directed study experience in a Spanish-speaking country.



TEXAS A&M
UNIVERSITY

A black and white photograph of a bronze statue of a man with a beard and mustache, wearing a military-style uniform with a high collar and buttons. The statue is positioned in the foreground, looking slightly to the left. In the background, there are trees and a large, domed building, likely the Texas A&M University building.

SCHOOL OF MILITARY SCIENCES

★ 2008–2009 UNDERGRADUATE CATALOG ★

School of Military Sciences

Administrative Officers

Commandant Lieutenant General (Ret.) John A. Van Alstyne
USA, B.B.A., M.S., M.A.

The School of Military Sciences is composed of three departments: Aerospace Studies, Military Science and Naval Science.

All courses offered by the School of Military Sciences are accredited by the University. However, the credit granted for degree plans varies by college and often by department. For precise information, consult the associate dean or department head.

The University's commitment to providing highly skilled and disciplined leaders to the Armed Forces requires all students enrolled in ROTC programs at Texas A&M to be members of the Corps of Cadets.

Students not enrolled in an ROTC program may be permitted to take ROTC courses as electives with the advance approval of the professor of military science, the professor of aerospace studies, or the professor of naval science, as appropriate, and the concurrence of the head of the School of Military Sciences.

State law permits the substitution of 3 hours of history and 3 hours of political science for a student in the program of an approved senior ROTC unit. With the approval of the dean of the appropriate college, students successfully completing their required four semesters of upper-level ROTC curriculum will be deemed to have completed the equivalent of Political Science 206 or 207 plus History 105 or 106 (or another appropriate course) for a total of 6 hours.

Students in the College of Liberal Arts may not substitute upper-level ROTC courses for this requirement. Students pursuing teacher certification are not allowed to substitute ROTC credits for this requirement.

Aerospace Studies

The Air Force ROTC (AFROTC) program at Texas A&M University is one of the largest AFROTC programs in the United States and is designed to prepare selected students to be commissioned officers in the United States Air Force.

The institutional phase of AFROTC, called aerospace studies, is divided into two parts. The first two years constitute the General Military Course and the second two years constitute the Professional Officer Course. Details on courses offered are set forth in the alphabetical departmental listing. Concurrent enrollment in more than one aerospace studies course requires the approval of the department head, also known as the Professor of Aerospace Studies.



The General Military Course consists of the 100- and 200-level courses. These courses focus on the structure and missions of Air Force organizations; officership and professionalism; and, include an introduction to communicative skills. The General Military Course prepares the cadet, as a candidate, for the Professional Officer Course (POC). Cadets in the General Military Course attend one hour of class plus two hours of leadership lab per week.

Students apply for enrollment in the Professional Officer Course during their sophomore year. Enrollment in the Professional Officer Course at the beginning of the junior year is limited to students of high moral character who are physically qualified, possess the necessary interest and aptitude, and have demonstrated leadership potential and are well qualified academically.

Before entry into the Professional Officer Course, cadets must attend AFROTC Field Training during the summer months at selected Air Force bases throughout the United States. The major areas of study in the Field Training program include junior officer training, aircraft and aircrew orientation, career orientation, survival training, base functions, Air Force environment, physical fitness training, and a culmination field training exercise. Those who complete Field Training are enlisted in the Air Force Reserve and enter the POC.

The purpose of the Professional Officer Course is to develop skills and attitudes vital to a career as a professional Air Force officer. A degree is a prerequisite for an Air Force commission. Cadets attend class three hours a week and leadership lab two hours per week during each semester of the Professional Officer Course.

If a student is selected for and enrolled in the Professional Officer Course, he or she must sign a contract with the government in which he or she agrees to enlist in the Air Force Reserve, complete the course and, upon graduation, accept a commission as an officer in the Air Force. He or she also must agree to serve on active duty for not less than four years after being commissioned. Persons selected for flight training must serve ten years of active duty following completion of pilot training or six years after completion of navigator training. Flight training takes approximately one year. During their two years in the Professional Officer Course, cadets are eligible to receive monthly subsistence pay, plus added monetary incentives.

Leadership training is continuous during the student's life as an AFROTC cadet. One way this is accomplished is through Leadership Laboratory. Instruction is conducted within the framework of an organized cadet corps with a progression of experiences designed to develop each student's leadership potential. Leadership Laboratory involves a study of Air Force customs and courtesies, drill and ceremonies, career opportunities in the Air Force, and the life and work of an Air Force junior officer. Students develop their leadership potential in a practical, supervised laboratory, which typically includes field trips to Air Force installations.

Students enrolled in the four-year program may apply and compete for two- or three-year AFROTC College Scholarships, while two-year program applicants are eligible for two-year AFROTC Scholarships. In addition to pay and travel allowance received for attending the four-week Field Training course, the U.S. Air Force pays scholarship recipients monthly subsistence pay plus the cost of tuition, fees and a textbook allowance.

Upon completion of the Professional Officer Course and graduation from the University, students are commissioned as Second Lieutenants in the United States Air Force. All instructors are active duty officers assigned to the University by the United States Air Force. Information about the Air Force ROTC program may be obtained by writing directly to the department, or visiting its Web site at afrotc.tamu.edu.

Military Science

The Army ROTC program at Texas A&M is the oldest on campus and is the largest ROTC program in the United States. Aggie ROTC graduates are renowned throughout the Army and the business world for their expertise, competence and leadership abilities. They are proud to contribute to the heritage of the “Fightin’ Texas Aggies.”

The Army has the career field to match a student’s education and interests, with no restrictions on the major field of study or discipline. Army ROTC classes are unique in the college curriculum in offering both instruction and the opportunity to develop leadership. The student who takes Army ROTC may enter such diverse career fields as aviation, engineering, law enforcement, medical services, armor, infantry, artillery, communications, finance, personnel administration, transportation, military intelligence, and research and development. Opportunities in Airborne, Ranger and Special Forces specialties also are available. Additionally, qualified applicants may compete to be granted delayed entry while pursuing medical or law degrees.

Army ROTC is divided into two parts: The Basic and Advanced Courses. The Basic Course is taken in the freshman and sophomore years. Course work covers the areas of applied management principles; national defense and leadership development; military courtesy, discipline and customs; and map reading, marksmanship and land navigation. Uniforms and the necessary textbooks are furnished. There is no military commitment for participation in the Basic Course. The Advanced Course is taken in the final two years of college and includes “Warrior Forge” (formerly known as the National Advanced Leadership Camp) taken during the summer of either the junior or senior year. Instruction includes advanced leadership development, organization ethics and professionalism, management, small unit tactics, administration, and military law. Warrior Forge permits the cadet to put into practice in the field the principles and theories acquired in the classroom. All cadets in the Advanced Course receive a tiered subsistence allowance of up to \$500 per month and are paid approximately \$800 for attending the Advanced Camp. Selected cadets may attend special schools such as Airborne, Air Assault, Northern Warfare, and Mountain Warfare. Additionally, qualified students may join the Simultaneous Membership Program (SMP) of the Army National Guard or Army Reserve, which will earn them approximately \$250 per month. The total dollar amount for those students can reach \$750 per month during their junior and senior years in ROTC. A tuition assistance program also is available through the Army Reserves and Texas National Guard, which pay between 75 to 100% tuition costs.

Army ROTC cadets receiving commissions may serve as officers in either of two ways. At Texas A&M, the cadet may request to go on to active duty with the U.S. Army following graduation or to pursue a civilian career upon completion of the officer’s basic schooling while remaining affiliated with the Army Reserve or National Guard.

The Army ROTC Scholarship program awards four-year and three-year advance designee scholarships, on a competitive basis, to students entering ROTC as college freshmen. Two-year and three-year scholarships also are available for college students already enrolled in ROTC. These scholarships pay the cost of tuition, required fees and a flat rate textbook allowance for the duration of the award. They also provide a tiered subsistence allowance of up to \$500 per month. In all, a four-year scholarship is worth over \$45,000 at Texas A&M.

Army ROTC has both two-year and three-year programs that are designed for transfer students and other students who have not taken Army ROTC during their first two years. Students can take advantage of the two-year program by successfully completing a six-week Leadership Training Course (LTC) after their sophomore year. The three-year program (for students starting as sophomores) can be completed by compressing basic course classes. Qualified veterans may enroll directly into the ROTC Advanced Course. Veterans in the Advanced Program receive a tiered subsistence allowance of up to \$500 per month in addition to their veterans benefits.

The U.S. Army Health Profession Scholarship Program offers a unique opportunity for financial support to cadets who desire to continue their education beyond their undergraduate work by enrolling in a program leading to a professional degree in medicine, dentistry or veterinary medicine.

Army ROTC members are leaders in a wide variety of university activities. Rudder's Rangers, the Fightin' Texas Aggie Band, Student Government, campus athletics, the Ross Volunteer Company, Parsons Mounted Calvary, and the Society of American Military Engineers are but a few of the many activities in which Army cadets are involved.

The "Aggie Warrior Battalion" Army ROTC program provides the opportunity to receive an officer's commission and college degree simultaneously. The military science faculty and staff are dedicated to providing well-educated commissioned officers and to ensuring that the Aggie ROTC graduate continues to be recognized as an outstanding member of the U.S. Army Officer Corps.

For more information on Army ROTC programs, contact the Military Science Department at (979) 845-2814.

Naval Science

Mission. The Naval ROTC Unit at Texas A&M University provides qualified young men and women the opportunity to learn the mission of the Naval Services and pursue a commission as an officer in the United States Navy or United States Marine Corps. The Naval ROTC Unit operates as the Department of Naval Science at Texas A&M and is one of the largest Naval ROTC Units in the United States. Graduates from our program can be found serving around the world. Officers commissioned as Ensigns in the United States Navy have the option, based on physical and aptitude qualification, to serve in the Aviation (Pilot or Naval Flight Officer), Surface Warfare (Conventional, Nuclear, or Engineering Duty), Nuclear Submarine, or Special Warfare (SEAL or Explosive Ordnance Disposal) communities. Officers commissioned as Second Lieutenants in the United States Marine Corps can serve in one of more than 36 military operational specialties in three categories including Aviation (Pilot or Naval Flight Officer), Combat Arms (Infantry, Artillery, Armor, Assault Amphibians, Combat Engineers, etc.), or Combat Service Support (Logistics, Supply, Data Processing, Finance, etc.).

Naval ROTC students may participate fully in all aspects of university life. This includes serving in positions with Student Government or the Memorial Student Center, belonging to campus clubs and service organizations, or participating in religious, social, professional or personal interest organizations. The NROTC Unit also sponsors and advises special units within the Corps of Cadets such as SEAL Platoon and RECON Company.



Scholarships. The Naval ROTC program provides numerous scholarship opportunities for qualified individuals who are seeking a commission upon graduation as an officer in either the United States Navy or United States Marine Corps. The four-year Naval ROTC scholarship program is a nationally competitive program. High school students seeking a four-year Navy or Marine Corps Option Naval ROTC scholarship may apply as early as the spring of their junior year in high school, and should apply no later than December of their senior year in high school. The Naval ROTC scholarship pays for all tuition, most university fees, uniform fees, and provides the student with a stipend of \$250 per month during the freshman year, \$300 per month in the sophomore year, \$350 per month during the junior year and \$400 per month during the senior year. Naval ROTC scholarship recipients also receive a book allowance of \$375 per semester while on scholarship. Three- and two-year scholarships with the same benefits listed above are available for qualifying students who apply while enrolled as NROTC students at Texas A&M.

College Program. Students without NROTC scholarships initially participate in Naval ROTC as Naval Science Students. Those meeting established prerequisites may be enrolled as Basic College Program Students. Those prerequisites include: motivation to serve as a commissioned officer in either the United States Navy or United States Marine Corps, meet the physical requirements for commissioned service, maintain a minimum of 2.00 cumulative GPR, and possess the aptitude for commissioned service. The Basic College Program exists to provide students the opportunity to learn about the United States Navy and United States Marine Corps and provide an alternate means for a commission for those not on scholarship. Basic College Program students can apply for a two-year or three-year Navy or Marine Corps Option Naval ROTC scholarship. These scholarships provide the same benefits as the four-year scholarship covering all tuition, most university fees, uniform fees, and provide the student with the same stipend rates and book allowance. Students who do not qualify for a scholarship but still desire a commission can apply for acceptance into the College Program (Advanced Standing). The College Program (Advanced Standing) begins during the junior year and pays the stipend rates of \$350 per month during the junior year and \$400 per month during the senior year, but does not pay for tuition and fees. All NROTC students are provided Naval Science textbooks at no cost.

Leadership. All Scholarship and College Program (Basic and Advanced Standing) NROTC students are also members of the Texas A&M Midshipman Battalion, an organization providing distinct training and leadership opportunities for students pursuing Navy and Marine Corps commissions. This training is accomplished through the NROTC's Leadership Laboratory. Associated with each Naval Science class and conducted every Thursday afternoon, Leadership Laboratory is a combination of classroom study and practical hands-on application that exposes the students to many facets of the Navy and Marine Corps and provides them the opportunity to develop their leadership skills.

Academic Requirements. Academic requirements vary by program, but all freshmen and sophomore Naval ROTC students must take a Naval Science (NVSC) class each Fall and Spring semester. These courses include Introduction to Naval Science, Leadership and Management, Seapower and Maritime Affairs, and either Navigation (for Navy option students) or Evolution of Warfare (for Marine option students). These courses provide a basic understanding of the Navy and Marine Corps organization and mission; address the concepts of leadership, ethics, and management; and provide a basic understanding of the history of American sea power and the evolution of warfare throughout the ages. All Scholarship and College Program (Advanced Standing) students continue to take Naval Science courses during their junior and senior year. These courses cover additional topics such as navigation, weapons systems, amphibious warfare and leadership and ethics for the junior officer.

Naval ROTC Scholarship students are not restricted on their choice of major, but are required to complete the required naval science classes and other Navy-specified college courses. NROTC instructors will review each student's degree plan and identify which, if any, additional courses are required.

Summer Cruise. Scholarship students receive four to six weeks of additional training every summer with operational Navy and Marine Corps units around the world. Between the freshman and sophomore years, students receive orientation training with naval aviation, surface combatant, submarine and Marine Corps units. Between the sophomore and junior years, Navy Option students experience the life of enlisted sailors aboard ships and submarines and Marine Option students experience the life of enlisted marines with Marine units in the field. For the final training session between the junior and senior years, all Scholarship and College Program (Advanced Standing) students receive service-specific training in final preparation for commissioning. Navy Option students are assigned to aviation units, surface combatants or submarines depending upon their qualifications and desires and receive hands-on training working closely with qualified junior officers. Marine Option students attend Officer Candidate School at Quantico, VA where they are screened, trained and evaluated in an intense, competitive environment alongside other Marine Option students from around the country. Students participating in summer cruises are provided government travel, medical and dental care, commissary and exchange privileges, and are paid approximately \$895 per month for the duration of the training.

Commissioning. Upon graduation, qualified Naval ROTC Navy and Marine Option Scholarship students receive commissions as Ensigns in the United States Navy or as Second Lieutenants in the United States Marine Corps and serve a minimum of four years of active duty. Qualified Naval ROTC College Program (Advanced Standing) Navy Option students receive commissions as Ensigns in the United States Navy and serve a minimum of three years of active duty. Qualified Naval ROTC College Program (Advanced Standing) Marine Option students receive commissions as Second Lieutenants in the United States Marine Corps and serve a minimum of three and a half years of active duty. Those Navy Option graduates who are academically qualified and accepted to graduate school in certain disciplines may apply for active duty deferments to complete their post-graduate education.

NROTC Staff. The staff of the Naval Science Department is dedicated to producing officers of the highest quality for the United States Navy and United States Marine Corps. All instructors are active duty Navy or Marine Corps officers and senior enlisted personnel assigned to the University by the United States Navy or United States Marine Corps. In addition, they work with the Corps of Cadets and act as military advisors to the units within the Naval regiments. This group of highly trained professionals places specific emphasis on the academic and professional development of every student assigned. Additional information about the Naval ROTC program at Texas A&M University can be obtained by calling the department at (979) 845-1775, or by visiting the Texas A&M Naval ROTC Web site at nrotc.tamu.edu.



TEXAS A&M
UNIVERSITY

A black and white photograph of a bronze statue of a man with a beard and mustache, wearing a suit and tie. The statue is in the foreground, and in the background, a large domed building is visible through some foliage.

TEXAS A&M UNIVERSITY
AT GALVESTON

★ 2008–2009 UNDERGRADUATE CATALOG ★

Texas A&M University at Galveston

Administrative Officers

R. Bowen Loftin	Vice President and Chief Executive Officer
Rodney McClendon	Executive Associate Vice President and Chief Operating Officer
Gilbert Rowe.....	Associate Vice President and Chief Academic Officer
Donna Lang.....	Associate Vice President for Enrollment Management and Outreach
William A. Seitz.....	Associate Vice President for Research and Graduate Studies
Allen B. Worley.....	Superintendent, Texas Maritime Academy
Tammy Holliday	Assistant Vice President for Research and Graduate Studies
Brad McGonagle.....	Assistant Vice President for Administration
Grant Shallenberger.....	Assistant Vice President for Student Affairs and Auxiliary Services

Board of Visitors

Texas A&M University at Galveston is served by a Board of Visitors appointed by the Board of Regents of The Texas A&M University System. The Board functions in an advisory capacity to the Vice President.

William W. Pickavance, Jr. (Chairman)	Cape Canaveral, Florida
B. Greg Mitchell (Vice Chairman)	La Jolla, California
Tony Buzbee.....	Galveston, Texas
Christopher S. Cahill	Galveston, Texas
James C. Card.....	Houston, Texas
Jonathan W. Cook	The Woodlands, Texas
Elsa Murano (Ex-Officio Member).....	College Station, Texas
James T. Edmonds	Houston, Texas
Thomas E. Farmer	Galveston, Texas
G. Allen Flynt	Houston, Texas
Robert A. Fry, Jr.....	Pasadena, Texas
Frans Gillebaard	Kemah, Texas
Billy Greer (Ex-Officio Member).....	Beaumont, Texas
William E. Jenkins.....	Houston, Texas
John W. Lyons, Jr. (Emeritus Member).....	Texas City, Texas
Mark Lyons.....	Texas City, Texas
Keith McFatrige, Jr.	Galveston, Texas
James P. McGregor	Houston, Texas
Phyllis Milstein	Galveston, Texas
George P. Mitchell (Emeritus Member).....	The Woodlands, Texas
Frank M. Muller, Jr.....	Houston, Texas
Victor R. Pierson	Jamaica Beach, Texas
James E. Pozzi	Galveston, Texas
Terry Ray	Brownsville, Texas
John F. Reinhart.....	Norfolk, Virginia
William G. Schubert	Pinehurst, Texas
Albert P. Shannon.....	Galveston, Texas
Robert Smith, III.....	Houston, Texas

Susanne H. Sullivan.....	Galveston, Texas
Kelly Teichman.....	Galveston, Texas
Steven P. Valerius.....	Houston, Texas
Deepak Varshney (Ex-Officio Member).....	New Orleans, Louisiana
Kris Anne Vogelpohl.....	Galveston, Texas
Jonathan Whitworth.....	Tampa, Florida

General Statement

Texas A&M University at Galveston, a branch campus of Texas A&M University, offers ocean-oriented, undergraduate and graduate courses with excellence in business, oceanographic/physical and biological sciences, engineering and transportation. Degrees are awarded from Texas A&M University. Ocean voyages, sailing in Galveston Bay, beachfront experiments and independent study complement the rigorous classroom experience at Texas A&M University at Galveston. In addition to its academic programs, the campus houses the Texas Maritime Academy, which offers training programs leading to officer licensing in the U.S. Merchant Marine.

Texas A&M University at Galveston is located near the mouth of Galveston Bay with close access to the Gulf of Mexico. The University has facilities at three separate campus locations. Most instructional programs are taught at the 130-acre Mitchell Campus on Pelican Island (with housing for 600+ students). The training ship, T/S Texas Clipper, serves as a floating classroom, laboratory and dormitory for the annual summer training cruise of the U.S. Maritime Service cadets. During the regular school year, the ship is berthed at Pelican Island and provides valuable dockside laboratory facilities for instruction in the practical aspects of the maritime curricula.

Courses of Study

Texas A&M University at Galveston provides undergraduate and graduate instruction in marine and maritime-related degree programs in Marine Biology, Marine Engineering Technology, Marine Fisheries, Marine Transportation, Marine Resources Management, Maritime Administration (policy/business), Maritime Studies, Maritime Systems Engineering (ocean/civil), Ocean and Coastal Resources, Marine Sciences (Oceanography and Geology), and University Studies. All students complete the University Core Curriculum requirements set by Texas A&M University to ensure a broad-based education. Cooperative graduate degree programs, at both the master and doctoral levels, are in place with the Departments of Biology, Oceanography, and Wildlife and Fisheries Sciences at Texas A&M University in College Station. The Texas Maritime Academy is headquartered on the Galveston campus.

Students interested in specific academic programs and course offerings on the Galveston campus should refer to the catalog published by Texas A&M University at Galveston.

Texas A&M University at Galveston is fully accredited by the Commission on Colleges of the Southern Association of Colleges and Schools. Maritime Systems Engineering is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).

Admission

To obtain an enrollment packet or schedule a campus visit, call (409) 740-4428 or toll free at 1-87-SEAAGGIE, write Student Relations Office, Texas A&M University at Galveston, P. O. Box 1675, Galveston, TX 77553-1675, or email seaaggie@tamug.edu. The SAT or the

ACT admission examinations are acceptable. Students should have the scores forwarded to Texas A&M University at Galveston (Code 6835 for SAT and Code 6592 for ACT).

Acceptance by the Office of Admissions and Records does not constitute admission to the U.S. Maritime Service License Option Program. When admission requirements have been satisfied, the Office of Admissions and Records will send the applicant a letter of acceptance.

Facilities

Classrooms, laboratories and meeting spaces are housed within 13 major buildings on the Mitchell Campus on Pelican Island. There are three residence halls on campus, a physical education facility and the Mary Moody Northen Student Center with cafeteria services. The Jack K. Williams Library contains over 43,000 books, 35,000 bound volumes of journals and a collection of charts and maps. The training ship *T/S Texas Clipper*, in addition to being a floating campus during summer cruises, provides additional classroom, meeting and training space during the school year. Texas A&M University at Galveston has telecommunications systems established to communicate statewide within The Texas A&M University System universities and agencies. The Galveston campus has direct access to the Texas A&M University computer network in College Station via remote job entry connect lines.

Housing applications are available from Texas A&M University at Galveston and should be returned with the required deposit to the Office of Student Services, Texas A&M University at Galveston, P. O. Box 1675, Galveston, TX 77553-1675.

U.S. Maritime Service Corps of Cadets

Texas A&M University at Galveston houses the Texas Maritime Academy, which is one of six state maritime academies in the U.S. preparing graduates for licensing as officers in the American Merchant Marine. This program provides an opportunity for students to learn how to operate and maintain an ocean-going vessel. In addition to classroom and field training during the regular school year, students will sail aboard a training vessel during three summer cruises to gain practical experience in seamanship, navigation and operations.

Each summer, the *T/S Texas Clipper* (with its complement of about 240 cadets, faculty and staff) sails to exotic ports of call. Cruises are varied to include Northern Europe, the Caribbean, the Mediterranean and the United States. At the conclusion of the program, cadets are tested to become licensed as officers in the U.S. Merchant Marine and may seek employment in the exciting field of marine transportation as a licensed Third Mate or Third Assistant Engineer.

The NROTC Program offers men and women an opportunity to qualify for a commission in the Navy while attending Texas A&M University at Galveston. All NROTC students are required to participate in the U.S. Maritime Service Corps of Cadets and may qualify for licensing as a Third Mate or Third Assistant Engineer. Any student may join the NROTC Program either as a National Scholarship winner or as a non-subsidized college program student. Applications for National Scholarships can be obtained through a Navy recruiting office before the submission deadline of January 30 of the year for which the student is applying.



TEXAS A&M
UNIVERSITY

A black and white photograph of a bronze statue of a man with a beard and mustache, wearing a suit and tie. The statue is in the foreground, and in the background, there is a large, domed building, likely the Texas A&M University building, partially obscured by trees.

GRADUATE STUDIES

★ 2008–2009 UNDERGRADUATE CATALOG ★

Graduate Studies

Administrative Officers

Interim Vice President for Research	James A. Calvin, B.S., M.S., Ph.D.
Interim Dean of Graduate Studies.....	Robert C. Webb, Sr., B.A., M.A., Ph.D.
Assistant Dean	David J. Wenting, B.S., M.S., Ph.D.
Assistant Dean	John D. Vitek, B.S., M.A., Ph.D.

General Statement

Texas A&M University aspires to offer graduate programs of the highest quality. The University endeavors to admit graduate students with the highest qualifications and promise, while maintaining a balanced representation of gender, ethnic, racial and cultural backgrounds. The Office of Graduate Studies is responsible for all graduate programs in the University and assists graduate students in their pursuit of advanced academic degrees.

The Office of Graduate Studies is administered by a Dean of Graduate Studies reporting to the Vice President for Research.

The Graduate Council serves as an advisory group to the Dean of Graduate Studies. It makes recommendations to the Dean of Graduate Studies and on major policy matters, to the Faculty Senate. The Graduate Council concerns itself with the development of graduate programs within the University and with the maintenance of standards of excellence in all graduate instruction and graduate activities. Each college has a committee on graduate instruction with the responsibility for making recommendations concerning graduate course offerings, general policies on graduate instruction, and for other matters pertaining to graduate studies in that college. The chair of each committee on graduate instruction is a member of the Graduate Council.



The Graduate Operations Committee serves as an advisory body to the Vice President for Research. It focuses primarily on operations and procedures regarding administration of graduate education throughout the University. The Graduate Operations Committee works very closely with the Graduate Council to coordinate all curriculum and policy issues. It also works closely with the Academic Operations Committee and the Academic Program Council to consider recommendations concerning operations and procedures. Each academic college is represented on the Graduate Operations Committee by the associate dean (or other named individual) responsible for graduate studies in that college.

The Graduate Student Council is an advisory body to the Vice President for Research and is composed of graduate student representatives to the Student Government of the University. It also serves, through the Office of Graduate Studies, as a communication link between graduate students and the University administration.

Graduate Degrees

Texas A&M University offers the following master's and doctoral degrees:

- Master of Science (M.S.)
- Master of Arts (M.A.)
- Master of Agribusiness (M.A.B.)
- Master of Agriculture (M.Agr.)
- Master of Architecture (M.Arch.)
- Master of Biotechnology (M.BIOT.)
- Master of Business Administration (M.B.A.)
- Master of Computer Science (M.C.S.)
- Master of Education (M.Ed.)
- Master of Engineering (M.Eng.)
- Master of Fisheries Science (M.F.SC.)
- Master of Geoscience (M.Gsc.)
- Master of Industrial Distribution (M.I.D.)
- Masters Program in International Affairs (M.P.I.A.)
- Master of Land Economics and Real Estate (M.L.E.R.E.)
- Master of Landscape Architecture (M.L.A.)
- Master of Natural Resources Development (M.N.R.D.)
- Master of Public Service and Administration (M.P.S.A.)
- Master of Recreation and Resources Development (M.R.R.D.)
- Master of Urban Planning (M.U.P.)
- Master of Wildlife Science (M.W.SC.)
- Master of Water Management and Hydrological Science (M.W.M.)
- Doctor of Philosophy (Ph.D.)
- Doctor of Education (Ed.D.)
- Doctor of Engineering (D.Eng.)

There are several majors and options available at the master's and doctoral levels. Consult the *Texas A&M University Graduate Catalog*.

Admission

A formal application is required of all persons seeking admission to Graduate Studies. The application is available via the Apply Texas Web site at www.applytexas.org. Please contact the department of interest for specific application deadlines. Admission to Graduate Studies cannot be granted until all required credentials are received. A list of credentials required by the Admissions office can be found at admissions.tamu.edu/graduate.

Current Texas A&M University undergraduate students that are admitted to Graduate Studies will not be able to register for graduate courses until they have been cleared for graduation by the Degree Audit Office. All communications relating to admission should be addressed to the Office of Admissions and Records. Questions on other matters concerning graduate study programs should be addressed to the Office of Graduate Studies or to the appropriate department of interest.

The Graduate Catalog

The *Texas A&M University Graduate Catalog*, published annually, provides information about the graduate programs of Texas A&M University to students, prospective students, and faculty and staff of the University. Included is information concerning requirements for admission to graduate studies at the University, services available to students, graduate course offerings and listings of the administrative officers and the Graduate Faculty. Copies of this publication may be purchased from the University Bookstore.



TEXAS A&M
UNIVERSITY

A black and white photograph of a bronze statue of a man with a beard and mustache, wearing a suit and tie. The statue is in the foreground, and in the background, there is a large, domed building, likely the Texas A&M University building, partially obscured by trees.

COURSE DESCRIPTIONS

★ 2008–2009 UNDERGRADUATE CATALOG ★

Course Descriptions

All undergraduate courses offered in the University are described on the following pages and are listed by subject and arranged alphabetically. Some of the new courses and changes in courses are included in this catalog pending their approval by the Texas Higher Education Coordinating Board. The course numbering scheme is as follows: 100–199, primarily open to freshmen; 200–299, primarily open to sophomores; 300–399, primarily open to juniors; 400–499, primarily open to seniors; 900–999, professional courses in veterinary medicine open to students who have been admitted to these programs.

Figures in parenthesis before the course title indicate the Texas Common Course Number(s). For a complete listing, see page 982. Figures in parentheses following the course title indicate the clock hours per week devoted to theory and practice, respectively. Theory includes recitations and lectures; practice includes work done in the laboratory, shop, drawing room or field. The unit of credit is the semester hour, which involves one hour of theory or from two to four hours of practice per week for one semester of 15 weeks. Roman numerals to the right of the credit indicate the semester in which it is usually offered—"I" for fall, "II" for spring and "S" for summer. When courses are cross-listed, credit cannot be received for both courses. Any course may be withdrawn from the session offerings in case the number of registrations is too small to justify offering the course.

Department of Accounting

Professors A. S. Ahmed, J. J. Benjamin (Head), L. L. Bravenec, G. A. Giroux, S. H. Kratchman, D. R. Lassila, M. L. Loudder, C. J. Nixon, T. C. Omer, L. Rees, W. T. Shearon, Jr., L. M. Smith, J. R. Strawser, R. H. Strawser, E. P. Swanson, S. Tse, C. J. Wolfe; Associate Professors J. C. Flagg, S. D. Grossman, M. R. Kinney, M. L. McAnally, A. S. McGowan, M. K. Shelley, C. D. Weaver, M. S. Wilkins; Assistant Professors N. Sharp, D. Wang; Executive Professor K. Roach; Clinical Professor M. K. Shaub; Clinical Associate Professor S. B. Fiechtner; Senior Lecturers N. L. Allen, N. Cassidy, C. B. Clark, A. Myers III, J. E. Sanders, L. Thornton; Lecturers J. A. Barrett, M. Hill Carter, S. Knight, T. M. Phinney, M. Stasny

Accounting (ACCT)

209. **Survey of Accounting Principles.** (3-0). Credit 3. I, II, S Accounting survey for non-business majors; non-technical accounting procedures, preparation and interpretation of financial statements and internal control. May not be used to satisfy degree requirements for majors in business. Business majors who choose to take this course must do so on a satisfactory/unsatisfactory basis.
210. **Survey of Managerial and Cost Accounting Principles.** (3-0). Credit 3. II A survey of managerial and cost accounting for non-business majors; accounting responsibility of the manager, job and process cost systems, budgeting, cost-volume-profit analysis for decision-making. May not be used to satisfy degree requirements for majors in business. Business majors who choose to take this course must do so on a satisfactory/unsatisfactory basis. Prerequisite: ACCT 209.
229. **(ACCT 2301, 2401) Introductory Accounting.** (3-0). Credit 3. I, II, S Analysis, recording and reporting of business transactions; partnership and corporation accounting; analysis and use of financial statements. Prerequisite: Sophomore classification.
230. **(ACCT 2302, 2402) Introductory Accounting.** (3-0). Credit 3. I, II, S Continuation of ACCT 229. Use of budgets; introduction to cost accounting; cost control techniques and methods of measuring performance. Prerequisites: ACCT 229 and sophomore classification.
314. **Programming of Business Systems.** (3-0). Credit 3. Introduction to the programming of computerized business systems using contemporary software and practices; focus on development of computer-based solutions to common business problems. Prerequisites: Admission to Professional Program or approval of instructor.
315. **Intermediate Accounting for Non-Accounting Majors I.** (3-0). Credit 3. I, II, S Revenue recognition, principles of asset valuation, and disclosure requirements for corporations; interpretation of financial statements, rather than their preparation. May not be used as a directed or free elective for accounting majors and does not count towards the accounting requirement for the CPA exam. Prerequisites: Admission to upper division in Mays Business School.

316. **Intermediate Accounting for Non-Accounting Majors II.** (3-0). **Credit 3. I, II, S** Includes the measurement and disclosure requirements for liabilities and stockholders' equity, SEC registration statements, and cash flow reporting; focus on the analysis and interpretation of financial statements rather than their preparation. Does not qualify as a directed or free elective for accounting majors and does not count towards the accounting requirement for the CPA exam. Prerequisite: ACCT 315 or 327.
320. **Accounting Communications.** (3-0). **Credit 3.** Development of oral and written communication skills prerequisite to successful careers in public and corporate accounting. Prerequisite: Admission to Professional Program.
321. **Professional Development Seminar.** (2-0). **Credit 2.** Exposure to professional issues of professional accounting practice using a workshop format. Prerequisite: Admission to Professional Program.
327. **Financial Reporting I.** (3-0). **Credit 3. I, II, S** Study of theoretical basis for financial accounting concepts and principles related to financial reporting; emphasizing income measurement and accounting for assets. BBA accounting majors must earn a minimum grade of C for graduation. Prerequisites: Admission to upper division in Mays Business School.
328. **Financial Reporting II.** (3-0). **Credit 3. I, II, S** Continued study of accounting concepts and principles related to reporting long-debt and owners' equity; including reporting issues of leases, retirement benefits, income taxes and international accounting standards. Prerequisite: ACCT 327 with grade of C or better.
329. **Cost Management and Analysis.** (3-0). **Credit 3. I, II, S** Theory, concepts and methods relating to use of information and design of systems to aid managers in planning, controlling, decision making, evaluating performance and reporting financial results. Prerequisite: ACCT 315 or ACCT 327 with a grade of C or better.
345. **Accounting for Not-for-Profit Organizations.** (3-0). **Credit 3. II** Basic concepts and techniques of fund accounting; reporting and management problems of not-for-profit organizations. Prerequisite: ACCT 316 or 328.
401. **Advanced Accounting.** (3-0). **Credit 3. I, II** Methods of measuring and communicating economic information including consolidated statements, partnerships and fund units. Prerequisite: ACCT 328.
405. **Income Tax.** (3-0). **Credit 3. I, II, S** Introduction to federal income tax legislation pertaining primarily to corporations and individuals. Prerequisite: ACCT 327 with grade of C or better.
407. **Auditing.** (3-0). **Credit 3. I, II, S** Introduction to auditing theory and procedures pertaining to financial statements, in the context of both external auditing, by certified public accountants, and internal auditing; preparation of working papers. Prerequisite: ACCT 427.
408. **Internal Auditing.** (3-0). **Credit 3. II** Reading and evaluation of current theory and procedures used by internal auditors; selected case studies; statistical methods of forming auditing judgment. Prerequisite: ACCT 327 with a grade of C or better.
410. **Fraud Examination.** (3-0). **Credit 3.** Principles and methodologies of detecting and deterring fraud using accounting, auditing, and investigative skills; includes skimming, larceny, misappropriations, fraudulent statements, interviewing witnesses and support for litigation. Prerequisites: ACCT 327 with grade of C or better; junior or senior classification.
425. **Corporate Tax Planning.** (3-0). **Credit 3. I, II** Integration of tax regulations into overall corporate finance planning and decision making cycle. Prerequisite: ACCT 405.
427. **Accounting and Financial Information Systems.** (3-0). **Credit 3. I, II, S** Overall data flow systems emphasizing financial data and computerized systems, for accounting majors; flow and logic concepts, developing meaningful control concepts and data reporting techniques. Prerequisite: ACCT 327 with a grade of C or better.
445. **International Accounting.** (3-0). **Credit 3.** Introduction and examination of accounting issues unique to multinational enterprises and international business activity. Prerequisites: ACCT 315 or 327; FINC 341. Cross-listed with IBUS 445.
447. **Financial Statement Analysis.** (3-0). **Credit 3.** Development of an analytical approach to financial statements, integrating relevant finance and accounting concepts and principles; current topics in financial analysis. Prerequisites: ACCT 315 or 327; FINC 341 with a grade of C or better. Cross-listed with FINC 447.
450. **Accounting Ethics.** (3-0). **Credit 3.** Integration of ethical reasoning, objectivity, independence and other core values into the development of a professional accountant; critical analysis of the ethical lapses which have occurred in business and the accounting profession; exploring ways to integrate ethical behavior into professional life. Prerequisites: ACCT 328; junior or senior classification.

484. **Accounting Internship.** (0-6). **Credit 3. II, S** A practicum in accounting under the supervision of accounting practitioners; one semester program for each student participant. Free elective only and must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Accounting major and approval of department head.
485. **Directed Studies.** **Credit 1 to 3 each semester. I, II, S** Directed study of selected problems in the area of accounting not covered in other courses. Prerequisite: Accounting major and approval of department head.
489. **Special Topics in...** **Credit 1 to 4. I, II, S** Selected topics in an identified area of accounting. May be repeated for credit. Prerequisite: Admission to upper division in Mays Business School and approval of instructor.

Department of Aerospace Engineering

Professors R. D. Bowersox, L. A. Carlson, S. Girimaji, W. E. Haisler, D. C. Hyland, J. L. Junkins, V. K. Kinra, D. C. Lagoudas, R. Langari, M. S. Pilant, J. N. Reddy, O. K. Rediniotis, H. L. Reed (Head), W. S. Saric, J. C. Slattery, T. W. Strganac, T. Strouboulis, R. R. Talreja, S. R. Vadali, J. R. Walton, J. D. Whitcomb; **Associate Professors** J. G. Boyd, P. G. Cizmas, J. E. Hurtado, D. Mortari, T. C. Pollock, J. L. Valasek, E. B. White; **Assistant Professors** A. A. Benzerga, R. Bhattacharya, S. Chakravorty, Y. Jin, T. Kalmar-Nagy, A. N. Karpetis, Z. Ounaies; **Senior Lecturers** J. C. Richard; **Lecturers** J. K. Hostetler, K. J. Shryock

Aerospace Engineering (AERO)

101. **Principles of Aerospace Engineering.** (1-0). **Credit 1. I, II** Overview of aerospace engineering and the aerospace industry, including requirements and assignments of an aerospace engineer, vehicle configurations and missions, aerodynamics, structures and materials, dynamics and control, simulation and testing, and aerospace engineering in the future. Prerequisites: ENGR 111, MATH 151, PHYS 218, or registration therein.
201. **Introduction to Aerospace Engineering.** (3-0). **Credit 3. I, II** Basic aerodynamic phenomena and simplified theory; elementary aerospace vehicle performance and design. Prerequisites: Admission to upper division degree sequence in aerospace engineering; AERO 211 or registration therein.
211. **Aerospace Engineering Mechanics.** (2-2). **Credit 3. I,II** Fundamentals of Newtonian mechanics; static equilibrium of particles, system of particles and rigid bodies; free body diagrams; rectilinear and curvilinear motion of particles; linear momentum; angular momentum; friction; plane motion of rigid bodies; beams and trusses. Prerequisites: Admission to upper division degree sequence in aerospace engineering, MATH 251 or 253 or registration therein.
212. **Thermodynamics for Aerospace Engineers.** (2-2). **Credit 3. I,II** Study of thermodynamic properties and processes, heat and work, first and second laws of thermodynamics, power and refrigeration ideal cycles, psychrometrics. Prerequisites: Admission to upper division degree sequence in aerospace engineering; MATH 308 or registration therein.
213. **Material Science for Engineers.** (2-2). **Credit 3. I,II** Study of the interrelations in engineering materials and their microstructure; study of structural, electrical, optical, thermal properties; study of structure-property relationships in terms of the engineering of materials. Prerequisites: Admission to upper division degree sequence in aerospace engineering; AERO 211 and MATH 251 or 253 or registration therein.
214. **Aerospace Engineering Principles of Continuum Mechanics.** (2-2). **Credit 3. I,II** Fundamental concepts and illustrative examples of conservation laws forming the framework upon which our description of engineering mechanics of deformable bodies is based; complex examination of the manner in which these principles are applied to selected traditional areas of engineering and their associated applications. Prerequisites: AERO 211; AERO 213 and MATH 308 or registration therein.
220. **Introduction to Aerospace Computation.** (1-2). **Credit 2.** Introduction to the basic skills required for developing computer programs that solve aerospace engineering problems; engineering and math background from previous and concurrent courses will serve as the theoretical basis and motivation for programming assignments; an integrated development environment will be used for code writing, compilation, debugging, and organization. Prerequisites: Admission to upper division degree sequence in aerospace engineering; AERO 211 or registration therein.
289. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of aerospace engineering. May be repeated for credit. Prerequisite: Approval of instructor.

291. **Research.** Credit 1 to 4. Research conducted under the direction of faculty member in aerospace engineering. May be repeated 3 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
301. **Theoretical Aerodynamics.** (3-0). Credit 3. I, II Fundamentals of incompressible flow, conservation principles, continuity, momentum, rotationality, circulation, lift, drag, potential flow, thin airfoil theory, panel methods, airfoil design, high lift devices, finite wing theory, vortex lattice methods, and wing design. Prerequisites: AERO 201, MATH 308; AERO 320 or registration therein.
302. **Aerospace Engineering Laboratory I.** (1-3). Credit 2. I, II Demonstrates and complements material in courses on aerodynamics, structures and dynamics; basic testing techniques and use of computers. Prerequisite: ; AERO 301 or registration therein.
303. **High Speed Aerodynamics.** (3-0). Credit 3. I, II Fundamentals of compressible flow, acoustic waves, shock and expansion waves, shock-expansion theory, supersonic airfoil design, small perturbation theory, conical flow theory, supersonic wing panel methods, supersonic wing design, similarity theory, cone flow, unsteady waves, and theory of characteristics. Prerequisites: AERO 212, 301.
304. **Structural Analysis I.** (4-0). Credit 4. I, II Structural design considerations; mechanics of structures; introduction to elasticity; constitution of materials; analysis of typical aerospace structures in bending, extension, torsion and shear. Prerequisites: AERO 320 or registration therein; AERO 213, 214, MATH 308.
305. **Aerospace Engineering Laboratory II.** (1-3). Credit 2. I, II Demonstrates and complements material on aircraft stability and control and propulsion as well as aerodynamics and structures. Prerequisites: AERO 304, 310; ECEN 215.
306. **Structural Analysis II.** (3-0). Credit 3. I, II Work and energy principles; analysis of indeterminate structures by classical virtual work and finite elements; introduction to elastic stability of columns; application of energy methods to determine stresses, strains and displacements in typical aerospace structures; design considerations in aerospace structures. Prerequisite: AERO 304.
310. **Aerospace Dynamics.** (3-0). Credit 3. I, II Linear theory of free and forced vibrations and dynamic response of single and multi-degree of freedom systems; frequency response of first and second order systems with instrumentation applications. Prerequisites: AERO 320 or registratin therein; AERO 214, MATH 308.
320. **Numerical Methods.** (2-3). Credit 3. I, II, S Numerical and analytical methods of solving engineering problems involving curve fitting; interpolation and extrapolation; difference operators and differentiation; integration; solutions to linear and non-linear equations and differential equations with engineering applications. Prerequisite: AERO 220; MATH 308 or registration therein.
351. **Aerothermodynamics and Propulsion.** (3-0). Credit 3. I, II Aerothermodynamics of gases; laws of thermodynamics; equilibrium conditions; mixtures of gases; combustion and thermochemistry; compressible internal flows with friction, heat transfer and shock; turbojet cycle analysis and performance; chemical rockets. Prerequisite: AERO 303 or registration therein.
401. **Aerospace Vehicle Design I.** (2-3). Credit 3. I, II Aerodynamic design, specification, arrangement, performance analysis, weight and balance, stability. Prerequisites: AERO 303, 306, 351, 421.
402. **Aerospace Vehicle Design II.** (0-6). Credit 2. I, II Continuation of AERO 401. System optimization by examination and analysis of necessary trade-offs. Prerequisite: AERO 401.
404. **Mechanics of Advanced Aerospace Structures.** (3-0). Credit 3. I Advanced analysis techniques for aerospace structures; material anisotropy, plasticity, fatigue and fracture; laminated materials; solution of plane elasticity, plate and multi-component structural configurations; buckling of beams and plates; application of finite element analysis. Prerequisite: AERO 306.
405. **Aerospace Structural Design.** (3-0). Credit 3. II Overall structural integrity of complete aerospace systems; structures subjected to critical loads; design considerations in aerospace structures. Prerequisite: AERO 306.
406. **Polymer Nanocomposites and their Applications.** (3-0). Credit 3. Recent advances and methodologies in processing and characterization of nanostructured polymers and nanocomposites, as well as their commercial applications; investigate polymers filled with nanometer-size inclusions, including nanoparticles, nanotubes, nanofibers, and nanoclays; macroscale, microscale and nanoscale characterizations investigated in relation to properties of interest. Prerequisites: Senior classification or approval of the instructor; junior or senior classification.

417. **Aerospace Propulsion. (3-0). Credit 3. I** Air breathing propulsion; design and analysis of inlets, compressors, combustors, turbines and nozzles; application to aeronautical and ground transportation. Prerequisite: AERO 351.
419. **Chemical Rocket Propulsion. (3-0). Credit 3. II** Nozzles and heat transfer in rockets, liquid and solid propellant systems; combustion and combustion stability; flight performance including trajectories, multi-staging and exchange rate curves; rocket testing. Prerequisite: AERO 351.
420. **Aeroelasticity. (3-0). Credit 3. II** Classical analysis of fundamental aeroelastic phenomena with application to aerospace vehicles; flutter, divergence, control effectiveness. Prerequisites: AERO 303, 306, 310.
421. **Dynamics of Aerospace Vehicles. (3-0). Credit 3. I, II** Aircraft static stability and control; longitudinal and lateral dynamic stability; general equations of motion; stability derivatives; response to control inputs. Prerequisites: AERO 301 and 310.
422. **Active Controls for Aerospace Vehicles. (3-0). Credit 3. I** Introduction to the Theory of Automatic Control specifically applied to aerospace vehicles; techniques for analysis and synthesis of linear control systems, stability criteria, systems response and performance criteria; design studies of active controls to improve aerospace vehicle performance. Prerequisite: AERO 421.
423. **Space Technology I. (3-0). Credit 3. I, II** Rocket fundamentals; trajectories including aerodynamics, gravity turn and trajectory optimization, orbital mechanics, orbit lifetimes, three-body problem, orbit perturbations. Prerequisite: AERO 421.
424. **Spacecraft Attitude Dynamics and Control. (3-0). Credit 3.** Introduces students to fundamental concepts of satellite attitude dynamics and control; includes derivations of environmental disturbances due to gravity gradient, aerodynamic, and solar radiation pressure; includes treatments of attitude control subsystems, such as thrusters, reaction wheels, CMGs, and magnetic torquers, and their designs. Prerequisites: AERO 421, 423, or approval of instructor.
425. **Flight Test Engineering. (2-3). Credit 3. II** Application of performance and stability and control theory to flight test measurements; standard atmosphere and airspeed equations for pilot-static system calibrations; flight test methods for evaluating performance, stability and control, and stall-spin characteristics; laboratory practice in planning and conducting small flight test project. Prerequisite: AERO 421.
426. **Space System Design. (3-0). Credit 3.** Introduces prevailing practices and processes used in modern space system design; applies knowledge in component engineering disciplines to a design challenge of interest to NASA or DoD; utilizes instruction in systematic methods of design and on dynamics of teamwork; when possible concludes with detailed design using an engineering design facility. Prerequisites: AERO 306, 351, 421.
428. **Electromagnetic Sensing for Space-Borne Imaging. (3-0). Credit 3.** Study IR and Visible range imaging systems to obtain high resolution imaging of objects from space; this area has numerous applications and areas of advanced development; following instruction in needed background on optics, telescopes, and interferometry, perform preliminary design of imaging system with a different imaging design offered each year. Prerequisites: AERO 306, 351, 421.
430. **Numerical Simulation. (3-0). Credit 3. I** Numerical and analytical simulation of physical problems in science and engineering using applied methods; developing and using numerical techniques for physical problems described by nonlinear algebraic equations, ordinary and partial differential equations. Prerequisite: AERO 320 or MATH 417.
435. **Aerothermochemistry. (3-0). Credit 3. I** Composition of chemically reacting gases (air and propellant); thermodynamic functions based on classical and quantum mechanical theories; calculation of gas temperatures; equilibrium, frozen and non-equilibrium flows through nozzles and shock waves. Prerequisite: AERO 303.
440. **Cockpit Systems and Displays. (3-0). Credit 3.** Design, development, and implementation of cockpit systems and multi-function displays; cockpit system requirements and specifications; human-machine interfaces, Flight Management Systems, navigation and guidance systems; 3-D real-time displays of weather, traffic, and terrain; characteristics and missions of air vehicles; project design and cost analysis. Prerequisite: AERO 421 or junior or senior classification in computer science.
445. **Vehicle Management Systems. (3-0). Credit 3.** Introduction to vehicle management systems for manned and unmanned air and space vehicles; system centric concepts, requirements definition, specifications, and architectures; reliability analysis, health monitoring, and mission management; SISO digital design of integrated flight control, propulsion control and structural control; introduction to vehicle autonomy; design and analysis methods, industrial examples. Prerequisite: AERO 422.

452. **Heat Transfer and Viscous Flows.** (3-0). **Credit 3. I, II** Navier-Stokes and boundary layer equations; exact and approximate solutions; laminar boundary layers; origin of turbulence; transition; turbulent boundary layers; viscous airfoil design; one and two dimensional heat transfer; methods for steady and transient heat conduction; thermal boundary layers; convection; and radiation. Prerequisites: AERO 351; MATH 308.
472. **Airfoil and Wing Design.** (3-0). **Credit 3. I** Subsonic airfoil design and analysis, subsonic wing design and analysis, swept and delta wings, vortex lift, transonic flow methods, viscous transonic phenomena, transonic airfoil and wing design, supersonic panel methods, supersonic wing design, optimization. Prerequisite: AERO 303.
481. **Seminar.** (1-0). **Credit 1. I** Readings, reports, conferences and discussion. Prerequisite: Senior classification in aerospace engineering. To be taken on a satisfactory/unsatisfactory basis.
485. **Directed Studies.** **Credit 1 to 4 each semester. I, II, S** Special problems in aerospace engineering assigned to individual students or groups. Prerequisites: Senior classification; approval of department head.
489. **Special Topics in...** **Credit 1 to 4. I, II, S** Selected topics in an identified field of aerospace engineering. May be repeated for credit. Prerequisite: Approval of instructor.
491. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in aerospace engineering. May be repeated 3 times for credit. Prerequisites: Junior or senior classification and approval of instructor.

(See page 767 for the aerospace engineering course in applied mechanics.)

Department of Aerospace Studies

Professor Colonel B. D. Bartles (Head); Assistant Professors Lt. Colonel W. B. Cade, III, Captain G. M. Beck, Captain E. W. Davis, Captain D. Mack, 1 Lt. E. M. Marquardt

Aerospace Studies (AERS)

The General Military Course

101. **Foundations of the USAF.** (1-0). **Credit 1. I** Introduces students to the U.S. Air Force and the Air Force Reserve Officer Training Corps (AFROTC); includes Officership, professionalism, military customs and courtesies, and officer opportunities and benefits; AFROTC cadets must register for Leadership Laboratory (AERS 105) as it complements this course with followership experience.
102. **Foundations of the USAF.** (1-0). **Credit 1. II** Continuation of AERS 101; AFROTC cadets must register for Leadership Laboratory (AERS 106) as it complements this course with followership experience.
105. **AFROTC Leadership Lab.** (0-2). **Credit 1. I** Designed to give insight into the Air Force and give leadership opportunities to cadets through a variety of experiences; expected to perform a multitude of tasks in both the subordinate and superior roles.
106. **AFROTC Leadership Lab.** (0-2). **Credit 1. II** Designed to give insight into the Air Force and give leadership opportunities to cadets through a variety of experiences; expected to perform a multitude of tasks in both the subordinate and superior roles.
201. **Evolution of Air and Space Power.** (1-0). **Credit 1. I** Examines general aspects of air and space power through a historical perspective; covers the time period from the first use of balloons to the Persian Gulf War; AFROTC cadets must register for Leadership Laboratory (AERS 105) as it complements this course with followership/leadership experience.
202. **Evolution of Air and Space Power.** (1-0). **Credit 1. II** Continuation of AERS 201; AFROTC cadets must register for Leadership Laboratory (AERS 106) as it complements this course with followership/leadership experience.

The Professional Officer Course

303. **Air Force Leadership Studies. (3-0). Credit 3. I** Leadership, management fundamentals, professional knowledge, Air Force personnel and evaluation systems, and leadership ethics; case studies of leadership and management situations as a means of demonstrating and exercising practical application of concepts; Air Force contract individuals (or those seeking a contract) must register for Leadership Lab (AERS 105).
304. **Air Force Leadership Studies. (3-0). Credit 3. II** Continuation of AERS 303; Air Force contract individuals (or those seeking a contract) must register for Leadership Lab (AERS 106).
403. **National Security Affairs—Preparation for Active Duty. (3-0). Credit 3. I** Examines the Constitution and the national security process; focuses on civilian control of the military; the roles of the Services; and the functions of the Air Force commands; Air Force contract individuals (or those seeking a contract) must register for Leadership Lab (AERS 105). Prerequisite: Non-Air Force contract students must have approval of instructor and department head.
404. **National Security Affairs—Preparation for Active Duty. (3-0). Credit 3. II** Continuation of AERS 403; Air Force contract individuals (or those seeking a contract) must register for Leadership Lab (AERS 106). Prerequisite: Non-Air Force contract students must have approval of instructor and department head.
485. **Directed Studies. Credit 1 to 3.** Directed study of problems in the field of aerospace studies. Prerequisites: Air Force ROTC Cadet; junior or senior classification; approval of department head.

Africana Studies (AFST)

201. **Introduction to Africana Studies. (3-0). Credit 3.** Introduction to the field of Africana Studies: interdisciplinary approach drawing from history, philosophy, sociology, political studies, literature and performance studies; explores the African foundational relationship to and connections with its diaspora populations; covers Africa, the United States, the Caribbean, Europe and South America.
289. **Special Topics in... Credit 1 to 4.** Selected topics in Africana Studies. May be repeated for credit.
302. **Gateway Course. (3-0). Credit 3.** Gateway to a series of courses offered for the minor in Africana Studies: explores topics such as Afrocentrism, postcolonial studies, black cultural studies, black feminist theory for a close study of issues among African and African diaspora populations in Africa, the United States, Caribbean, Europe and South America.
481. **Seminar. (3-0). Credit 3.** Comparative studies of slave societies in the modern world; history and analysis of African American feminism; comparative analyses of the social, political, and economic condition of African Americans and other African peoples of the diaspora. Prerequisite: AFST 302; junior or senior classification.
485. **Directed Studies. Credit 1 to 3.** Selected fields of Africana Studies not covered in depth by other courses. Reports and extensive reading required. May be repeated for credit. Prerequisite: Approval of director of Africana Studies.
489. **Special Topics in... Credit 1 to 4.** Selected topics in Africana Studies. May be repeated for credit. Department of Agricultural Economics
491. **Research. Credit 1 to 3.** Research conducted under the direction of a faculty member in Africana Studies. May be repeated 3 times for credit. Prerequisites: 6 credits of AFST; junior or senior classification and approval of instructor.

Department of Agricultural Economics

Professors D. A. Bessler, F. O. Boadu, O. Capps, J. R. Conner, S. W. Fuller, R. C. Griffin, W. L. Griffin, E. Jones, D. A. Klinefelter, R. D. Lacewell, C. F. Lard, D. J. Leatham, K. K. Litzenberg, H. A. Love, B. A. McCarl, J. W. Mjelde, R. M. Nayga, A. G. Nelson, J. P. Nichols (Head), J. B. Penson, Jr., J. W. Richardson, M. E. Rister, C. P. Rosson, W. D. Shaw, J. W. Siebert, G. W. Williams; **Associate Professors** J. L. Park, V. Salin, R. T. Woodward; **Assistant Professors** Y. Jin, D. Newburn, D. Ng, G. Power, D. Vedenov, X. Wu

Agricultural Economics (AGEC)

105. **(AGRI 2317) Introduction to Agricultural Economics.** (3-0). **Credit 3. I, II, S** Characteristics of our economic system and basic economic concepts; survey of the farm and ranch firm and its organization and management; structure and operation of the marketing system; functional and institutional aspects of agricultural finance; government farm programs.
217. **Fundamentals of Agricultural Economics Analysis.** (1-4). **Credit 3. I, II** Relates contemporary agribusiness issues to economic and financial management, illustrating their integration toward pragmatic applications in the agricultural industry; lab focuses on the integration of mathematics and economics with computer skills directed toward spreadsheets, databases, web pages, and communications software; emphasis is on writing as a critical communication skill. Prerequisites: AGEC 105; ENGL 104; MATH 141; MATH 142; and sophomore or junior agricultural economics or agribusiness majors; or approval of department head.
285. **Directed Studies.** **Credit 1 to 4. I, II, S** Directed study of selected problems in agricultural economics. Prerequisites: AGEC 105; freshman or sophomore classification in agricultural economics, agribusiness, or approval of instructor and department head; 2.5 GPR in major, overall, and CBK courses, if applicable; see an academic advisor in Room 331 Blocker.
289. **Special Topics in...** **Credit 1 to 4. I, II** Selected topics in an identified area of agricultural economics. May be repeated for credit. Prerequisites: Freshman or sophomore classification and approval of department head.
291. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in agricultural economics. May be repeated 3 times for credit. Prerequisites: Freshman or sophomore classification and approval of department head; see an academic advisor in Room 331 Blocker.
314. **Marketing Agricultural and Food Products.** (3-0). **Credit 3. I, II, S** General introductory course covering operations involved in movement of agricultural commodities from farmer to consumer, essential marketing functions of buying, selling, transportation, storage, financing, standardization, pricing, and risk bearing. Prerequisites: AGEC 105 or 3 hours of economics; and junior or senior classification.
315. **Food and Agricultural Sales.** (3-0). **Credit 3. I, II** Principles of professional sales techniques used in food and agricultural firms; develop a professional sales presentation; study current agribusiness industry professional salespersons. Prerequisite: Junior or senior classification.
317. **Economic Analysis for Agribusiness Management.** (3-0). **Credit 3. I, II** Quantitative methods used to address managerial problems, specifically calculus-based optimization, marginal analysis, elasticities, statistical and forecasting techniques, linear programming, and risk analysis; emphasis on theoretical aspects and applied analysis of managerial problems faced by agricultural firms. Prerequisites: MATH 141; MATH 142; AGEC 217; ECON 323 or 322; STAT 303 or 302 or 301 or INFO 303; and junior or senior classification; agricultural economics, agribusiness majors only; or approval of department head.
325. **Principles of Farm and Ranch Management.** (2-2). **Credit 3. II** Agribusiness managerial decision making and analysis in different market environments; emphasis is on profit maximization; lab focuses on using computerized methods for evaluating management alternatives for farming and ranching problem situations. Prerequisites: AGEC 105 or ECON 202; junior or senior non-agricultural economics, non-agribusiness majors only; and knowledge of Excel.
330. **Financial Management in Agriculture.** (3-0). **Credit 3. I, II** Principles of financial management of farms, ranches, livestock operations, and other agribusiness firms; financial statement analysis, investment analysis, firm growth, risk management, cost of capital, income taxes, business organization, estate planning, legal aspects of borrowing, and sources and terms of agricultural loans. Prerequisites: AGEC 105 or 3 hours of economics; ACCT 209 or 229; and junior or senior classification.

340. **Agribusiness Management.** (3-0). **Credit 3. I, II, S** Systematic analysis of agribusiness firm-level decision making using a broad array of management concepts, managing agribusiness firms and their unique problems and opportunities, and exposure to decision making in agribusiness environment. Prerequisites: AGEC 105 or 3 hours of economics; and junior or senior classification.
344. **Food and Agricultural Law.** (3-0). **Credit 3. I, II** Legal problems relevant to agribusiness; torts, fencing laws, liability for agricultural pollution, irrigation water rights, corporations and partnerships. Prerequisite: Junior or senior classification.
350. **Environmental and Natural Resource Economics.** (3-0). **Credit 3. I, II** Inspection of issues such as environmental degradation, population growth, recycling, water use and depletion, natural habitat protection, water and air pollution, acid deposition, fishery management, and global warming; using economically-derived principles and tools. Prerequisite: Junior or senior classification.
400. **Field Studies in Agricultural Economics.** **Credit 1 to 2. II** Arranged during spring break or between semesters; field trip to observe operations of agricultural business firms, state and federal agencies and farms and ranches; test on field studies required; additional expenses to be borne by students. Prerequisites: AGEC 105 or 3 hours of economics; and junior or senior classification.
401. **Global Agri-Industries and Markets: Study Abroad.** (3-0). **Credit 3. I, II, S** Understanding agri-industries and markets; analysis of production; importing; exporting; provides classroom experience with an exposure to a variety of global cultures in an international setting. Course may be repeated 3 times for credit. Prerequisites: AGEC 105 or 3 hours of economics; junior or senior classification or approval of department head.
402. **Survey of International Agricultural Economics: Study Abroad.** (3-0). **Credit 3. I, II, S** Examine, from an international setting, the shape of international agriculture; how culture, history, politics and geography in foreign countries affect the production and management of agricultural products; agricultural policy formation; countries' natural resources and competitive strategies. Course may be taken 3 times for credit. Prerequisites: AGEC 105 or 3 hours of economics; junior or senior classification or approval of department head.
413. **Agricultural Cooperatives.** (3-0). **Credit 3. I** Historical development and principles of cooperative associations in our economic system; organizational and operational aspects of cooperatives; legal considerations, financing, management, and member relations; and future role of cooperatives. Prerequisites: AGEC 105; AGEC 314; and junior or senior classification.
414. **Agribusiness and Food Market Analysis.** (3-0). **Credit 3. I, II** Application of economic and marketing principles to contemporary food and agribusiness marketing; practical marketing management for agribusiness firms; market analysis; and marketing strategy and planning as related to the emerging trends in the global food and agribusiness sector of the economy. Prerequisites: AGEC 317; FINC 341; MKTG 321; and junior or senior agribusiness majors only.
422. **Land Economics.** (3-0). **Credit 3. I, II** Economic, institutional, and physical factors involved in the use and control of natural resources; includes elements of introductory land economics as a discipline, economic foundations of land economics, institutional influences on land use, and the effects of public policy on land use. Prerequisites: AGEC 105 or 3 hours economics; and junior or senior classification.
424. **Rural Entrepreneurship I.** (2-2). **Credit 3. I** Strategic planning regarding economic and financial feasibility of rural business ventures; emphasis on processes for developing a comprehensive enterprise analysis; including management information system components; production, marketing, and financial plans; enterprise budget(s); and evaluation of risk management alternatives; and exchanges with "real-world" lenders, entrepreneurs, and other agribusiness management personnel. Prerequisites: AGEC 217; AGEC 317 or concurrent enrollment; AGEC 330 or FINC 409/341; ACCT 209/229; ACCT 210/230; and junior or senior classification; or approval of department head.
425. **Rural Entrepreneurship II.** (2-2). **Credit 3. II** Strategic planning regarding feasibility of rural business ventures; emphasis on processes for developing comprehensive economic and financial prospectuses, including enterprise budgets, risk management planning, cash flow budgeting, net worth statements, income budgets, reconciliation statements and shock analysis; and exchanges with "real-world" lenders, entrepreneurs, and other agribusiness management personnel. Prerequisites: AGEC 424; and junior or senior classification.
429. **Agricultural Policy.** (3-0). **Credit 3. I, II** Analysis of the causes, nature, and effects of government participation in agriculture; and interrelationship of the American agriculture and agribusiness sector with the political and economic system, public administration, and interest group representation. Prerequisites: AGEC 105 or 3 hours of economics; ENGL 104; and junior or senior classification.

430. **Macroeconomics of Agriculture.** (3-0). **Credit 3. II** Physical and financial linkages between agriculture and the rest of the economy; agriculture's importance to the economy; the determinants of aggregate supply of agricultural products; the organization and performance of financial intermediaries serving agriculture; and the differential effects of national economic policies on agriculture. Prerequisites: AGEC 105 or 3 hours of economics; AGEC 317 or concurrent enrollment; AGEC 429; AGEC 330 or FINC 409/341; and junior or senior classification.
431. **Cases in Agribusiness Finance.** (3-0). **Credit 3. I, II** Financial management of agribusiness firms; advanced topics in financial statement analysis, liquidity management, investment analysis, and capital structure illustrated through examination of agribusiness cases. Prerequisites: AGEC 317; AGEC 340; FINC 341; and junior or senior agribusiness majors only.
432. **Rural Real Estate and Financial Analysis.** (3-0). **Credit 3. II** Advanced topics in investment analysis; financial intermediation in agriculture; real estate markets and market analysis; and appraisal valuation. Prerequisites: AGEC 317 (waived for nonmajors); AGEC 330 or FINC 409/341; AGEC 422; ACCT 210 or 230; and junior or senior classification.
440. **Agribusiness Strategic Analysis.** (3-0). **Credit 3. I, II** Economic features of the agribusiness system and related management problems; problem recognition and economic decision making in marketing, production, and finance for agribusiness firms. Prerequisites: AGEC 317; AGEC 340; FINC 341; MGMT 363; MKTG 321; and junior or senior agribusiness majors only.
447. **Food and Agricultural Price Analysis.** (3-0). **Credit 3. I** Factors influencing the level of food and agricultural prices; price trends and seasonal variation; methods of forecasting demands and prices; and futures trading. Prerequisites: AGEC 314; AGEC 317; and junior or senior classification.
448. **Agricultural Commodity Futures.** (3-0). **Credit 3. II** Activities of commodity futures exchanges; the mechanics of trading futures contracts; the use of futures trading for hedging and forward pricing; and options, basis behavior, and hedging strategies for selected commodities. Prerequisites: AGEC 105 or 3 hours of economics; AGEC 314; AGEC 317 or concurrent enrollment; and junior or senior classification; or approval of department head.
452. **International Trade and Agriculture.** (3-0). **Credit 3. I** Changing role of U.S. agriculture in a dynamic world economy; national and international policies and institutions affecting agriculture; and exchange rates, tariffs, and non-tariff barriers. Prerequisites: AGEC 105 or 3 hours of economics; and junior or senior classification.
453. **International Agribusiness Marketing.** (3-0). **Credit 3. I** Basic competencies in international marketing of agri-foods; and market entry, pricing, payment, finance, and promotion. Prerequisites: AGEC 105 or 3 hours of economics; and junior or senior classification.
481. **Ethics in Agribusiness and Agricultural Economics.** (1-0). **Credit 1. I, II** Ethical issues facing managers and policy-makers in the agribusiness sector; role of professionals in the agricultural food and resource industries; professional opportunities and responsibilities; individual investigations and reports; and discussions with prominent leaders in the field. Prerequisites: AGEC 217; junior or senior classification; and agricultural economics or agribusiness majors only.
484. **Internship.** **Credit 1 to 3. I, II, S** Supervised experience program conducted in the area of the student's interest in agricultural economics and agribusiness. May be taken two times. Prerequisite: See an academic advisor in Room 331 Blocker.
485. **Directed Studies.** **Credit 1 to 3 each semester. I, II, S** Special problems not covered by other courses. Content will depend upon problem studied. Prerequisite: See an academic advisor in Room 331 Blocker.
489. **Special Topics in...** **Credit 1 to 4. I, II** Selected topics in an identified area of agricultural economics. May be repeated for credit. Prerequisites: Junior or senior classification.
491. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in agricultural economics. May be repeated 3 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of department head; see an academic advisor in Room 331 Blocker.

*Field trips may be required for which departmental fees may be assessed to cover costs.

Department of Agricultural Leadership, Education, and Communications

Professors G. E. Briers, K. E. Dooley, A. Larke, Jr., J. R. Lindner, T. H. Murphy, G. C. Shinn, D. P. Starr, C. D. Townsend (Head); Associate Professors B. L. Boyd, C. D. Elbert, J. F. Harlin, M. Piña, Jr., T. A. Rutherford, J. D. Townsend, T. A. Vestal, G. J. Wingenbach; Assistant Professors C. T. Boleman, S. R. Cummings, M. J. McCormick, T. P. Murphrey, T. G. Roberts, M. H. Rosser, N. P. Stedman; Senior Lecturer D. W. Dunsford; Assistant Lecturers S. Felton, H. Musoma

Agricultural Leadership and Development (ALED)

102. **Critical Issues in Agricultural Leadership.** (1-0). Credit 1. **I, II** Explore resources in the department; research career and internship possibilities; identify, name and describe career setting for agricultural leadership and development; plan course of study and select courses in an emphasis area.
125. **Leadership Learning Community I.** (1-0). Credit 1. Offered to students living in the Freshmen Leadership Living Learning Community; fundamentals of developing personal leadership while participating in co-curricular activities; emphasis on the relational model of leadership and global perspective building. Prerequisites: Freshman classification or approval of instructor; on-campus residence.
225. **Leadership Learning Community II.** (1-0). Credit 1. Offered to students living in the Freshmen Leadership Living Learning Community; fundamentals of peer mentoring while participating in co-curricular activities; emphasis on building supportive relationships on a college campus. Prerequisites: Freshman classification or approval of instructor; on-campus residence.
285. **Directed Studies in Agricultural Leadership and Development.** Credit 1 to 4. Directed study of selected issue in agricultural leadership and development with emphasis on collection, synthesis and interpretation of information. Prerequisite: Approval of department advisor.
289. **Special Topics in...** Credit 1 to 4. Special topics in an identified area of agricultural development. May be repeated for credit. Prerequisite: Approval of department advisor.
291. **Research.** Credit 1 to 4. Research conducted under the direction of faculty member in agricultural development. May be repeated 2 times for credit. Please see academic advisor in department. Prerequisites: Freshman or sophomore classification and approval of instructor.
301. **Topics in Agricultural Leadership.** (3-0). Credit 3. **I, II** Gain insights into their personal leadership strengths, styles, motivation and values; plan a course for self-improvement as a leader. Prerequisites: Junior or senior classification or approval of instructor.
340. **Professional Leadership Development.** (3-0). Credit 3. **I, II, S** Identification of styles and roles of leadership; development of leadership techniques and skills required in working with organizations and youth groups; methods of resolving conflict, of communicating, of guiding and of evaluating; ethical consideration for leaders. Prerequisite: Junior or senior classification.
341. **Team Learning.** (3-0). Credit 3. Team development theory; emphasizes research on team member behaviors, team decision making models and positive conflict in team environments. Prerequisites: ALED 340; junior or senior classification.
342. **Learning Organizations.** (3-0). Credit 3. Social systems language and archetypes; systems thinking theory including mental models, mastery, team learning, concept models of human organizations. Prerequisites: ALED 340; junior or senior classification.
343. **Human Resource Management in Agriculture and Life Sciences.** (3-0). Credit 3. Principles, theories, concepts, techniques and applications for managing human resources in food and agricultural organizations and in local communities; attracting, staffing, training, developing and compensating human talent. Not intended for majors in business. Prerequisites: ALED 340; junior or senior classification.
344. **Leadership of Volunteers.** (3-0). Credit 3. Principles, theories, concepts, techniques and applications for leading volunteers in agriculture and life sciences nonprofit, governmental and community organizations. Prerequisites: ALED 340; junior or senior classification.
380. **Workshop in Agricultural Leadership and Development.** Credit 1 to 4. The study, understanding and solution of human-agricultural problems based on theory learned in the classroom, library, laboratory and fieldwork completed by individuals and teams. Prerequisite: Junior or senior classification.
400. **Public Leadership Development.** (3-0). Credit 3. Major issues in the study of public leadership, development of leadership skills, and a field investigation done in conjunction with local public leaders. Prerequisites: Junior classification and approval of instructor. Cross-listed with CARC 400 and ENGR 400.

422. **Cultural Pluralism in Agriculture.** (3-0). **Credit 3.** Selected topics on the diversity of human resources in agriculture; emphasis on working in a multicultural society and developing a sensitivity toward different cultures; explores the interrelationships between the contributions of diverse individuals and the state, nation and global success of agriculture. Prerequisite: Junior or senior classification.
425. **Principles of Program Evaluation in Agriculture and Life Sciences.** (3-0). **Credit 3.** Evaluation principles applied to education programs in agriculture and life sciences; conceptual understanding of and skills in program evaluation theory, development, process and practice; application of evaluation design and processes for youth and adults in extension, community and school-based programs. Prerequisites: ALED 340; junior or senior classification.
426. **Methods in Adult Agricultural Education.** (3-0). **Credit 3.** Planning educational programs for adults in agriculture. Developing skill in use of group processes in teaching. Prerequisite: Junior or senior classification.
440. **Principles of Technological Change.** (3-0). **Credit 3.** I, II, S Processes by which professional change agents influence the introduction, adoption and diffusion of technological change. Applicable to persons who work closely with people. Prerequisite: Junior or senior classification.
441. **Agricultural Extension Organization and Methods.** (3-0). **Credit 3.** Cooperative extension in agriculture and home economics; development, objectives, organization, program building and methods of teaching. Prerequisite: Junior or senior classification.
442. **Professional Communications in Agriculture and Life Sciences.** (2-2). **Credit 3.** Technological communication theory; instructional and presentation models; teaching strategies; multimedia development. Prerequisite: Junior or senior classification.
481. **Seminar.** (1-0). **Credit 1.** Review of current literature and research as related to program development in light of legislation and policies affecting leadership, the broader fields of agriculture and life sciences and issues critical to the future of agriculture. Prerequisite: Senior classification in agricultural leadership and development.
485. **Directed Studies in Agricultural Leadership Development.** **Credit 1 to 4.** Directed individual study of selected problems in agricultural leadership and development with emphasis on collection, analysis and presentation of information. Prerequisite: Junior or senior classification and approval of instructor.
489. **Special Topics in...** **Credit 1 to 4.** Special topics in an identified area of agricultural development. May be repeated for credit. Prerequisite: Junior or senior classification.
491. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in agricultural development. May be repeated 2 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded. Please see academic advisor in department. Prerequisites: Junior or senior classification and approval of instructor.
494. **Internship.** **Credit 1 to 6.** I, II, S Supervised internship and independent study related to student's professional interest. Prerequisites: ALED 301; junior or senior classification; 2.0 GPR; approval of instructor.

Agricultural Communications and Journalism

(faculty, see page 604)

(AGCJ)

105. **Introduction to Agricultural Communication.** (2-0). **Credit 2.** Introduction to mass communication, its history, role in society, and especially its unique role in agriculture; importance of mass communication and the communication methods used in modern society; foundation for an understanding of agricultural news and information; credit cannot be given for both AGCJ 105 and JOUR 102.
203. **Agricultural Media Writing I.** (2-2). **Credit 3.** News gathering, writing, editing and ethics for current and emerging mediums used in agricultural communication; includes news identification, basic news writing methods, introduction to public relations, broadcast and Internet writing; interviewing skills, proper use of direct quotes and other news style; credit cannot be given for both AGCJ 203 and JOUR 203. Prerequisites: Grade of C or better in AGCJ 105.
281. **Journalism Concepts for Agriculture.** (1-0). **Credit 1.** The role of the news media in covering government, the court systems, corporations, taxation, and insurance; a practical perspective on how journalists interact with public and private institutions from a legal, ethical and social standpoint.

285. **Directed Studies. Credit 1 to 4.** Directed study of selected issue in field of agricultural communications with emphasis on collection, synthesis and interpretation of information. Prerequisite: Approval of department head.
289. **Special Topics in... Credit 1 to 4.** Special topics in an identified area of agricultural development. May be repeated for credit. Prerequisite: Approval of department head.
291. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in agricultural journalism. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
303. **Agricultural Media Writing II. (2-2). Credit 3.** Interpretative agricultural news gathering and writing for all media types; basic media law and ethics, interviewing skills with assigned practice writing about agriculture, and science and technology, including meeting and event coverage both on and off campus; print, broadcast, Interactive and other media; credit cannot be given for both AGCJ 303 and JOUR 303. Prerequisites: Grade of C or better in AGCJ 203; junior or senior classification.
304. **Editing for Agricultural Audiences. (2-2). Credit 3.** Principles and practices of editing for agricultural and technical audiences including improving and tightening copy; writing headlines, titles, and subheads; photo editing and captions, graphics and layout; print, broadcast, Interactive and other media; credit cannot be given for both AGCJ 304 and JOUR 304. Prerequisites: Grade of C or better in AGCJ 203; junior or senior classification.
305. **Theory and Practice of Agricultural Publishing. (3-0). Credit 3.** Audience identification, publication content, management and design; analyze existing agricultural publications, identify audiences, advertising base and content; credit cannot be given for both AGCJ 305 and JOUR 321. Prerequisites: AGCJ 105; junior or senior classification.
306. **Theory and Practice of Agricultural Public Relations. (3-0). Credit 3.** Public relations between agricultural producers and their suppliers as a critical part of agricultural communication; public relations objectives, strategies, tactics, evaluation and execution theory and practice examined; credit cannot be given for both AGCJ 306 and JOUR 324. Prerequisites: AGCJ 105; junior or senior classification.
307. **Electronic Media Production in Agricultural Communications. (2-2). Credit 3.** Study of the principles, concepts, and practices of agricultural industry uses of electronic media production (radio, television and computer) for advertising, informational videos, computer-mediated instruction and distance education. Prerequisites: Computer usage course and AGCJ 105; junior or senior classification.
308. **Agricultural Photography. (2-2). Credit 3.** Develop knowledge of photography, editing software, and composition techniques used in the agricultural communications field; develop photography and photo editing skills to a satisfactory level as demonstrated by performance on assignments and exams. Prerequisite: Junior or senior classification.
380. **Workshop in Agricultural Communications and Journalism. Credit 1 to 4.** The study, understanding and solution of human-agricultural problems based on theory learned in the classroom, library, laboratory and fieldwork completed by individuals and teams. Prerequisite: Junior or senior classification.
404. **Communicating Agricultural Information to the Public. (2-2). Credit 3.** Use of agricultural education principles and techniques to communicate scientific information related to agriculture, agribusiness, natural resources and life sciences to the general public; communication processes include audience identification, writing, editing and production of agricultural science-based manuscripts for popular and refereed publications. Prerequisite: Junior or senior classification.
405. **Agricultural Publications Production. (2-3). Credit 3.** Study and practice of the principles and concepts of designing, writing, editing, producing and distributing the AgriLeader magazine and Web site; includes practical applications of writing feature articles, magazine and Web site design, advertising sales, layout and graphics. May be repeated one time for credit. Prerequisites: AGCJ 305 and approval of instructor; junior or senior classification.
406. **Agricultural Public Relations Methods. (2-2). Credit 3.** Agricultural public relations campaign analysis; public relations case studies and methods including writing public relations plans for agricultural entities, producing public relations components and evaluating public relations objectives, strategies and tactics. Prerequisites: AGCJ 306; junior or senior classification.
407. **Web Authoring in Agricultural Communication. (2-2). Credit 3.** Study and practice of basic Web site design theories, principles and writing for the Web; use of Web authoring software (not a programming class) to create online publications tailored for agricultural audiences; emphasizes informative content and functional design. Prerequisites: AGCJ 307; junior or senior classification.

481. **Senior Seminar. (1-0). Credit 1.** Seminar for students within 2 semesters or graduation; overview of agricultural communications, communication methods and careers in the profession; includes an introduction to professionals in agricultural communications and interview strategies. Prerequisites: Junior or senior classification; approval of department head.
485. **Directed Studies. Credit 1 to 4.** Directed individual study of selected problems in agricultural communications, communication methods and the communication profession with emphasis on collection, analysis and presentation of information. Prerequisites: Junior or senior classification; approval of department head.
489. **Special Topics in... Credit 1 to 4.** Special topics in an identified area of agricultural journalism. May be repeated for credit. Prerequisite: Approval of department head.
491. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in agricultural journalism. May be repeated 3 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor.
494. **Internship. Credit 1 to 6.** Supervised internship and independent study related to the student's professional interest. Prerequisites: Junior or senior classification; approval of department head.

Agricultural Science

(faculty, see page 604)

(AGSC)

289. **Special Topics in... Credit 1 to 4.** Special topics in an identified area of agricultural science. May be repeated for credit. Prerequisite: Approval of department head.
291. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in agricultural science. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
301. **Introduction to Agricultural Science Teaching. (3-0). Credit 3. I, II** Introduction to agricultural science teaching at the secondary level; an overview of preparing teachers for a changing world including knowledge of learners, subject matter and teaching within the context of agricultural science. Prerequisite: Junior or senior classification.
325. **Instructional Design in Agricultural Science. (1-2). Credit 2. I, II** Instructional design as it relates to teaching agricultural science, including topics on effective teaching, principles of learning, learning styles, lesson planning, instructional media and teaching methods. Prerequisites: AGSC 384; junior or senior classification or approval of instructor.
327. **Program Planning in Teaching Agricultural Science. (1-2). Credit 2. I, II** Planning and supervising experiences and activities for students enrolled in secondary agricultural science programs. Prerequisite: AGSC 384; junior classification or approval of instructor.
380. **Workshop in Agricultural Science. (4-0). Credit 1 to 4.** The study, understanding and solution of human-agricultural problems based on theory learned in the classroom, library, laboratory and fieldwork completed by individuals and teams. Prerequisite: Junior or senior classification.
383. **Teaching Agricultural Mechanics. (2-3). Credit 3.** Methods of teaching and motivating students in agricultural mechanics; designed for students preparing to teach agricultural science in Texas public schools. Prerequisite: AGSC 301.
384. **Clinical Professional Experience in AGSC. (2-3). Credit 3.** Clinical field experience for students preparing to teach agricultural science in public schools of Texas; through first-hand observation, students will study learning theories, individual differences, teaching methods, classroom management, curriculum, school climate and culture, and teacher roles and responsibilities. Prerequisite: AGSC 301.
402. **Designing Instruction for Secondary Agricultural Science Programs. (2-3). Credit 3.** Theory and practice in designing instruction for secondary agricultural science programs including effective planning and delivery methods; designed for students preparing to teach agricultural science in Texas public schools. Prerequisites: AGSC 384; concurrent enrollment in AGSC 405.
405. **Facilitating Complete Secondary Agricultural Science Programs. (2-3). Credit 3.** Theory and practice in facilitating secondary agricultural science programs: includes classroom instruction, supervised experience, and youth leadership development; designed for students preparing to teach agricultural science in Texas public schools. Prerequisites: AGSC 384; concurrent enrollment in AGSC 402.

425. **Learner Centered Instruction in Agricultural Science.** (3-0). **Credit 3. I, II** Preparing curriculum materials for secondary agricultural science and adult education programs. Prerequisites: AGSC 325, 327; senior classification; or approval of department head.
436. **Professional Teaching Internship in AGSC.** (2-12). **Credit 6. I, II** Planning for and teaching secondary agricultural science in selected high schools in Texas; includes 12 weeks of professional teaching experience under the guidance of a university supervisor and a cooperating teacher in the school. Prerequisites: Senior classification; completion of the prerequisite sequence of professional courses in agricultural education; full admission into student teaching.
481. **Seminar.** (1-0). **Credit 1. I, II** Review of current literature and research as related to program development in light of legislation and policies affecting education in agriculture. Prerequisite: Approval of department head.
484. **Field Experience.** **Credit 1 to 6 each semester. I, II, S** An on-the-job supervised experience program conducted in the area of the student's specialization. Prerequisites: Senior classification; 2.0 GPR; approval of department head.
489. **Special Topics in...** **Credit 1 to 4.** Special topics in an identified area of agricultural science. May be repeated for credit. Prerequisite: Approval of department head.
491. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in agricultural science. May be repeated 3 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor.
494. **Internship.** **Credit 1 to 6. I, II, S** Supervised internship and independent study related to student's professional interest. Prerequisites: AGED 301; junior or senior classification; 2.0 GPR; approval of instructor.

Agricultural Systems Management

(faculty, see page 632)

(AGSM)

125. **Introduction to Agricultural Systems Management.** (0-2). **Credit 1. II** Introduction to technical management of agricultural systems using management projects presented by agricultural managers from industry; problem definition, information search, idea generation and development of management solutions. Prerequisite: Freshman or sophomore classification or approval of instructor; majors only.
201. **(AGRI 2301) Farm Tractors and Power Units.** (2-2). **Credit 3. I, II, S** Tractors and other internal combustion power units used on farms; principles of operation, horsepower measurements, maintenance and adjustments of the electrical, ignition, fuel, lubricating and cooling systems.
285. **Directed Studies.** **Credit 1 to 4.** Selected problems in any phase of agricultural systems management; credit and specific content dependent upon background, interest, ability and needs of student enrolled; individual consultations and reports required. Prerequisites: Freshman or sophomore classification; approval of department head.
289. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of agricultural systems management. May be repeated for credit. Prerequisite: Approval of instructor.
291. **Research.** **Credit 1 to 3.** Research conducted under the direction of faculty member in agricultural systems management. Prerequisites: Freshman or sophomore classification and approval of instructor.
301. **Systems Analysis in Agriculture.** (3-0). **Credit 3. I** Operations research and systems theory applied to management problems in food and agricultural industries; linear programming, queuing theory, simulation and critical path method; provides students with the knowledge and computer skills to better manage resources for the evolving agricultural industries. Prerequisite: Junior or senior classification or approval of instructor.
310. **Agricultural Machinery Management.** (2-2). **Credit 3. II** Selection of a matched complement of power units and machines for farming operations; consider constraints such as crops, season, weather, personnel and capital; apply systems techniques such as linear programming, optimization, queuing theory and inventory models; utilize available software programs and learn to develop electronic spreadsheets and other customized software. Prerequisites: AGSM 301; AGECE 330; or registration therein.*

315. **Food Process Engineering Technology.** (2-2). **Credit 3. I, II** Elementary mechanics, physical properties of food and processing materials, heat transfer, temperature measurement, solar heating and cooling, refrigeration and insulation, dehydration as applied to foods and food processing. Prerequisite: Junior or senior classification or approval of instructor. Cross-listed with FSTC 315.
325. **Agri-Industrial Applications of Electricity.** (2-2). **Credit 3. II** Elements of electric current generation and transmission, applications of electric heating, lighting and power, wiring, motors, energy rates, meter reading, safety rules and regulations. Prerequisite: Agricultural systems management majors only or approval of instructor.
335. **Water and Soil Management.** (2-3). **Credit 3. I** Elementary principles of surface and ground water supply, flood control, water distribution systems and irrigation systems; principles of drainage, soil conservation and erosion control; elementary surveying, chaining, leveling and mapping applied to agricultural and natural resource needs; illustrated by practical examples of terracing and farm pond design. Prerequisite: AGSM 301.
337. **Technology for Environmental and Natural Resource Engineering.** (3-0). **Credit 3. I** For the non-engineering student in the environmental and management sciences; concentrates on the application of technology for solving local environmental problems while considering global issues; reduction of water, air and hazardous waste pollutants; legislative issues and modeling. Prerequisites: AGSM 301, MATH 142.
360. **Occupational Safety Management.** (3-0). **Credit 3. I, II, S** Safety considerations in the work environment, including safety mandates, safety mission, personal and business liability, fire, chemical, dust, machine noise, personal protective devices; design and implementation of safety programs.
403. **Processing and Storage of Agricultural Products.** (2-2). **Credit 3. I** Factors influencing the nature of biological materials and the preservation of quality throughout the harvesting, handling and processing system; a systems approach to cereal grains includes principles of drying, quality deterioration, storage, conveying and handling; processing of fiber crops. Prerequisites: AGSM 310 and 315; or registration therein.*
410. **Spatial Technology for Precision Agriculture.** (2-2). **Credit 3.** Information techniques and technologies of precision agriculture and their application within agronomic systems with emphasis on commercial practices; including global positioning system, mapping software, variable rate technologies and decision support systems; selection of appropriate technologies for use in a management system. Prerequisites: AGSM 301; AGLS 201 or equivalent; junior or senior classification.
435. **Irrigation Principles and Management.** (2-3). **Credit 3. II** Principles of irrigation and management for efficient use of water; soil-water-plant relationships; methods of application; power and labor requirements; automated systems and components. Prerequisites: AGSM 335, AGSM 301, MATH 141.
439. **Management of Agricultural Systems I.** (0-2). **Credit 1.** Application of agricultural systems management principles in solving realistic problems faced by agribusiness managers; project selection from problems posed by biological and agricultural industrial consultants; project feasibility study and outline; management and application philosophy; teamwork and communication, economics; product liability and reliability; standards and codes; goal setting and time management. Prerequisites: AGSM 301, 315, 325, and 360; AGSM 335, 337 and 403 or registration therein; senior classification; must be taken prior to AGSM 440; AGSM majors only.
440. **Management of Agricultural Systems.** (1-5). **Credit 3. II** Management of agricultural systems through team solution of management problems posed by agribusiness managers, farmers, extension specialists and other industry consultants; application of management principles to give students experience in solving realistic problems faced by agribusiness managers; critical evaluation of results by students, staff and consultants. Prerequisites: AGSM 439; should be taken last spring semester prior to graduation.
461. **Geographic Information Systems for Resource Management.** (2-2). **Credit 3.** Geographic Information System (GIS) approach to the integration of spatial and attribute data to study the capture, analysis, manipulation and portrayal of natural resource data; examination of data types/formats; integration of GIS with remote sensing and Global Positioning System; lab use of GIS applications to conduct analyses of topics in natural resources. Prerequisite: Junior or senior classification or approval of instructor. Cross-listed with FRSC 461 and SPSC 461.
462. **Advanced GIS Analysis for Natural Resource Management.** (2-2). **Credit 3.** Advanced topics in Geographic Information Systems (GIS) to solve natural resource problems; manipulation of raster data types; three-dimensional modeling; emphasis on geo-processing as it relates to applied projects particularly with habitat suitability models; field and lab use of global positioning systems (GPS); internet-based GIS modeling. Prerequisites: AGSM 461, FRSC 461, SPSC 461, GEOG 390 or LAND 461. Cross-listed with FRSC 462, GEOG 462, and SPSC 462.

470. **Agricultural Electronics and Control. (2-2). Credit 3. I** Technology of electronic systems in agricultural production and processing, sensors, actuators, and controllers, controller hardware and computer bases. Prerequisite: AGSM 325.
475. **Applied Information Technologies for Agricultural Systems. (2-2). Credit 3.** Definition and documentation of the value of information in agriculturally-based technology companies; methods for mapping information flow within the company and across companies; articulation value of information within a value chain for a food product by simulation; and projects using project management software and web-based interactions. Prerequisites: INFO 209 or equivalent; junior or senior classification.
481. **Seminar. (1-0). Credit 1. I** Professional development; ethics; career opportunities and topics of interest related to the practice of agricultural systems management. Prerequisite: Senior classification.
485. **Directed Studies. Credit 1 to 4.** Selected problems in any phase of agricultural systems management; credit and specific content depend on background and interest of student; individual consultations and reports required. Prerequisites: Junior classification; approval of department head; 2.0 GPR.
489. **Special Topics in... Credit 1 to 4.** Special topics in an identified area of agricultural systems management. May be repeated for credit.
491. **Research. Credit 1 to 3.** Research conducted under the direction of faculty member in agricultural systems management. May be repeated 2 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor.

*Field trips may be required for which departmental fees may be assessed to cover costs.

College of Agriculture and Life Sciences (AGLS)

101. (AGRI 1131, 1231) **Modern Agricultural Systems and Renewable Natural Resources. (1-0). Credit 1. I, II** An introduction to modern agriculture and the natural, human and scientific resources upon which it depends.
105. **Research in Agriculture and Life Sciences. (1-0). Credit 1.** An introduction to the research process as applied to agriculture, renewable natural resources and biological sciences. Prerequisite: Freshman classification, major in College of Agriculture and Life Sciences and approval of instructor.
125. **Life Sciences Learning Community I. (1-0). Credit 1.** Development of personal and professional competencies in the life sciences: learning styles, leadership skills, appreciation for the arts; ethics in science, problem solving skills, experimental design, data gathering and interpretation, introduction to life sciences literature, critical analysis skills, and the connectivity between life science disciplines. May be taken two times for credit. Prerequisites: Freshman classification and approval of instructor.
201. (AGRI 1309) **Computer Applications in Agriculture. (2-2). Credit 3. I, II, S** Fundamentals of programming of agriculturally oriented software and the application of agricultural software. Computer use in decision making and problem solving in agriculture. Prerequisite: MATH 102. Cross-listed with RENR 201.
225. **Life Sciences Learning Community II. (1-0). Credit 1.** Continuation of the development of personal and professional competencies in the life sciences: ethics in science, problem solving skills, experimental design, data gathering and interpretation, examination of life sciences literature, critical analysis skills, and the connectivity between life science disciplines. May be taken two times for credit. Prerequisites: Freshman classification and approval of instructor.
289. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of agriculture and life science. May be repeated for credit. Prerequisite: Freshman or sophomore.
292. **Cooperative Education in Agriculture. Credit 2. I, II, S** Educational work assignment by a student in the field of his or her career interest and course of study; supervision of the student by the cooperating employer and the instructor; a technical report, approved by the instructor, on a related subject area required. Prerequisite: Approval of the college coordinator of cooperative education.
301. **College of Agriculture and Life Sciences Study Abroad. Credit 1 to 18.** For students in approved programs abroad. May be repeated for credit. Prerequisites: Admission to approved program and approval of academic dean.

392. **Cooperative Education in Agriculture.** Credit 2. I, II, S Educational work assignment by a student in the field of his or her career interest and course of study. Supervision of the student by the cooperating employer and the instructor; a technical report, approved by the instructor, on a related subject area required. Prerequisite: AGLS 292.
489. **Special Topics in...** Credit 1 to 4. Selected topics in an identified area of agricultural and life sciences.
492. **Cooperative Education in Agriculture.** Credit 2. I, II, S Educational work assignment by a student in the field of his or her career interest and course of study; supervision of the student by the cooperating employer and the instructor; a technical report, approved by the instructor, on a related subject area required. Prerequisite: AGLS 392.

Department of Soil and Crop Sciences

Professors D. D. Baltensperger (Head), N. E. Borlaug, J. M. Chandler, J. T. Cothren, S. E. Feagley, C. T. Hallmark, J. L. Heilman, F. M. Hons, R. H. Loeppert, K. J. McInnes, L. W. Rooney, W. L. Rooney, S. A. Senseman, C. W. Smith, D. M. Stelly, D. M. Vietor, R. H. White, H. Zhang, D. A. Zuberer; **Associate Professors** H. T. Cralle, A. M. Ibrahim; **Assistant Professors** J. Aitkenhead-Peterson, Y. Deng, S. A. Finlayson, T. J. Gentry, S. Hague, D. B. Hays, C. L. Morgan, K. Steinke; **Lecturer** R. L. Duble

Agronomy (AGRO)

101. **Introduction to Soil and Crop Science.** (1-0). Credit 1. I Brief summary of sciences of agronomic crops, soils and water; management, production and processing of various crops; education, employment and research pertaining to respective professions.
105. **(AGRI 1307, 1407) World Food and Fiber Crops.** (2-2). Credit 3. I, II Plant relationships, structure and development; environmental factors affecting plants; technological aspects of agricultural practices; food production for an increasing population.*
291. **Research.** Credit 1 to 3. Research conducted under the direction of faculty member in agronomy. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
301. **Soil Science.** (3-2). Credit 4. I, II, S An introduction to the nature and properties of soils. Application of science and technology to the use of this natural resource and the roles in the environment. Prerequisite: CHEM 101 or equivalent.*
302. **Recreational Turf.** (3-0). Credit 3. I, II, S Principles underlying construction and maintenance practices for turf facilities including athletic fields, golf courses, parks and home lawns; aesthetic, safety and economic aspects of turf varieties, soil conditions, plant protectants and maintenance equipment. Prerequisite: Biology or approval of instructor.
303. **Crop Ecology.** (3-2). Credit 4. I Ecology of species adaptation and selection and management principles; crop establishment, growth and development, mineral nutrition, productivity and sustainability. Prerequisite: AGRO 105.*
304. **Plant Breeding.** (3-0). Credit 3. II Genetics of crop improvement; special breeding methods and techniques applicable to naturally self-pollinated, cross-pollinated and asexually reproduced plants. Prerequisite: AGRO 105.*
306. **Grain, Fiber and Oilseed Crops.** (3-2). Credit 4. I Geographical distribution, classification, physiology, principles of production, use of grain, fiber and oilseed crops and marketing. Prerequisites: AGRO 105 and 301.*
308. **Forage Crops.** (3-0). Credit 3. II Description, analysis and evaluation of forage systems in relation to livestock and wildlife production and environmental conservation; principles of selection and management of establishment, weeds, nutrients, grazing and harvest for introduced species. Prerequisites: Junior or senior classification or approval of instructor.*
310. **Soil Morphology and Interpretations.** (1-3). Credit 2. I, II Field study of morphological features of soil profiles and the morphological characterization of important soils of Texas in relation to soil use and management. Prerequisite: AGRO 301 or registration therein.*

312. **Introductory Turfgrass Management Laboratory.** (0-2). **Credit 1. I** Fundamentals of turfgrass anatomy, growth habit, identification and characteristics of cool- and warm-season turfgrass species; understanding of seed quality and labeling, pesticide safety, handling, and application, and fertilizer sources, safety, and application; specialized equipment used in the turfgrass industry. Prerequisite: AGRO 302 or registration therein.
314. **Life and Physical Environment.** (3-0). **Credit 3. II** Description of physical environments in which living organisms reside; interaction and adaptation of plants, animals and humans to their physical environments; survival in extreme environments; creating livable artificial environments on earth and in space. Prerequisite: Junior or senior classification.
330. **Social and Ethical Aspects of International Cropping Systems.** (3-0). **Credit 3.** Philosophical basis of ethical decisions; includes slavery, war, population growth, migration, farm workers, chemical inputs, genetically modified organisms, soil and water conservation and protection of wild species. Prerequisites: Junior or senior classification.
405. **Soil Microbiology.** (3-2). **Credit 4. I, II** Role of soil microorganisms in soil-plant ecosystems. Microbial ecology, microbes in nutrient cycles important to agriculture, pesticide degradation, bacterial fertilizers, composting, waste disposal, plant microbe interactions. Laboratory estimation of soil microbial populations, and measurement of important biological processes in soil with current methods. Prerequisite: 3 hours of microbiology or approval of instructor.
417. **Forage and Grassland for Livestock and the Environment.** (3-0). **Credit 3. II** Description, analysis, and evaluation of forage and grassland systems in relation to livestock production and environmental conservation; selection of introduced grasses, legumes and establishment of forage; management of weeds, nutrients, grazing and harvest. Prerequisite: Junior or senior classification.*
420. **Brazilian Agriculture and Food Production Systems.** **Credit 3 to 6.** Comparison and study of Brazilian and U.S. agriculture and culture related to soil, water, and forest conservation and management in Brazil; tour and learn about Amazon River, rain forest, Brasilia, farm, ranch, and floral production systems, agricultural cooperatives and research, sugar and alcohol production, phosphate mining and production; visit points of interest. Prerequisite: Junior or senior classification or approval of instructor.
422. **Soil Fertility and Fertilizers.** (3-0). **Credit 3. I** Chemical, biological and physical processes as they influence soil fertility. Manufacture of fertilizers and their reactions with soils. Prerequisites: AGRO 301; registration in AGRO 432 or approval of instructor.
428. **Advanced Turf Ecology and Physiology.** (3-0). **Credit 3. II** Examination of how environmental stresses, genetics, and cultural management practices influence the growth, development, and physiology of turfgrasses; exploration of how turf communities function within urban landscapes; introduction to environmental, social, and political issues encountered when managing these areas.
429. **Turf Management Systems.** (3-2). **Credit 4. I** Development of turf management plans for large turfgrass sites including parks, golf courses and sports facilities; use of case studies to critically analyze turf management programs. Prerequisite: AGRO 428.
430. **Turfgrass Maintenance.** (3-2). **Credit 4. II** Activities in a day-to-day turfgrass maintenance operation; decision-making in culture, equipment, irrigation systems, budgets, records and labor management. Laboratory includes principles and actual mechanical procedures involved in maintaining turfgrass. Prerequisite: AGRO 428 or approval of instructor.*
432. **Soil Chemistry and Fertility Laboratory.** (0-3). **Credit 1. I** Measurement and interpretation of fertility status of soils by chemical methods. Prerequisites: AGRO 301; AGRO 422 or registration therein or approval of instructor.*
435. **Ecology of Agrichemicals in Field Crops and Turf.** (3-0). **Credit 3. II** History, rationale, and ecological consequences of irrigation, fertilization, and pesticide applications in crop production; methods to determine the fate of agrichemicals in water, soil, and food; assessment of the risks and benefits of agrichemical use to human health, farm economy and natural habitats. Prerequisite: CHEM 101.
445. **Soil Physics.** (2-3). **Credit 3. I** Fundamentals of soil physics; soil texture, structure, water, air and thermal relations and their relations to the solution of problems in crop production, irrigation, pollution and engineering. Prerequisite: 9 hours of soils and physics with minimum of 3 hours of each, or approval of instructor.*
450. **Chemical Weed Control.** (3-0). **Credit 3. I** Fundamentals of chemical weed control; relationships of families of herbicides, basis for selectivity of herbicides, fate of herbicides in plants and soils and effect of herbicidal additives. Prerequisites: CHEM 222 or 227 and 237; approval of instructor.

452. **Chemical Weed Control Laboratory.** (0-2). **Credit 1. I** Important weed problems in Texas; herbicides and equipment used for herbicidal application. Prerequisite: AGRO 450 or registration therein.*
455. **Environmental Soil Science.** (3-0). **Credit 3. II** Environmental aspects of soil receiving organic and inorganic materials involved with crop production and from wastes associated with agriculture, industry and municipalities; soil properties largely determine environmentally sound practices of applying these materials and the quantities that may be added without polluting air, soil and water resources. Prerequisite: AGRO 301 or approval of instructor.
460. **Problems in Agronomy - Plants.** (1-0). **Credit 1.** Development of writing skills in the plant science aspect of agronomy: instruction in drafting, editing, and revising technical and popular reports for specific audiences; critical thinking, analytical reading, peer review, and discussion are emphasized. Prerequisite: Junior or senior classification.
461. **Problems in Agronomy - Soils.** (1-0). **Credit 1.** Development of writing skills in the soil science aspect of agronomy: instruction in drafting, editing, and revising technical and popular reports for specific audiences; critical thinking, analytical reading, peer review, and discussion are emphasized. Prerequisite: Junior or senior classification.
465. **Crop Management: An Extension Perspective.** (3-0). **Credit 3. I** Examination of critical management decisions for corn, sorghum, peanut, wheat, soybean, cotton and turfgrass production; investigation of cultivar selection, land preparation, planting methods, plant population, fertilization, irrigation, dryland techniques, harvesting, pest control, water quality, and soil testing and conservation. Prerequisite: AGRO 105 or HORT 201.
481. **Agronomy Seminar.** (1-0). **Credit 1. I, II** Preparation and presentation by students of papers on pertinent agronomic topics. Required of all agronomy majors in their last semester. Prerequisite: Senior classification in agronomy.
484. **Internship.** **Credit 1 to 3. I, II, S** Practical on-the-job experience in the student's area of specialization. Prerequisites: Junior or senior classification; approval of instructor; 2.0 or better GPR in major and overall.
485. **Directed Studies.** **Credit 1 to 4 each semester. I, II, S** For advanced undergraduates to permit field or laboratory investigation or study of subject matter not included in established courses. Prerequisite: 10 hours of junior and senior agronomy or approval of instructor.
489. **Special Topics in...** **Credit 1 to 4. I, II, S** Selected topics in an identified area of agronomy. May be repeated for credit. Prerequisite: Approval of department head.*
491. **Research.** **Credit 1 to 3.** Research conducted under the direction of faculty member in agronomy. May be repeated 2 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor.

*Field trips required for which departmental fee may be assessed to cover costs.

American Studies (AMST)

300. **Imagined Americas.** (3-0). **Credit 3.** Exploration of the development of major conceptions of American culture with particular attention to the major debates over the nature of national identity, set in historical context. Prerequisite: Junior or senior classification or approval of instructor.
310. **Confronting Conflict.** (3-0). **Credit 3.** Exploration of America's legacy of violent conflict; examples include Euro-American conflict, labor strife, crime, urban riots, civil and international war and domestic violence. Prerequisites: AMST 300 or approval of instructor.
320. **Versions of the American Dream.** (3-0). **Credit 3.** Exploration of American issues such as the "good life," spirituality, utopian communities, consumption and waste, economic expectations, and America as a "city on a hill." Prerequisite: AMST 300 or approval of instructor.
330. **Intersecting Cultures.** (3-0). **Credit 3.** Examines the questions of American identity and its construction, especially through cultural encounters in the Americas. Prerequisites: AMST 300 or approval of instructor; junior or senior classification.

340. **Region and Place.** (3-0). **Credit 3.** Explores the mythic functions of various settings and practices in America and/or the United States; representations of the landscape and regional sensibilities; various media, such as literature, paintings, photography, film and music examined. Prerequisites: AMST 300 or approval of instructor; junior or senior classification.
350. **Materializing America.** (3-0). **Credit 3.** Considers the meanings of material objects that people make and use as art and functional objects of everyday life; examines the interactions between people and objects and the ways objects shape and reflect "American" culture, both past and present. Prerequisites: AMST 300 or approval of instructor; junior or senior classification.
481. **Senior Seminar.** (3-0). **Credit 3.** A capstone course for the B.A. in American Studies, featuring in-depth investigation of an issue, problem or question in American Studies; includes a student research project and research paper. Prerequisite: Completion of 12 credits in American Studies or approval of instructor.
489. **Special Topics in...** **Credit 1 to 4.** Special topics in an identified area of American Studies. Prerequisite: Junior or senior classification or approval of instructor.

Department of Animal Science

Professors G. R. Acuff (Head), F. W. Bazer, R. L. Edwards, D. W. Forrest, T. H. Friend, P. G. Harms, J. T. Keeton, D. A. Knabe, D. C. Kraemer, R. K. Miller, E. A. Murano, R. D. Randel, J. O. Sanders, J. W. Savell, D. H. Sigler, C. L. Skaggs, S. B. Smith, T. H. Welsh, Jr., G. Wu; **Associate Professors** G. E. Carstens, A. Castillo, C. A. Gill, M. D. Hardin, K. B. Harris, A. D. Herring, N. H. Ing, W. N. Osburn, W. S. Ramsey, T. E. Spencer; **Assistant Professors** M. Amstalden, C. A. Cavinder, J. A. Coverdale, G. A. Holub, C. R. Long, P. K. Riggs, J. E. Sawyer, T. M. Taylor, L. O. Tedeschi, T. A. Wickersham; **Senior Lecturer** M. M. Vogelsang

Animal Science (ANSC)

107. (AGRI 1319, 1419*) **General Animal Science.** (3-0). **Credit 3. I, II, S** Scientific animal agriculture; selection, reproduction, nutrition, management and marketing of beef cattle, swine, sheep, goats and horses; evaluation and processing of meat, wool and mohair. Importance of livestock and meat industries. Prerequisite: Concurrent registration in ANSC 108 required.
108. (AGRI 1419*) **General Animal Science.** (0-2). **Credit 1. I, II, S** Laboratory to accompany ANSC 107. Prerequisite: Concurrent registration in ANSC 107 required.
201. **Introductory Equine Care and Use.** (2-0). **Credit 2. I, II** Survey of basic equine care and use; breeds of horses and their use; care and maintenance of equines including feeding, health care, housing and equipment.
207. **Art and Heritage of Livestock.** (3-0). **Credit 3.** Using art as a venue to understand the legacy and heritage of livestock production and livestock's contribution to civilization and society; from man as hunter, agriculturalist, and finally, as industrialist; from cave paintings to Russell and Remington; history of the effects of painting, poetry, architecture and sculpture on agriculture.
242. **Growth and Development of Livestock.** (2-2). **Credit 3. II** Evaluation of slaughter livestock as related to growth and development, production efficiency, carcass value; selection of breeding animals based on performance, production records, visual appraisal; principles of growth biology; biotechnological tools used to manage growth and development. Prerequisites: ANSC 107 and 108.
291. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in animal science. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor; 2.0 GPR in major and overall.
302. **Basic Beef Cattle Production.** (3-0). **Credit 3. I** Fundamental concepts of beef management and production principles. Service course recommended for non-animal science majors. Prerequisites: ANSC 107 and 108.
303. **Principles of Animal Nutrition.** (3-0). **Credit 3. I, II, S** Scientific approach to nutritional roles of water, carbohydrates, proteins, lipids, minerals, vitamins, and other dietary components; emphasis on the comparative aspects of gastrointestinal tracts and on digestion, absorption, and metabolism of nutrients. Prerequisites: CHEM 222; CHEM 227 or equivalent. Cross-listed with NUTR 303.

305. **Animal Breeding.** (2-2). **Credit 3. I, II, Summer of even numbered years** A systems approach to selection and mating of livestock; gene frequency, heritability, relationship, inbreeding, linebreeding, heterosis, crossbreeding, direct and correlated response to selection, and use of pedigree, family, progeny testing and indices for selection. Prerequisites: ANSC 107 and 108; GENE 301; STAT 301.
307. **Meats.** (2-3). **Credit 3. I, II, S** Integrated studies of the meat animal processing sequence regarding the production of meat-type animals and the science and technology of their conversion to human food. Prerequisites: ANSC 107 and 108. Cross-listed with FSTC 307.
310. **Behavior and Management of Domestic Animals.** (2-2). **Credit 3. I, II** Application of behavior of cattle, horses, sheep, goats and swine to their management; basic principles, physiology of behavior, perception, training, predators, use of dogs in livestock production, stress and animal welfare. Prerequisites: ANSC 107 and 108.
311. **Equine Behavior and Training.** (1-5). **Credit 3. I, II** Equine behavior and application of principles of psychology to training horses; systematic approaches to horse training emphasizing principles of learning; equipment and its use; stable management and preparation of horses for competition; separate laboratory sections for students with varying backgrounds.
312. **Equestrian Technology.** (1-3). **Credit 2. I, II** Advanced scientific methods and techniques for execution of equine performances in hunter, dressage and stock horse events; anatomical, physiological and psychological implications; preparation of horses and riders.
314. **Wool Evaluation and Grading.** (1-3). **Credit 2.** Evaluation of U.S.D.A. grades for wool and mohair; steps involved in processing raw wool into finished fabric; genetic and environmental factors affecting quality characteristics of wool and mohair; grading, evaluation and selection of fleeces for economic value; oral and written defense of judgments.
315. **Livestock Judging.** (1-3). **Credit 2. I** Selection and evaluation of beef cattle, swine, sheep and horses. Ability to present accurate, clear and concise oral and written reasons stressed. Prerequisites: ANSC 107 and 108; junior or senior classification.
316. **Equine Selection and Judging** (1-3). **Credit 2. II** Detailed evaluation and comparison of horses; selection and critique of athleticism and performance in horses; industry trends addressed; oral and written defense of judgments also explained and expected of student; a prerequisite for participation on the Horse Judging Team. Prerequisite: ANSC 311 or equivalent experience.
317. **Meat Selection, Evaluation and Grading.** (1-3). **Credit 2. I** Selection and grading of carcasses and wholesale cuts of beef, pork and lamb; principles of evaluation included in carcass contests and progeny testing. Prerequisites: ANSC 107 and 108.
318. **Feeds and Feeding.** (2-3). **Credit 3. I, II, Summer of even numbered years** Characteristics of feedstuffs used in livestock enterprises; manual and computer ration formulation procedures and life cycle nutritional management of beef, swine, sheep, dairy, horses, fish and pets; methods of grain, protein supplement and forage processing and evaluation; commercial and on-the-farm feed mixing methods and feed control laws. Prerequisite: ANSC 303.
320. **Animal Nutrition and Feeding.** (3-0). **Credit 3. I, II** Nutritional functions of water, protein, carbohydrates, fats, minerals and vitamins and their digestion, absorption, use and excretion; energy, protein and forage feedstuff characteristics and processing; nutritional requirements, ration formulation and feeding methods for farm animals; general course for non-animal science majors. Prerequisites: CHEM 222 or 227.
337. **Meat Merchandising.** (1-3). **Credit 2.** Steps of meat processing and merchandising of retail and foodservice; merchandising practices such as selection, identification, fabrication, pricing, packaging and distribution. Prerequisites: ANSC 307; junior or senior classification.
400. **Animal Science Industry Studies.** **Credit 1 to 3. I, II, S** Organized instruction based on well-planned visits to selected industry operations which produce, process or market animal and dairy products, or produce and market supplies and materials to support animal industries; acquaint students with such operations, to reinforce campus based instruction and to acquaint prospective employers with Texas A&M students. Field trips will normally be made during holidays or between sessions for which departmental fees may be assessed to cover costs. Prerequisites: Junior or senior classification; approval of instructor organizing study tour; 2.0 GPR in major and overall. Cross-listed with DASC 400.

402. **Exploring Animal Industries.** (2-0). **Credit 2.** Instruction for students nearing the end of their undergraduate studies; theoretical understanding of organizations and human resources available to students; awareness and understanding of the job application process, resume and cover letter writing; networking, professional and business attire; ethics related to job searches and retention. Prerequisite: Junior or senior classification.
406. **Beef Cattle Production and Management.** (3-2). **Credit 4. I, II, S** Basic principles and methods of application involved in breeding, feeding, management, marketing and disease control in cow-calf production. Prerequisites: ANSC 303, 305, 318; ANSC 433 or registration therein.
408. **Management of Stocker and Feedlot Cattle.** (2-2). **Credit 3. II** Basic principles involved in feeding, management, marketing and disease control of stocker and feeder cattle from weaning through slaughter for economical production of beef. Prerequisites: ANSC 305, 406, 433.
412. **Swine Production and Management.** (3-2). **Credit 4. I** Basic principles and their practical application in efficient, economical pork production; all areas of production—breeding and selection, nutrition, housing and equipment, marketing, herd health and economic management. Prerequisites: ANSC 318 or registration therein for animal science majors; ANSC 320 or registration therein for non-animal science majors.
414. **Sheep and Goat Production and Management.** (3-2). **Credit 4. II** Application of basic principles of genetics, physiology and nutrition to practical sheep and angora goat production systems; management, health care and marketing of animals and fiber. Prerequisites: ANSC 303 and 318 or approval of instructor.
420. **Equine Production and Management.** (3-2). **Credit 4. II** Application of biological and biotechnological principles and concepts in areas including genetics, breeding, nutrition, reproduction, immunology, parasitology, anatomy and exercise physiology to efficient production of horses for market; management of equine enterprises. Prerequisites: ANSC 201, 305, 318, 433.
433. **Reproduction in Farm Animals.** (2-2). **Credit 3. I, II, S** Physiological principles of reproductive processes in cattle, sheep, swine and horses including sperm and ova production, estrus, fertilization, gestation and parturition; techniques of semen evaluation and storage, estrous synchronization, embryo transfer and pregnancy determination. Prerequisite: Junior classification.
434. **Animal Reproduction Management.** (2-2). **Credit 3. I, II, S** Available and emerging technologies; strategies including artificial insemination, embryo manipulation and transfer, control of ovulation, sex ratio manipulation and animal cloning for managing the reproductive function of farm animals; hands-on sessions using available technologies including artificial insemination of cattle. Prerequisite: ANSC 433, priority enrollment given to graduating seniors in animal science.
437. **Marketing and Grading of Livestock and Meats.** (2-2). **Credit 3. I, II** Study of USDA livestock and carcass grades; understanding current market trends for beef, pork, lamb and goat; review of branded and certified programs; principles applied in contracting, breakeven determination, hedging, and grid or formula pricing. Prerequisite: Junior or senior classification.
439. **Feedlot Risk Management.** (2-0). **Credit 2. II** Advanced study of livestock marketing techniques; cash sales, video sales, futures and options markets, forward contracting; problem solving in real-time livestock marketing situations; risk of ownership of hypothetical livestock operations. Prerequisites: ANSC 437 and 438.
447. **Advanced Meat Science and Technology.** (3-3). **Credit 4.** Advanced basic and applied studies of meat science and/or technology utilizing the underlying physiological and structural components for conversion to human food; understanding the influence of pre- and post-harvest factors on meat quality, composition, color, packaging, sensory and preparation factors; applying scientific and business principles to manufacturing and process flow of commercial meat food products and demonstrating knowledge of these principles through development of meat products. Prerequisites: ANSC 307; CHEM 222 or approval of instructor; junior or senior classification.
457. **Hazard Analysis and Critical Control Point System.** (3-0). **Credit 3.** Hazard Analysis and Critical Control Point (HACCP) principles specifically related to meat and poultry; microbiological and process overviews; good manufacturing practices and standard operating procedures development. Prerequisite: FSTC 326 or approval of instructor. Cross-listed with FSTC 457.
481. **Seminar.** (1-0). **Credit 1. I, II, S** Review of literature and research problems related to the livestock and food industries; preparation of a technical report including an oral presentation supported by a written technical paper. Prerequisite: Priority enrollment given to graduating seniors in animal science.

484. **Livestock Practicum. (0-2). Credit 1. I, II** Provides students an opportunity to learn some of skills required in livestock production; planned for students who have had limited farm and ranch experience in one or more species. Prerequisite: Junior or senior classification in animal science or approval of instructor.
485. **Directed Studies. Credit 1 to 4. I, II, S** Directed individual study of selected problem in field of animal science. Prerequisites: Junior or senior classification; written approval of professor supervising the activity; 2.0 GPR in major and overall.
487. **Sensory Evaluation of Foods. (2-2). Credit 3.** Application of sensory science principles and practices to food systems including an understanding of discriminative, descriptive and consumer sensory techniques. Prerequisites: CHEM 222 or 228; junior or senior classification.
489. **Special Topics in... Credit 1 to 4. I, II, S** Selected topics in an identified area of animal science. May be repeated for credit. Prerequisite: Junior or senior classification.
491. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in animal science. May be repeated 3 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisite: Junior or senior classification and approval of instructor; 2.0 GPR in major and overall.
494. **Animal Science Internship. Credit 1 to 5. I, II, S** Independent study and supervised field experience related to the student's professional interest. Prerequisites: Junior or senior classification or approval of instructor; 2.0 GPR in major and overall.

* See Texas Common Course Numbering System (TCCNS) on page 982.

Department of Anthropology

Professors V. M. Bryant, Jr., N. Dannhaeuser, D. B. Dickson, D. L. Hamilton (Head), M. R. Waters; **Associate Professors** M. S. Alvard, D. L. Carlson, K. J. Crisman, F. E. Goebel, T. A. Green, S. L. Gursky-Doyen, C. M. Pulak, C. W. Smith, A. V. Thoms, L. F. Vieira de Castro S. Wachsmann, C. A. Werner, L. E. Wright; **Assistant Professors** S. Athreya, S. Busdiecker, D. N. Carlson, D. J. de Ruiter, S. L. Eckert,

Anthropology (ANTH)

201. (ANTH 2346) **Introduction to Anthropology. (3-0). Credit 3. I, II, S** An introduction to the discipline of anthropology through the examination of its four sub-fields: archaeology, physical anthropology, socio-cultural anthropology and linguistics.
202. (ANTH 2302) **Introduction to Archaeology. (3-0). Credit 3. I, II** An introduction to the study of the human past through the retrieval, analysis and interpretation of material remains.
205. **Peoples and Cultures of the World. (3-0). Credit 3. I, II, S** Survey of human cultures around the world using case studies of customs and cultural organization; case studies exemplifying contrasting types of cultures and societies.
210. (ANTH 2351) **Social and Cultural Anthropology. (3-0). Credit 3. I, II** Evolution of cultures; differences, similarities and effects of material and non-material culture on economic, social and political organization.
225. **Biological Anthropology. (3-3). Credit 4.** Human biology to include examination of evolutionary processes acting on human populations; human genetics; non-human primate anatomy, classification and ecology of primates; the primate paleontological record, and human variation and adaptation.
229. **Introduction to Folklore. (3-0). Credit 3.** Study of folklore through selected examples of traditional cultures, their beliefs, customs and art forms such as: tales, folksongs, proverbs, riddles and material culture.
300. **Cultural Change and Development. (3-0). Credit 3.** Anthropological strategies for the study of cultural change and the implication of these strategies for the development of Western and non-Western societies.
301. **Indians of North America. (3-0). Credit 3.** Native North American cultures from the Arctic to Mesoamerica; their origins, cultures prior to extensive acculturation and their contemporary situations.
302. **Archaeology of North America. (3-0). Credit 3.** Overview of archaeology and prehistory of North America from the arrival of humankind through the development of agriculture to Euro-American contact. Prerequisite: ANTH 201, 202, 205 or 210.

303. **Archaeology of the American Southwest. (3-0). Credit 3.** Overview of archaeology and prehistory of the southwestern United States and northern Mexico from the earliest evidence of human occupation to the Spanish conquest. Prerequisite: ANTH 201, 202, 205 or 210.
306. **Indians of Texas. (3-0). Credit 3.** Tribal cultures of native and emigrant Texas Indians from prehistoric to contemporary times; origins, traditional cultures and problems of acculturation.
308. **Archaeology of Mesoamerica. (3-0). Credit 3.** Development of Indian civilizations in Mexico and Guatemala, including prehistory of the Olmec, Maya, Aztec and other regional cultures to the time of the Spanish conquest.
312. **Fossil Evidence of Human Evolution. (3-0). Credit 3.** Detailed review of fossil antecedents of humans including theoretical implications for an understanding of human evolution. Prerequisite: ANTH 225 or approval of instructor.
313. **Historical Archaeology. (3-0). Credit 3.** Use and methods of historical archaeology in locating, documenting, restoring and preserving our historical resources.
314. **Agrarian Peasant Societies. (3-0). Credit 3.** Major adaptations among traditional agricultural peoples of the world; production and marketing organization; culture of the village; ties between peasants and the nation; contemporary changes in traditional life.
315. **Peoples and Cultures of Africa. (3-0). Credit 3.** African cultures and prehistory prior to extensive acculturation and problems facing contemporary African cultures.
316. **Nautical Archaeology. (3-0). Credit 3.** I Underwater shipwrecks, sunken harbors and other submerged evidence of human activities; relationship to cultural geography in general; problems of diving technology, surveying and preservation; relevance to modern problems. Prerequisite: Junior or senior classification.
317. **Introduction to Biblical Archaeology. (3-0). Credit 3.** Application of archaeology in biblical research; basic overview of the material cultures that are the setting for the biblical narratives. Cross-listed with RELS 317.
318. **Nautical Archaeology of the Americas. (3-0). Credit 3.** Seafaring in the Americas from the 16th to the 20th centuries based on shipwreck archaeology; ship construction, exploration, commerce, naval warfare and related activity; influence of seafaring on the cultures, economics and history of the Western Hemisphere.
319. **Indians of Mexico and Central America. (3-0). Credit 3.** Examination of Mexican and Central American Indian culture and society through ethnographic and historical materials with a focus on the problems of socio-cultural change. Prerequisite: ANTH 201 or 205 or 210.
324. **Music in World Cultures. (3-0). Credit 3.** Examines music from an ethnomusicological perspective focusing on musical performance and the complex interrelationship of music to culture, society, and daily life; surveys music from a variety of cultures through a series of case studies. Prerequisite: MUSC 102 or approval of instructor. Cross-listed with MUSC 324.
325. **Texas Cultural History. (3-0). Credit 3.** The image of Texas history, tradition and popular culture from the 19th century to the present. Prerequisite: HIST 226 or ANTH 201, 210 or 229. Cross-listed with HIST 325.
330. **Field Research in Anthropology. Credit 1 to 9.** Training for students in formulating and solving anthropological problems through field research; problem oriented field research under supervision. Prerequisites: 6 hours of anthropology; approval of instructor.
335. **Cultures of Central Asia. (3-0). Credit 3.** Study of anthropological research in Central Asia: ecological adaptations; colonialism and post-colonialism; ethnic politics and ethnic conflict; religion and identity; gender and family; globalization and modernization. Prerequisite: Junior or senior classification.
340. **Folklore and the Supernatural. (3-0). Credit 3.** Introduction to the traditional expressions of the supernatural such as superstition, belief tale and divination classified as folklore genres and their relationships to the cultures in which they develop; theories drawn from anthropology, folklore and related social sciences. Prerequisite: Junior or senior classification.
350. **Archaeology of the Old World. (3-0). Credit 3.** Overview of archaeology and prehistory of Europe, Africa and Asia from the evolution of the hominids to the development of agriculture and the rise of civilization.
351. **Classical Archaeology. (3-0). Credit 3.** Origins and spread of Western civilization through the material remains of Minoan, Mycenaean, Etruscan, and early Greek and Roman cultures.

353. **Archaeology of Ancient Greece.** (3-0). **Credit 3.** Archaeology of ancient Greece from the Stone Age until the ascent of Rome in the Hellenistic Period; remains of ancient Greek art (sculpture, mosaic, painting), architecture (temples, homes, civic structures), religion (figurines, votive offerings), and social history (coins, inscriptions). Prerequisite: Junior or senior classification. Cross-listed with CLAS 353.
354. **Archaeology of Ancient Italy.** (3-0). **Credit 3.** Archaeology of ancient Italy from the Stone Age until the collapse of the Roman Empire in the fourth century; remains of ancient Etruscan and Roman art (sculpture, mosaic, painting), architecture (temples, homes, civic structures), religion (figurines, votive offerings), and social history (coins, inscriptions). Prerequisite: Junior or senior classification. Cross-listed with CLAS 354.
401. **Ice Age Humans in North America.** (3-0). **Credit 3.** Archaeological, environmental and geological evidence related to the timing of human entry into the Americas and megafaunal extinctions at the end of the Pleistocene. Prerequisite: ANTH 202 or equivalent.
403. **Anthropology of Religion.** (3-0). **Credit 3.** Anthropological approach to religion and to the relationship between religion, economics, politics and social structure with particular reference to non-Western, pre-industrial societies. Cross-listed with RELS 403.
404. **Women and Culture.** (3-0). **Credit 3.** Examines women's lives in evolutionary and cross-cultural perspective; women's roles in subsistence, politics, religion and economics in traditional cultures; women's roles in international development; the cultural and social construction of women's biology cross-culturally including circumcision, menstruation, pregnancy, childbirth and motherhood. Cross-listed with WMST 404.
405. **Introduction to the Primates.** (3-0). **Credit 3.** Survey of nonhuman primates from ecological and evolutionary perspectives covering numerous topics including: taxonomy; primate evolution; behavioral observation; reproductive strategies; diet; and conservation. Prerequisite: Junior or senior classification.
410. **Anthropological Theory.** (3-0). **Credit 3.** A systematic examination of the basic principles of anthropology. Prerequisite: ANTH 210.
415. **Anthropological Writing.** (3-0). **Credit 3.** Reading and discussion of the classic genres of anthropological literature; instruction in writing styles and techniques appropriate to each genre, followed by guided writing assignments. Prerequisite: Junior or senior classification.
421. **Museums and Their Functions.** (2-3). **Credit 3.** Role of museums, those specializing in natural history and the extent to which they serve the community, state, nation, and the advancement of the sciences included in their programs; history, operations, methods and programs. Prerequisite: Junior or senior classification. Cross-listed with WFSC 421.
423. **Bioarchaeology.** (3-0). **Credit 3.** Role of human skeletal studies in reconstructing the biological and cultural past of humans; evidence gleaned from human skeletal remains recovered from archaeological sites such as data regarding diet, health, genetics and migration. Prerequisites: ANTH 225 or BIOL 225; junior or senior classification.
424. **Introduction to Human Evolutionary Ecology.** (3-0). **Credit 3.** An introduction to the field of Human Evolutionary Ecology. Examines human behavioral adaptation through the application of evolutionary theory in a ecological context; emphasizes interdisciplinary, scientific methodologies.
425. **Human Osteology.** (2-3). **Credit 3.** I Concepts and methods used by anthropologists to identify, describe and analyze human skeletal remains from forensic and archaeological contexts. Prerequisites: ANTH 225 or VIBS 305; junior or senior classification.
426. **Anthropology of Food and Nutrition.** (3-0). **Credit 3.** Anthropological study of human foodways and their nutritional consequences; how environmental, biological and cultural factors interact to produce patterns of food intake, and the effects of such patterns on health, growth and fertility; examples drawn primarily from non-Western societies. Prerequisite: ANTH 201 or 210 or 225 or NUTR 202 or approval of instructor.
427. **Human Variation.** (3-0). **Credit 3.** Biological basis of variation in the physical features of modern humans; details of anatomical and physiological differences of living populations to understand their adaptive and historical significance; history of human variation studies rooted in the historical notion of "race." Prerequisites: ANTH 225, BIOL 214 or 225; junior or senior classification.
430. **Applied Anthropology.** (3-0). **Credit 3.** Theory, ethics and practical applications of anthropological methods and concepts as they relate to planned programs of sociocultural change. Prerequisites: ANTH 210; junior or senior classification.

439. **Gender, Ethnicity and Class in Archaeological Research.** (3-0). **Credit 3.** Exploration of theoretical and methodological issues in engendering archaeology; ideological biases in the interpretation of roles attributed to women, men, and underrepresented groups in the past; the impact of cultural transformation on underrepresented groups and gender relations; and the formulation of research questions concerning these issues. Prerequisites: ANTH 202, ANTH 210, WMST 200 or WMST 207; junior or senior classification or approval of instructor. Cross-listed with WMST 439.
446. **Ceramic Artifact Analysis.** (2-3). **Credit 3.** Concepts, methods, and approaches used in the analysis of archaeological pottery with a focus on the techniques and theories used to bridge the gap between the recovery of ceramic artifacts and their interpretation within various anthropological contexts. Prerequisite: ANTH 202 and approval of instructor; junior or senior classification.
447. **Lithic Artifact Analysis.** (2-3). **Credit 3.** Laboratory-based course reviewing methods archaeologists use to analyze stone tools and debitage, including identification of tool-stone sources, reconstruction of technology, explanation of assemblage variability, and microscopic use-wear analysis. Prerequisite: ANTH 202 and approval of instructor; junior or senior classification.
454. **Archaeological Photography.** (2-3). **Credit 3.** How to better use cameras in the process of reporting archaeological sites and material culture by exploring old and new photographic technologies. Prerequisite: Junior or senior classification.
484. **Anthropology Internship.** (3-0). **Credit 3.** Provides students with the opportunity to gain practical experience in a variety of settings, including local, state or federal agencies; museums; non-profit organizations; non-governmental organizations; private firms. Prerequisites: ANTH 202, 210 and 225 with a grade of B or higher.
485. **Directed Studies.** (9-0). **Credit 9.** For individual research in anthropology on subjects not included in established courses. Prerequisites: Approval of instructor and department head.
489. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of anthropology. May be repeated for credit.
491. **Research.** **Credit 1 to 3.** Research conducted under the direction of a faculty member in Anthropology. May be repeated 2 times for credit. Prerequisites: Junior or senior classification and approval of instructor.

Arabic (ARAB)

Director/Lecturer S. Ayari; Lecturer H. Ahmad

101. **Beginning Arabic I.** (4-0). **Credit 4.** Introduction to Modern Standard Arabic in its written and spoken forms; emphasis on conversation, rudimentary vocabulary, simple grammar, and reading.
102. **Beginning Arabic II.** (4-0). **Credit 4.** Introduction of more complex grammatical constructions; vocabulary building; emphasis on putting acquired vocabulary and grammar to conversational use. Prerequisite: ARAB 101 or equivalent.
201. **Intermediate Arabic I.** (3-0). **Credit 3.** Practice of listening, speaking, and writing skills; vocabulary building; discussion of topics related to daily life and general aspects of Arab culture. Prerequisite: ARAB 102 or equivalent.
202. **Intermediate Arabic II.** (3-0). **Credit 3.** Emphasis on comprehending printed material, perfecting pronunciation, and attending to more complex grammar; discussion of topics holding general and professional interest; knowledge of Arab culture and history. Prerequisite: ARAB 201 or equivalent.
289. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of Arabic studies. May be repeated for credit. Prerequisite: Approval of instructor.
489. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of Arabic studies. May be repeated for credit. Prerequisite: Approval of instructor.

College of Architecture (CARC)

291. **Research. Credit 1 to 4.** Research conducted under the direction of a faculty member. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
300. **College of Architecture Study Abroad. Credit 1 to 18.** For students in approved study abroad programs participating in reciprocal educational exchange programs. May be repeated for credit. Prerequisite: Admission to approved program.
301. **Field Studies in Design Innovation. Credit 1 to 18.** Design innovation in international and domestic environments away from the Texas A&M University campus; emphasis on the cultural, social, economic, geographical, climatic and technological factors influencing design solutions for human needs. May be taken up to two times in the same semester. Prerequisite: For environmental design and construction science majors: Upper-level classification in respective major; For landscape architecture majors: LAND 319 and 329.*
311. **Field Studies in Design Communication. (2-4). Credit 3.** Design communication in international and domestic environments away from the Texas A&M University campus; emphasis on the tools, methods and techniques for design communication. May be taken up to two times in the same semester. Prerequisite: For environmental design majors: ENDS 211; For landscape architecture majors: LAND 318, 319, 329, 330.*
321. **Field Studies in Design Technology. (3-0). Credit 3.** Design technology in international and domestic environments away from the Texas A&M University campus; emphasis on structural, material and environmental systems and methods of construction utilized to realize design solutions. May be taken up to two times in the same semester. Prerequisite: COSC 253.*
331. **Field Studies in Design Philosophy. (3-0). Credit 3.** Design philosophy in international and domestic environments away from the Texas A&M University campus; emphasis on the historical, philosophical, cultural, social and economic factors that influence design solutions. May be taken up to two times in the same semester.*
335. **Field Studies in Interdisciplinary Design Theory. (3-0). Credit 3.** Introduction to interdisciplinary design theory in an international environment for students in design-related fields; analysis of buildings, sketching techniques, architectural history, and relationship of culture to design; discussion of fundamental design processes, issues and theories relevant to design problem resolution. Prerequisite: Junior or senior classification or approval of instructor.
400. **Public Leadership Development. (3-0). Credit 3.** Major issues in the study of public leadership, development of leadership skills, and a field investigation done in conjunction with local public leaders. Prerequisites: Junior or senior classification and approval of instructor. Cross listed with ADEV 400 and ENGR 400.
481. **Seminar. (1-0). Credit 1.** Preparatory seminar for select College of Architecture study away and internships; topics include introduction to the language, culture and history of study abroad location. May be taken up to two times in the same semester. To be taken on a satisfactory/unsatisfactory basis. Prerequisites: Admission to approved study abroad program; approval of Associate Dean for Students.
485. **Directed Studies. Credit 1 to 6.** Individual research in architecture, construction science or landscape architecture in an international or domestic environment away from the Texas A&M University campus. May be taken up to two times in the same semester. Prerequisite: CARC 481 or approval of instructor and degree coordinator.
491. **Research. Credit 1 to 4.** Research conducted under the direction of a faculty member. May be repeated 2 times for credit. Prerequisites: Junior or senior classification and approval of instructor.

*Field trips may be required for which departmental fees may be assessed to cover costs.

Department of Architecture

Professors M. J. Clayton (Interim Head), R. R. Davison, Jr., F. E. Downing, J. G. Fairey, J. O. Greer, J. S. Haberl, R. C. Hill, R. E. Johnson, G. J. Mann, V. L. Paul, J. T. Regan, A. D. Seidel, M. M. Shepley, P. J. Tabb, L. G. Tassinary, R. S. Ulrich, J. Vanegas, R. B. Warden, W. V. Wells, D. G. Woodcock; **Associate Professors** R. F. Abrams, C. H. Culp, H. F. Eilers, P. Fisk, A. Geva, D. K. Hamilton, T. R. Larsen, V. Miranda, R. J. Schiffhauer; **Assistant Professors** L. Beltran, S. Deyong, B. Dougan, W. He, N. Klein, P. Lang, A. B. Nichols, S. Rodiek, W. Yan; **Senior Lecturers** M. Castillo Erminy, D. J. Hajash, J. S. Rogers; **Lecturers** M. Hankins-Jasckson, R. Holliday, S. D. Holliday, W. B. Pollard

Architecture (ARCH)

205. **Architecture Design I. (2-6). Credit 4.** Issues and methods in designing environments for human habitation and well-being; projects addressing site, functional planning, spatial ordering, form generation through a recognition of the synthesis of space, structure, use and context; reinforcement of appropriate graphic and model building techniques. Prerequisites: ENDS 105, 106, 115, 116.*
206. **Architecture Design II. (2-6). Credit 4.** Fundamental issues of innovative design processes and creation explored through the creative use of past, present and future materials, tools, and technologies; with an emphasis upon the research of materials, methods, scale, craft and technique as instruments of design, fabrication, and production. Prerequisites: ENDS 105, 106, 115, 116.*
207. **Architecture Design I. (1-6). Credit 4.** Technology as medium for design planning and communication; impact and influence of technology on architectural design process; investigation of computing theories, systems, methods and current and future trends through creative thinking and innovation design, problem solving and creation with the use of digital media. Prerequisites: ENDS 105, 106, 115, 116.*
212. **Social and Behavioral Factors in Design. (3-0). Credit 3.** Social and behavioral factors in the built and natural environment; environmental perception and spatial cognition; social-environmental processes such as privacy and crowding; setting-oriented discussion on residences, education, and the workplace; the psychology of nature and natural resource management; social design and social science contribution to architectural design.
249. **(ARCH 1301) Survey of World Architecture History I. (3-0). Credit 3.** A survey of the history of western and non-western architecture and the human-designed and built environment from the prehistoric to the 14th century; origins and the evolution of ideas related to the question of creativity in art and architectural objects and plans that make up the total scope of the designed environment.
250. **(ARCH 1302) Survey of World Architecture History II. (3-0). Credit 3.** A survey of western and non-western architecture and the human-designed and built environment from the 14th century to the present.
305. **Architectural Design III. (2-6). Credit 5.** Theory and practice of architecture as art and science; study of function, structure and form in site and building design through an analytical approach to programming, design methods, problem identification, case studies and problem resolution; exercises in identifying various conditions and forces associated with a variety of building types and the generation of a range of design solutions. Prerequisites: ARCH 205 or 207; ARCH 206; ARCH 249; ARCH 250.*
310. **Site Planning and Design. (3-0). Credit 3. I** An introduction to the history, theory and materials of site design that lead to environmentally sound development decisions based on a property's assets and limitations, balancing environmental sustainability with human well-being and the consequences of development; problem solving processes encompassing environmental, engineering, cultural and economic forms of analysis. Prerequisite: Upper-level classification in environmental design, construction science or landscape architecture.*
312. **Design Journal. (0-2). Credit 1.** Production of a journal, in any combination of physical artifact or electronic blog, as specified by the instructor, that documents the student's experience on a study abroad program, a professional internship, or other off-campus activity; journal reflects discipline-specific communication methods for the profession of architecture. Prerequisites: Upper division classification in the BED Architectural Studies Option and concurrent enrollment in CARC 301 or ENDS 494, or other off-campus program.
327. **Conceptual Structural Analysis. (3-0). Credit 3.** A non-mathematical investigation of structural systems and components with respect to behavior; selection of the most appropriate structural system for various building typologies. Prerequisite: Junior or senior classification.

329. **The American House. (3-0). Credit 3.** Domestic architecture in America; analysis of prototype based on contemporary documentation with an emphasis on vernacular building types and native arts; vision of the ideal life of the period as evidenced in original drawings and place within the framework of variants that impact form (climate, economics, soci-cultural factors, materials and technology). Prerequisites: ARCH 250.
331. **Foundations Structures. (3-0). Credit 3.** Introduction to the physical principles that govern statics and strength of materials through the design of architectural structures from a holistic view, in the context of architectural ideas and examples; introduction to construction, behavior of materials, and design considerations for simple and complex structural assemblies; computer applications. Concurrent enrollment in ARCH 305. Prerequisite: Upper level classification in the BED Architectural Studies Option; MATH 142 or equivalent; PHYS 201.
334. **Environmental Systems II. (3-0). Credit 3.** Theory and applications of building water supply, plumbing and drainage systems, electrical, acoustical, fire and lightning protection, transportation systems and construction materials; design opportunities, calculations, equipment selection, component sizing and economics as they relate to design. Prerequisites: Upper-level classification in environmental design, construction science or landscape architecture; ENDS 211.
335. **Foundations Systems. (3-0). Credit 3.** Theory and applications of building energy use, envelope design, shading analysis, heating and cooling systems, lighting design and construction materials; design opportunities, calculations, equipment selection and component sizing as they relate to building design. Concurrent enrollment in ARCH 305. Prerequisites: Upper level classification in the BED Architectural Studies Option; PHYS 201.
345. **History of Building Technology. (3-0). Credit 3.** Chronological development of civilization and building technology from prehistoric cultures to present; classic and modern materials, structural devices past and present, machine-produced products, prefabrication, construction methodology and servicing.
350. **History and Theory of Modern and Contemporary Architecture. (3-0). Credit 3.** Development of modern and contemporary architecture in the 20th and 21st centuries; materials, structure, social and economic changes as well as architectural theory. Prerequisites: ENDS 149, 150 or ARCH 249, 250.
401. **Design Creativity. (3-0). Credit 3.** Fundamental critical and creative thinking skills needed to participate in and create the future; how design can impact the physical environment and society. Prerequisite: Upper classification in Environmental Design.
405. **Architectural Design IV. (1-6). Credit 4. I** A comprehensive design studio focused on the integration of design theory with functionally sustainable environmental and structural systems; consideration of a project from site analysis and programming through design detailing. Concurrent enrollment in ARCH 431 and ARCH 435. Prerequisites: Upper level classification in the BED Architectural Studies Option; ARCH 305; CARC 301 or ENDS 494. *
406. **Architecture Design V. (2-6). Credit 5.** Topical approaches to design, emphasizing theory and practice of architecture or related disciplines, such as urban design, interior design, health care design, etc. Prerequisites: Upper level classification in the BED Architectural Studies Option; ARCH 405.*
407. **Integrated Home Architecture Studio. (2-6). Credit 5.** Integrated and comprehensive design, fabrication, and construction of a house, including practical experience with various architectural systems and controls. Concurrent enrollment in ARCH 432 and ARCH 436. Prerequisites: ARCH 305, 331.
408. **Experimental Home Architecture. (2-6). Credit 5.** Exploration of advanced and experimental topics in home architecture including off-the-grid homes, design for disassembly, industrialized construction, smart architecture, sustainable community design, and other topics. Prerequisites: ARCH 407, 431, 434.
421. **Energy Conservation in Residential Architecture. (3-0). Credit 3.** Analyze energy use for sustainability in architecture; energy and Leadership in Energy and Environmental Design (LEED) audits, computer simulations of design impact using solar, low-energy and passive energy; include LEED rating analysis. Prepare for LEED rating. Prerequisites: ENDS 233, with ARCH 334 preferred.
430. **History of Ancient Architecture. (3-0). Credit 3.** Architecture of antiquity, examining stylistic, structural and theoretical advancements in building, beginning with Mesopotamian and continuing with Egyptian, Greek and Roman civilizations. Prerequisite: ENDS 149 or approval of degree coordinator.
431. **Integrated Structures. (2-0). Credit 2.** Selection and economics of structural systems in the context of integrating structural systems into a building through good design; analysis and design of wood, steel, concrete, and composite systems and members in relation to building design. Concurrent enrollment in ARCH 405 and ARCH 435. Prerequisites: ARCH 305, 331.

432. **Integrated Home Structures and Construction.** (1-2). **Credit 2.** Selection and economics of structural systems in the context of integrating residential structures through good design; analysis and design of wood, steel, concrete, and composite systems and members in relation to building design. Concurrent enrollment in ARCH 407 and ARCH 436. Prerequisites: ARCH 305, 331.
433. **Architectural Lighting.** (3-0). **Credit 3.** Theory and practice of lighting design as an art and science; aperture design for sunlight control; selecting and locating luminaries to enhance interior and exterior surfaces and spaces. Prerequisite: Junior or senior classification.
434. **The Role of Sculpture and Painting in Ancient Architecture.** (3-0). **Credit 3.** Interrelationships of architecture, painting and sculpture in the ancient world including Egypt, Mesopotamia, Crete, Greece and Rome. Prerequisite: ENDS 149 or approval of degree coordinator.
435. **Integrated Systems.** (1-2). **Credit 2.** An understanding of how to integrate sustainable environmental systems into a building through good design; lectures are provided as a support to studio; systems faculty participate in studio critiques throughout the project. Concurrent enrollment in ARCH 405 and ARCH 431. Prerequisites: ARCH 305, 335.
436. **Integrated Home Architecture Systems.** (1-2). **Credit 2.** An understanding of how to integrate sustainable environmental systems into a residence through good design; lectures are provided as a support to studio; systems faculty participate in studio critiques throughout the project. Concurrent enrollment in ARCH 407 and ARCH 432. Prerequisites: ARCH 305, 335.
437. **Great Medieval Cathedrals.** (3-0). **Credit 3.** Interrelationships of architecture, sculpture and stained glass, technology and construction, function and form, society and patronage in the great period of medieval building. Prerequisite: Junior or senior classification or approval of degree coordinator.
440. **History of Renaissance Architecture.** (3-0). **Credit 3.** Renaissance architecture in Europe and America. Prerequisite: Junior or senior classification.
441. **Baroque and Rococo Architecture.** (3-0). **Credit 3.** The investigation of the history of architecture, the arts and society, and major creative individuals from the late sixteenth to the early eighteenth centuries. Prerequisite: ENDS 150 or ARTS 150 or approval of degree coordinator.
442. **Art and Architecture of Islam.** (3-0). **Credit 3.** An introduction to the art and architecture of the Mediterranean, Near Eastern and Central/South Asian territories under Muslim rule prior to circa 1700 CE. Prerequisite: ENDS 149 and ARTS 149; approval of instructor.
446. **Introduction to Historic Preservation.** (3-0). **Credit 3.** The cross-disciplinary world of historic preservation examining the significance of historic places to societal well-being and conservation alternatives for historic and cultural environments; review of preservation projects including interior rehabilitation and adaptive reuse; introduction to careers in preservation through guest presentations and case studies. Prerequisite: Junior or senior classification.
451. **Strategies in Architectural Management.** (3-0). **Credit 3.** Emerging strategies in the architecture and construction industry, with an emphasis on understanding the changing structure of the industry and the management of both firms and projects. Prerequisite: Senior classification or approval of degree coordinator.
452. **Alternative Careers in Architecture.** (3-0). **Credit 3.** Study of the careers of individuals who have utilized their architectural education in non-traditional ways, such as: politics, journalism, real estate, etc.; interviews with select representative individuals. Prerequisite: Upper-level classification in environmental design, construction science or landscape architecture.
457. **Ethics and Professional Practice.** (3-0). **Credit 3.** Issues and relationships within the business, legal and political environment; introduction to the concepts of architectural specifications and the AIA standard conditions of the construction contract; forms of construction, bidding and contract documents. For undergraduate students pursuing a professional degree and a career in architecture. Prerequisite: Senior classification in environmental design.
458. **Cultural and Ethical Considerations for Global Practice.** (3-0). **Credit 3.** Issues and relationships within the cultural, business, legal and political environments of global practice; differences in the construction contract, bidding and various forms of construction. Prerequisite: Junior or senior classification.
463. **Elements of Interior Architecture.** (3-9). **Credit 6.** Analysis and design of architectural interiors; historical and professional perspectives incorporating programming; space planning and organization; graphic presentation; specifications and selection of furnishings and materials to satisfy user needs in residential, commercial and institutional settings. Concurrent enrollment in ARCH 405 or 406 not allowed. Prerequisites: ARCH 305, 231, 233.*

485. **Directed Studies.** Credit 1 to 5 each semester. Special projects in architecture. May be repeated for credit. Prerequisites: Upper-level classification; approval of instructor and degree coordinator.
489. **Special Topics in...** Credit 1 to 4. Special topics in an identified area of architecture. May be repeated for credit. Prerequisite: Upper-level classification; approval of instructor and degree coordinator.
491. **Advanced Architecture Innovation Research.** Credit 1 to 6. Research conducted under the direction of faculty member in the College of Architecture. May be repeated 2 times for credit. Prerequisite: Approval of instructor.

*Field trips may be required for which departmental fees may be assessed to cover costs.

Art

(faculty, see page 622)

(ARTS)

103. **(ARTS 1311) Design I.** (2-4). Credit 3. Two-dimensional design; fundamentals of line, color, form, texture, shape, space and arrangement.
104. **Introduction to Graphic Design.** (0-2). Credit 1. Introduction to the concepts and techniques utilized in the layout of graphic presentations; basic digital camera operations, typography, use of color, design principles; integration of type, graphic elements and images. Prerequisite: Major in environmental design.
111. **(ARTS 1316) Drawing I.** (2-4). Credit 3. Variety of media techniques and subjects, exploring perceptual and descriptive possibilities; drawing as a developmental process as well as an end in itself; freehand.
112. **(ARTS 1317) Drawing II.** (2-4). Credit 3. Variety of media techniques and subjects, exploring conceptual, impressive and expressive possibilities; drawing as a description of structures within a spatial environment. Prerequisite: ARTS 111.
149. **(ARTS 1303) Art History Survey I.** (3-0). Credit 3. Survey of architecture, painting, sculpture and the minor arts from prehistoric times to 14th century.
150. **(ARTS 1304) Art History Survey II.** (3-0). Credit 3. Survey of architecture, painting, sculpture and the minor arts from the 14th century to the end of the 19th century.
203. **Graphic Design I.** (2-3). Credit 3. Introduction to graphic design visual principles; composition and their application for printed and digital media. Prerequisites: ARTS 103 and 111.
212. **Life Drawing.** (1-6). Credit 3. Life drawing course emphasizing structure and action of the human figure. Prerequisite: ARCH 111 or ENDS 115 or approval of instructor or department head.
304. **Graphic Design II.** (2-4). Credit 3. Continuation of ARTS 203; concepts in advanced graphics as a tool for design solutions for publication and promotion; emphasis on creative thinking over technology. Prerequisites: ARTS 203; junior or senior classification.
305. **Painting I.** (2-4). Credit 3. Exploring potentials of painting media with emphasis on color and composition. Prerequisite: ARTS 111, ENDS 115 or any drawing class or approval of instructor or department head.
308. **Sculpture.** (2-4). Credit 3. Sculptural approaches in a variety of media including additive and subtractive. Prerequisite: ENDS 115 or any drawing class or approval of instructor or department head.
329. **Texas Art History.** (3-0). Credit 3. The development of visual arts in Texas; an examination of art movements, artists and major works exhibiting a broad range of artistic techniques. Prerequisite: Junior or senior classification or approval of instructor or department head.
330. **The Arts of America.** (3-0). Credit 3. Survey of painting, sculpture, crafts and architecture of prehistoric America to the present; emphasis on art as a record of cultural, economic and social evolution. Prerequisite: Junior or senior classification or approval of instructor or department head.
335. **The Art and Architecture of Rome.** (3-0). Credit 3. Rome as a microcosm of western civilization; a survey of western architectural and art history from antiquity through the Baroque; a focus on the Eternal City's buildings, paintings, mosaics and sculptures exploring criteria, methods, goals and results of major architectural and artistic movements and the people involved. Prerequisite: Junior or senior classification or approval of instructor or department head.
349. **The History of Modern Art.** (3-0). Credit 3. Chronological development of late 19th through 20th century art; emphasis on key artists, paintings, sculpture, photography and architecture. Prerequisite: Junior or senior classification or approval of instructor or department head.

350. **The Arts and Civilization.** (3-0). **Credit 3.** Investigation of the image of work of selected periods in terms of criticism, aesthetic rationale, specific masters and social significance by going beyond historical chronology. May be repeated for up to 6 credit hours.
445. **Byzantine Art and Architecture.** (3-0). **Credit 3.** A critical and historical investigation of Mediterranean art and architecture from the third century to the middle of the fifteenth century; emphasis on the artistic achievements from the late antique Mediterranean and the Byzantine Empire; investigation of architectural decoration, public monuments, cultural diversity and controversies over images. Prerequisite: Junior or senior classification.
485. **Directed Studies.** **Credit 1 to 4.** **I, II, S** Special problems in the fine and applied visual and plastic arts. May be repeated for up to 12 credit hours. Prerequisite: Approval of instructor and department head.
489. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified field of the fine or applied visual and plastic arts. May be repeated for up to 9 credit hours. Prerequisite: Approval of instructor and department head.

Asian Studies (ASIA)

289. **Special Topics in...** **Credit 1 to 4.** Selected topics in asian studies. May be repeated for credit.
306. **Society and Population of Modern China.** (3-0). **Credit 3.** Major trends and current topics in social and demographic aspects of the society of modern China, including Taiwan. Prerequisite: Junior or senior classification. Cross-listed with SOCI 306.
329. **Pacific Rim Business Behavior.** (3-0). **Credit 3.** Theoretical models of Asian cultures and practical protocol/etiquette related to business and work in China, Thailand, South Korea, Japan, Australia, and other Pacific Rim nations; discussions of national character, managerial behavior and values. Prerequisite: Junior or senior classification. Cross-listed with SOCI 329.
349. **The Vietnam War/The American War.** (3-0). **Credit 3.** Vietnam's relations with the West; French colonialism; origins and development of Vietnamese nationalism; Cold War and American involvement; wartime societies in North and South Vietnam; expansion of the war to Cambodia and Laos; anti-war movements in the United States; reasons for the American defeat; consequences and lessons of the war. Prerequisites: Junior or senior classification. Cross-listed with HIST 349.
350. **Asia During World War II.** (3-0). **Credit 3.** The origins and development of Japanese imperialism; Japan's expansion into East and Southeast Asia; wartime societies; collaboration and resistance; effects of the war in the United States upon Japanese-Americans; the outcomes of the war; remembrance of the war. Prerequisite: Junior or senior classification. Cross-listed with HIST 350.
351. **Traditional East Asia.** (3-0). **Credit 3.** History and culture of China and Japan from earliest times to the coming of the West; impact of Confucianism and Buddhism; development of social, political and economic systems. Prerequisite: Junior or senior classification. Cross-listed with HIST 351.
352. **Modern East Asia.** (3-0). **Credit 3.** Impact of the West on traditional China and Japan; the response through modernization; rise of nationalism and formation of modern nation states. Prerequisite: Junior or senior classification. Cross-listed with HIST 352.
354. **Imperial China.** (3-0). **Credit 3.** History of imperial China from the earliest dynasties through the mid-19th century, including major political events, the structure of Chinese government, economic development, philosophies and religion, wars and military and culture and daily life. Prerequisite: Junior or senior classification. Cross-listed with HIST 354.
356. **Twentieth Century Japan.** (3-0). **Credit 3.** Industrialization and modernization of Japan; its rise from an isolated nation to a major world power and economic giant. Prerequisite: Junior or senior classification. Cross-listed with HIST 356.
463. **Gender in Asia.** (3-0). **Credit 3.** Gender dynamics in Asia; changes in gender roles; women's movements; women and the economy; women and politics; men's and women's private lives. Prerequisite: Junior or senior classification. Cross-listed with SOCI 463 and WMST 463.

485. **Directed Studies. Credit 1 to 3.** Selected fields of Asian Studies not covered in depth by other courses. Reports and extensive reading required. May be repeated for credit. Prerequisite: Approval of director of Asian Studies.
489. **Special Topics in... Credit 1 to 4.** Selected topics in asian studies. May be repeated for credit.
491. **Research. Credit 1 to 3.** Research conducted under the direction of a faculty member in asian studies. May be repeated 3 times for credit. Prerequisites: 6 credits of ASIA; junior or senior classification; approval of instructor.

Astronomy (ASTR)

101. **Basic Astronomy. (3-0). Credit 3. I, II, S** A qualitative approach to basic stellar astronomy; earth-moon-sun relationships then studies of distances to stars, stellar temperatures, and other physical properties; birth, life on the main sequence of the H-R diagram, and ultimate fates of stars.
102. **Observational Astronomy. (0-3). Credit 1. I, II, S** Observational and laboratory course which may be taken in conjunction with ASTR 101 or 314. Use of techniques and instruments of classical and modern astronomy. Prerequisite: ASTR 101 or 314, or registration therein.
314. **Survey of Astronomy. (3-0). Credit 3. I** Primarily for majors in science and engineering. Kepler's laws, law of gravitation, solar system, stars, stellar evolution, nucleosynthesis, cosmology, clusters, nebulae, pulsars, quasars, black holes. Prerequisite: PHYS 208.

Department of Atmospheric Sciences

Professors K. P. Bowman (Head), A. E. Dessler, J. W. Nielsen-Gammon, G. R. North, R. E. Orville, R. L. Panetta, R. Saravanan, T. T. Wilheit, P. Yang, R. Zhang; **Associate Professors** D. R. Collins, C. C. Epifanio, M. T. Lemmon, F. Zhang; **Assistant Professors** S. D. Brooks, R. Korty, S. L. Nasiri, G. W. Schade, C. J. Schumacher; **Lecturer** M. E. Alcorn

Atmospheric Sciences (ATMO)

201. **Atmospheric Science. (3-0). Credit 3. I, II, S** Structure, energy, and motions of the atmosphere; climate; fronts and cyclones; atmospheric stability; clouds and precipitation; severe storms.
202. **Atmospheric Science Laboratory. (0-2). Credit 1. I, II, S** Practical laboratory experiments and exercises, conducted by students in the meteorology and computer laboratories, concerning the fundamental physical processes underlying atmospheric phenomena, and the collection, display and interpretation of meteorological information. For non-majors only. Prerequisite: Concurrent enrollment in ATMO 201.
203. **Weather Forecasting Laboratory. (0-2). Credit 1. I, II** Short-range weather forecasting practice; numerical guidance; weather map analysis and discussions. Prerequisite: Concurrent enrollment in ATMO 201.
251. **Weather Observation and Analysis. (2-2). Credit 3. I** Standard and experimental weather observing techniques; subjective and objective analysis; application of conceptual models; simple kinematic and dynamic constraints. Prerequisite: ATMO 203 or registration therein.
285. **Directed Studies. Credit 1 to 4. I, II, S** Offered to enable majors in meteorology to undertake and complete with credit in their particular fields of specialization limited investigations not covered by any other courses in established curriculum. Prerequisite: Freshman or sophomore classification.
289. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of meteorology. May be repeated for credit. Prerequisite: Approval of instructor.
291. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in atmospheric sciences. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Freshman or sophomore classification and approval of instructor.
321. **Computer Applications in the Atmospheric Sciences. (2-2). Credit 3. II** Introduction to technical computing methods in the atmospheric sciences. Students learn to use specialized software and data analysis systems for meteorological applications.

324. **Physical and Regional Climatology.** (2-2). **Credit 3. I** Climate causes; global and surface energy balance; hydrologic cycle; general circulation; climate change; climate data analysis. Prerequisites: ATMO 201 and 203; MATH 172; course that satisfies departmental computer science requirement.
335. **Atmospheric Thermodynamics.** (3-0). **Credit 3. II** Application of thermodynamics to Earth's atmosphere; phase changes of water; stability concepts; introduction to physical chemistry. Prerequisites: CHEM 102; MATH 251; PHYS 218.
336. **Atmospheric Dynamics.** (3-2). **Credit 4. II** Kinematic concepts and relationships; equations of motion; geostrophic and accelerated motions; the vorticity equation and Rossby waves. Prerequisites: ATMO 335, MATH 311 or registration therein.
352. **Severe Weather and Mesoscale Forecasting.** (2-2). **Credit 3. II** Parcel theory for dry and moist convection; sounding diagrams and their application to atmospheric convection; organization of midlatitude convection and severe weather; thunderstorm forecasting. Prerequisite: MATH 172.
363. **Introduction to Atmospheric Chemistry and Air Pollution.** (3-0). **Credit 3. I** Descriptive introduction of the composition and chemistry of natural and pollutant compounds in the atmosphere; transport, cycling and reactivity of atmospheric material; atmospheric measurements, data processing, air quality and human health issues; air pollution trends and climate change. Prerequisites: CHEM 101 and 102 or approval of instructor.
435. **Synoptic-Dynamic Meteorology.** (3-0). **Credit 3. I** Dynamics and diagnosis of synoptic-scale systems; perturbation theory and baroclinic instability; wave energetics, frontogeneses. Prerequisite: ATMO 336 or equivalent.
441. **Satellite Meteorology and Remote Sensing.** (2-2). **Credit 3. II** Introduction to satellite orbit dynamics, atmospheric radiative transfer, atmospheric remote sensing methods, and analysis and application of remotely-sensed meteorological data. Prerequisites: ATMO 324, MATH 308; junior or senior classification.
446. **Physical Meteorology.** (3-0). **Credit 3. I** Physics and meteorology of clouds and precipitation; atmospheric electricity; radiative transfer. Prerequisite: ATMO 335.
455. **Numerical Weather Prediction.** (2-2). **Credit 3. II** Basic principles of computer models of the atmosphere; parameterizations; use and critical evaluation of models and model output. Prerequisites: MATH 308; ATMO 336 or registration therein.
456. **Practical Weather Forecasting.** (1-4). **Credit 3. II** Advanced weather forecasting techniques with application to a variety of forecasting problems, both public and private sector. Prerequisites: ATMO 336 or 455; junior or senior classification.
459. **Tropical Meteorology.** (3-0). **Credit 3. I** Tropical climatology; structure, evolution, and motion of tropical cyclones; tropical cyclone hazards; large-scale tropical phenomena. Prerequisites: ATMO 336; ATMO 352 or registration therein.
461. **Broadcast Meteorology.** (0-2). **Credit 1. II** Instruction in the practice of broadcast meteorology; practice in and preparation of weather forecast products and demonstration videotapes. Prerequisites: ATMO 455 or approval of instructor; senior classification.
463. **Air Pollution Meteorology.** (3-0). **Credit 3. II** Problems of air pollution in our global atmosphere; environmental cycles; waste products in the biosphere; atmospheric pollution; natural concentrations of atmospheric constituents; pollution sources; atmospheric transport; pollution sinks; effects of pollution; monitoring and surveillance; and management of air quality. Prerequisite: ATMO 335 or approval of instructor.
485. **Directed Studies.** **Credit 1 or more each semester. I, II, S** Offered to enable majors in meteorology to undertake and complete with credit in their particular fields of specialization limited investigations not covered by any other courses in established curriculum. Prerequisite: Junior or senior classification.
489. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of meteorology. May be repeated for credit.
491. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in atmospheric sciences. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor.

Bilingual Education Field Based

(faculty, see page 675)

(BEFB)

425. **Student Teaching in Hispanic Bilingual Education.** (3-0). **Credit 3.** Observation and participation in Hispanic bilingual education classroom activity; supervised student teaching in accredited school. Prerequisites: 2.5 GPA in teaching fields and professional development; approval of department head; senior classification. Must be taken concurrently with BEFB 426.
426. **Effective Instruction of Hispanic Students of Diverse Abilities.** (3-0). **Credit 3.** Field-based application of effective instructional strategies for teaching Hispanic bilingual students of diverse abilities. Prerequisites: 2.5 GPA in teaching fields and professional development; approval of department head. Must be taken concurrently with BEFB 425.
470. **Bilingual Assessment and Monitoring.** (3-0). **Credit 3.** Assessment of language ability for second language learners; assessment instruments in bilingual/ESL programs; scoring and evaluation of second language assessment instruments. Prerequisites: Junior or senior classification; BEFB 472 and 474. Must be taken concurrently with BEFB 476.
472. **Bilingual and Dual Language Methodologies.** (3-0). **Credit 3.** Use of theory and effective teaching practice in promoting student's development of strong social and academic skills; relationship of culture to language. Prerequisite: Junior or senior classification. Must be taken concurrently with BEFB 474.
474. **Biliteracy for Bilingual and Dual Language Classrooms.** (3-0). **Credit 3.** Social and linguistic characteristics of second language learners influencing literacy skills; reading and literature instruction for second language learners; reading and writing process across the curriculum for second language learners. Prerequisite: Junior or senior classification. Must be taken concurrently with BEFB 472.
476. **Content Area Instruction for Bilingual Programs.** (3-0). **Credit 3.** Use of theory and various approaches for integrating English as a second language; learning strategies relating to how plans, procedures and units engage language teachers, students and learning environments. Prerequisite: Junior or senior classification. Must be taken concurrently with BEFB 470.

Department of Biochemistry and Biophysics

Professors R. S. Chapkin, P. F. Fitzpatrick, E. A. Funkhouser, L. A. Guarino, J. M. Gunn, E. D. Harris, A. K. H. Holzenburg, M. A. O. Höök, A. E. Johnson, C. C. Kao, P. A. Lindahl, W. L. McKeehan, M. D. Manson, J. E. Muller, C. N. Pace, W. D. Park, D. O. Peterson, D. W. Pettigrew, F. M. Raushel, G. D. Reinhart (Head), J. C. Sacchettini, S. H. Safe, J. M. Scholtz, D. E. Shippen, M. D. Summers, R. D. Wells, J. R. Wild, R. F. Young; **Associate Professors** M. Bryk, J. Cruz-Reyes, S. Datta, J. C. Hu, G. M. Kapler, G. R. Kunkel, V. M. Panin, M. Polymenis, S. Sze; **Assistant Professors** T. Devarenne, T. Igumenowa, P. Li, J-P. Pellois, P. Straight, J. W. Tsai, X. Zhang; **Senior Lecturers** J. R. Ellison, B. W. Miles, L. S. Mullins, C. J. Ragland; **Lecturers** N. Ayers, A. Chandler, Y. M. Hartberg,

Biochemistry

(BICH)

107. **Horizons in Biological Chemistry.** (2-0). **Credit 2.** I An introduction to biochemistry and its relationship to the biological, biophysical and chemical sciences. Prerequisite: Freshman or sophomore classification or approval of instructor.
281. **Seminar in Biochemical Research.** (1-0). **Credit 1.** I, II Round table discussions with visiting seminar speakers; review current literature; topics including cutting edge research in biochemistry. Prerequisites: BICH 107 and freshman or sophomore classification in biochemistry or approval of instructor.
285. **Directed Studies.** **Credit 1 to 4.** Introduction to laboratory research. Prerequisite: Freshman or sophomore classification in biochemistry or approval of instructor.
289. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of biochemistry. May be repeated for credit. Prerequisite: Freshman or sophomore classification in biochemistry or approval of instructor.
291. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in Biochemistry. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor; biochemistry majors only.

303. **Elements of Biological Chemistry.** (3-0). **Credit 3. I** Survey of the biochemical sciences designed for the non-biochemistry major; introduction to the chemistry and metabolism of biologically important molecules, the biochemical basis of life processes, cellular metabolism and regulation. Students requiring biochemistry in greater depth should register for BICH 410 and 411. Not open to biochemistry majors. Prerequisite: CHEM 222 or equivalent.
407. **Horizons in Biological Chemistry II.** (1-0). **Credit 1. I, II** Application of formal classroom instruction; applied view of biochemical concepts; use of biochemical principles to ascertain, evaluate, and make judgments on research information. May be taken five times. Prerequisite: BICH 411 or 441.
410. **Comprehensive Biochemistry I.** (3-1). **Credit 3. I, II, S** Structure, function and chemistry of proteins and carbohydrates; kinetics, mechanisms and regulation of enzymes; metabolism of carbohydrates. Not open to biochemistry or genetics majors. Prerequisite: CHEM 228 or approval of instructor.
411. **Comprehensive Biochemistry II.** (3-1). **Credit 3. I, II, S** A continuation of BICH 410. Structure, function, chemistry and metabolism of lipids and nucleic acids; cellular metabolism viewed from the standpoint of energetics and control mechanisms; interrelationships of metabolic pathways. Not open to biochemistry or genetics majors. Prerequisite: BICH 410.
412. **Biochemistry Laboratory I.** (0-3). **Credit 1. I, S** Selected methods used to identify, isolate, purify and characterize biomolecules. Not open to biochemistry or genetics majors. Prerequisite: BICH 410 or registration therein.
413. **Biochemistry Laboratory II.** (0-3). **Credit 1. II** Selected methods used for the study of cellular metabolism and its regulation. Methods used complement those used in BICH 412. Prerequisite: BICH 411 or registration therein or approval of instructor.
414. **Biochemical Techniques I.** (0-6). **Credit 2. II** Techniques currently used in biochemistry such as spectrophotometry, column chromatography (gel filtration, ion exchange) electrophoresis and immunoelectrophoresis, performed by students in purification of proteins, enzymes and nucleic acids. For majors in biochemistry, genetics, molecular and cell biology and microbiology. Prerequisites: BICH 440; CHEM 316 and 318 or registration therein.
431. **Molecular Genetics.** (3-0). **Credit 3. I, II** Molecular basis for inheritance: gene structure and function, chromosomal organization, replication and repair of DNA, transcription and translation, the genetic code, regulation of gene expression, genetic differentiation and genetic manipulations. Prerequisites: BICH 410 or MEPS 313 or BIOL 351; GENE 301 or 302 or 320. Cross-listed with GENE 431.
432. **Laboratory in Molecular Genetics.** (0-6). **Credit 2. I, II** Laboratory for molecular genetics providing technical experience with tools of molecular biology. Prerequisite: BICH 431 or registration therein. Cross-listed with GENE 432.
440. **Biochemistry I.** (3-0). **Credit 3. I** Rigorous treatment of the structure, function and chemistry of proteins and carbohydrates; kinetics, mechanisms and regulation of enzymes; metabolism of carbohydrates. Course designed for biochemistry and genetics majors and honors students only. Prerequisite: CHEM 228 or approval of instructor.
441. **Biochemistry II.** (3-0). **Credit 3. II** Continuation of BICH 440; structure, function, chemistry and metabolism of lipids and nucleic acids, cellular metabolism viewed from the standpoint of energetics and control mechanisms; interrelationships of metabolic pathways. Course designed for biochemistry and genetics majors and honors students only. Prerequisite: BICH 440.
450. **Introduction to Genomics.** (3-0). **Credit 3.** Introductory genomics course designed to provide a basic understanding of the science of genomics, the study of genome data; major emphasis placed on the logic behind genomic approaches and the capabilities and limitations of these approaches to investigate biological processes; discussion of genomics as another extension of the science of genetics. Prerequisite: Junior or senior classification in Biology, Genetics or Biochemistry. Cross-listed with BIOL 450.
464. **Bacteriophage and Genomics.** (1-6). **Credit 3.** Examines the latest technologies in genomic analysis by sequencing and annotating the genomes of novel bacterial viruses (phage); generates real data which will be submitted to the NIH/NCBI public database; includes phage biology and potential uses. Prerequisites: GENE 302; BIOL 351 or concurrent enrollment; approval of instructor.
485. **Directed Studies.** **Credit 1 to 4 each semester. I, II, S** Directed study in biochemistry not included in established courses. Prerequisites: Junior or senior classification; approval of instructor and department head.

489. **Special Topics in...** Credit 1 to 4. **I, II, S** Selected topics in an identified area of biochemistry, biophysics or nutrition. May be repeated for credit. Prerequisite: Junior or senior classification in life or physical sciences.
491. **Research.** Credit 1 to 4 per semester. **I, II, S** Laboratory research supervised by a faculty member in the Department of Biochemistry and Biophysics. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisite: Biochemistry major.

Bioenvironmental Sciences

(faculty, see page 788)

(BESC)

201. **Introduction to Bioenvironmental Sciences.** (3-0). Credit 3. An introduction to the biological components of environmental sciences, with emphasis on the impact of the world's population on global resources; lectures by research scientists reflecting their disciplinary perspective in relevant areas.
204. **Molds and Mushrooms: The Impact of Fungi on Society and the Environment.** (3-0). Credit 3. Introduction to the fungi and the impact these organisms have on society and the environment; topics discussed will include: life cycles of fungi; classification schemes, pathogens of plants, animals and humans, fungi in food production; toxic fungi and the law, and others.
285. **Directed Studies.** Credit 1 to 4. Individually supervised research or advanced studies for lower-division undergraduate students to independently investigate special problems not available in existing courses. Prerequisite: Approval of instructor in consultation with departmental advisor.
291. **Research.** Credit 1 to 4. Research conducted under the direction of faculty member in bioenvironmental sciences. May be repeated 3 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
314. **Pathogens, the Environment and Society.** (3-0). Credit 3. The impact of microorganisms (bacteria, fungi and viruses) on the development of modern culture and society; the role pathogens played in the history of mankind and the influence of the changing environment on emerging diseases. Prerequisite: Junior or senior classification.
320. **Water and the Bioenvironmental Sciences.** (3-0). Credit 3. Critical understanding of salient issues relating to fresh water as a limited and important bioenvironmental resource. This is a writing intensive course. Prerequisite: Junior or senior classification.
401. **Bioenvironmental Microbiology.** (3-0). Credit 3. The interactions of microorganism in diverse environments; applied aspects of microbial interactions in the environment, their effects on the environment, and potential use to solve environmental problems. Prerequisites: AGRO 405 and 3 hours of organic chemistry, or equivalents; or approval of instructor.
402. **Microbial Processes in Bioremediation.** (3-0). Credit 3. Metabolic pathways of microbes involved in the biodegradation of hazardous materials will be presented; ecological requirements for biotreatability of contaminated sites will be discussed emphasizing factors affecting microbial growth; strategies for in situ bioaugmentation will be presented. Prerequisite: One semester of organic chemistry.
403. **Sampling and Environmental Monitoring.** (2-3). Credit 3. Introduction to environmental sampling and methodology; strategies and analyses of sampling data; overview of current applications of sampling and monitoring in the environmental sciences; emphasis on practical aspects of sampling from air, soil and water; detection and quantification of microbial and chemical unknowns in environmental media. Prerequisite: Junior or senior classification or approval of instructor.
484. **Field Experience.** Credit 1 to 4. An on-the-job supervised experience program conducted in the area of the student's specialization. Prerequisite: Junior or senior classification or approval of department head.
485. **Directed Studies.** Credit 1 to 4. Special problems for advanced undergraduates to permit study of subject matter not available in existing courses. Prerequisite: BESC 201 or approval of instructor.
489. **Special Topics in...** Credit 1 to 4. Selected topics in an identified area of bioenvironmental sciences. May be repeated for credit. Prerequisite: BESC 201 or approval of instructor.
491. **Research.** Credit 1 to 4. Research conducted under the direction of faculty member in bioenvironmental sciences. May be repeated 3 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor.

Department of Biological and Agricultural Engineering

Professors M. E. Castell-Perez, C. R. Engler, J. R. Gilley, A. L. Kenimer, R. E. Lacey, B. P. Mohanty, R. G. Moreira, C. L. Munster, Z. Nikolov, C. B. Parnell, Jr., G. L. Riskowski (Head), S. W. Searcy, V. P. Singh, R. Srinivasan, J. A. Thomasson; **Associate Professors** C. L. Darcey, P. K. Smith; **Assistant Professors** S. C. Capareda, S. D. Fernando, Y. Huang, R. Karthikeyan; **Lecturer** G. L. Stark

Biological and Agricultural Engineering (BAEN)

150. **Introduction to Biological and Agricultural Engineering Design. (0-2). Credit 1. I** Introduction to the engineering design process using design problems presented by biological and agricultural engineers from industry; problem definition, information search, idea generation and development of design concepts. Prerequisite: Engineering major or approval of department head.
265. **Investigative Techniques for Biological and Agricultural Engineers. (1-6). Credit 3. II** Use of field and laboratory techniques to reinforce fundamental engineering concepts; applications of techniques for data collection and analysis to problems in biological and agricultural engineering; design of experiments and communication of experimental results. Prerequisite: MEEN 221 or registration therein.
285. **Directed Studies. Credit 1 to 4.** Selected problems in any phase of agricultural engineering; credit and specific content dependent upon background, interest, ability and needs of student enrolled; individual consultations and reports required. Prerequisites: Freshman or sophomore classification; approval of department head.
289. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of agricultural engineering. May be repeated for credit. Prerequisite: Approval of instructor.
291. **Research. Credit 1 to 3.** Research conducted under the direction of faculty member in biological and agricultural engineering. Prerequisites: Freshman or sophomore classification and approval of instructor.
320. **Engineering Thermodynamics. (2-2). Credit 3.** First and second laws of thermodynamics; properties of pure substances; analysis of closed and open systems; applications to steady-flow and non-flow processes; power and refrigeration cycles; psychrometrics. Prerequisites: MEEN 221, MATH 251 or registration therein; junior or senior classification.
340. **Fluid Mechanics. (3-0). Credit 3.** Fundamentals of fluid properties; basic conservation principles of momentum, energy and continuity; flow through closed conduits; open channel flow; principles of turbomachines and compressible flow. Prerequisites: MEEN 221; BAEN 320; junior classification.
354. **Engineering Properties of Biological Materials. (2-3). Credit 3. I** Relationships between composition, structure and properties of biological materials; definition and measurement of mechanical, physical, thermal and other material properties; variability of properties; application of properties to engineering analysis and design of biological and agricultural processes and systems. Prerequisite: MEEN 222.
360. **Systems Engineering in Food and Agriculture. (3-0). Credit 3. II** Tools of operations research applied to food and agricultural industries; linear programming, queuing theory and simulation; techniques for optimizing design of materials handling, processing and irrigation systems; techniques for improving management decisions. Prerequisites: CVEN 305; MATH 251.
365. **Unit Operations for Biological and Agricultural Engineering. (2-3). Credit 3. II** Theoretical and practical understanding of basic unit operations required to design processes and equipment in the agricultural, biological, environmental, and food industries, with unique constraints presented by biological and agricultural systems considered in design of all units. Prerequisites: BAEN 340; CVEN 305 or registration therein; junior or senior classification.
366. **Transport Processes in Biological Systems. (3-0). Credit 3. II** Basic principles governing transport of energy and mass; application of these principles to analysis and design of processes involving biological, environmental and agricultural systems. Prerequisites: BAEN 340; BAEN 354; BAEN 365 or registration therein; MATH 308; junior or senior classification.
370. **Measurement and Control of Biological Systems and Agricultural Processes. (2-2). Credit 3. II** Theory and application of sensors and techniques in the design of systems for automatic control in biological systems and agricultural production and processing; sensor operation; signal processing; control techniques; automation and robotics. Prerequisite: ECEN 215.

375. **Design Fundamentals for Agricultural Machines and Structures.** (3-0). **Credit 3.** I Applications of stress/strain relationships and failure theory to the design of agricultural machines and structures; structural properties of engineering materials; finite element analysis and computer aided engineering design. Prerequisite: CVEN 305.
412. **Hydraulic Power.** (2-2). **Credit 3.** Hydraulic power systems; energy and power relationships; hydraulic fluid properties; frictional losses in pipelines; hydraulic pumps, cylinders, valves and motors; servo and proportional valves; circuit design and analysis; conductors, fittings and ancillary devices; maintenance of hydraulic systems; pneumatic components and circuits; electrical controls and fluid logic; electro-hydraulic systems. Prerequisites: BAEN 340 and 375.
427. **Engineering Aspects of Packaging.** (3-0). **Credit 3.** Introduction to properties and engineering aspects of materials for use as components of a package and/or packaging system; principles of design and development of packages; evaluation of product-package-environment interaction mechanisms; testing methods; environmental concerns; regulations. Prerequisite: Senior classification or approval of instructor.
458. **Environmental Control for Biological Systems.** (3-0). **Credit 3.** Analysis of physical and biological factors affecting living organisms in controlled environment systems; air quality, gas exchange, water use, radiant energy, energetics of living systems; design of environmental control systems for greenhouses, livestock housing and closed environment life support systems. Prerequisites: BAEN 365; BAEN 366.
460. **Principles of Environmental Hydrology.** (3-0). **Credit 3.** I Hydrologic cycle; precipitation, evaporation, evapotranspiration, infiltration, percolation, runoff, streamflow; groundwater and surface water flow; transport of contaminants in surface water; measurement and analysis of hydrologic data for engineering design. Prerequisites: BAEN 340; senior classification.
464. **Irrigation and Drainage Engineering.** (2-2). **Credit 3.** I Engineering principles and design of both surface and pressurized irrigation systems; introduction to the design of surface and subsurface drainage systems including crop water requirements, soil moisture, irrigation scheduling, surface irrigation, sprinkler irrigation, trickle irrigation, pumps, pipelines, irrigation canals, irrigation wells, and surface and subsurface drainage. Prerequisite: BAEN 340.
465. **Design of Biological Waste Treatment Systems.** (3-0). **Credit 3.** I Management and treatment of high organic content wastes, with emphasis on agricultural and food processing wastes; engineering design of biological waste treatment processes; regulatory aspects affecting management of agricultural wastes. Prerequisites: BAEN 365; junior or senior classification.
468. **Soil and Water Conservation Engineering.** (2-2). **Credit 3.** II Engineering principles of soil and water conservation; open channel flow principles, hydraulic grade stabilization, erosion control, storm water management, design of structures for floodwater routing, culvert design, design of waterways and agricultural reservoirs, stream bank protection, water quality assessment, groundwater flow, surface water modeling. Prerequisites: BAEN 340; CVEN 305.
469. **Water Quality Engineering.** (3-0). **Credit 3.** II Nonpoint source pollution processes including transport mechanisms and contaminant fate; design of best management practices for abating nonpoint source pollution. Prerequisites: BAEN 340 or equivalent; CVEN 305.
471. **Introduction to Biochemical Engineering.** (3-0). **Credit 3.** I, II Fundamentals of microbial and enzyme processes; application of biochemical reaction kinetics, transport phenomena and chemical reactor design principles to design and analysis of enzyme reactors and fermentation systems. Prerequisite: Senior classification in engineering or approval of instructor. Cross-listed with CHEN 471.
474. **Unit Operations in Food Processing.** (2-2). **Credit 3.** I Design of food process engineering systems; basic concepts of rheology and physical properties of foods; fundamentals of heat and mass transfer and process control. Prerequisites: CHEN 205 and 304, or CVEN 305. Cross-listed with CHEN 474.
477. **Air Pollution Engineering.** (3-0). **Credit 3.** I Design of air pollution abatement equipment and systems to include cyclones, bag filters and scrubbers; air pollution regulations; permitting; dispersion modeling; National Ambient Air Quality Standards. Prerequisite: CVEN 305 or equivalent. Cross-listed with MEEN 477 and SENG 477.
479. **Biological and Agricultural Engineering Design I.** (1-2). **Credit 2.** I Capstone design project selection from problems posed by biological and agricultural engineers in industrial practice; project to be completed in BAEN 480; completion of project feasibility study and outline; design philosophy, teamwork and communication; economics; product liability and reliability; use of standards and codes; goal setting and time management. Prerequisites: BAEN 365 ; BAEN 370 and 375; senior classification.

480. **Biological and Agricultural Engineering Design II. (0-6). Credit 3. II** Continuation of engineering design experience through team solution of design problem developed in BAEN 479; preparation of design solution under supervision of biological and agricultural engineering staff and clients; critical evaluation of results by students; staff and industrial consultants. Prerequisites: BAEN 479; senior classification.
481. **Seminar. (1-0). Credit 1. II** Review of current literature dealing with agricultural engineering problems presented by staff members and students. Prerequisite: Senior classification.
485. **Directed Studies. Credit 1 to 4 each semester. I, II, S** Selected problems in any phase of agricultural engineering. Credit and specific content dependent upon background, interest, ability and needs of student enrolled. Individual consultations and reports required. Prerequisites: Junior or senior classification and approval of department head.
489. **Special Topics in... Credit 1 to 4. I, II, S** Special topics in an identified area of agricultural engineering. May be repeated for credit. Prerequisite: Approval of department head.
491. **Research. Credit 1 to 3.** Research conducted under the direction of faculty member in biological and agricultural engineering. May be repeated 2 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor.

Department of Biology

Professors D. Bell-Pedersen, M. J. Benedik, L. Campbell, V. M. Cassone (Head), J. W. Golden, S. S. Golden, I. F. Greenbaum, L. A. Guarino, T. C. Hall, P. E. Hardin, A. K. Holzenburg, R. L. Honeycutt, T. D. McKnight, M. D. Manson, C. O. Patterson, B. B. Riley, M. Sachs, M. D. Summers, T. L. Thomas, M. K. Wicksten, H. D. Wilson, R. F. Young; **Associate Professors** R. Aramayo, K. J. Aufderheide, S. Datta, D. J. Earnest, J. W. Erickson, L. R. Garcia, L. R. Griffing, A. C. Lekven, D. S. MacKenzie, J. R. Manhart, A. E. Pepper, P. J. Rizzo, D. A. Siegele, M. J. Zoran; **Assistant Professors** G. E. Carney, A. G. Jones, X. Lin, R. Lints, T. J. Lints, K. A. Maggert, B. D. Perkins, H. Qin, G. Rosenthal, K. J. Ryan, M. S. Smotherman, T. A. Stidman, W. K. Versaw, J. Xiong; **Senior Lecturers** C. B. Johnson, R. B. Moyes, W. Wen, L. Winemiller

Biology (BIOL)

101. **(BIOL 1111 and 1311, BIOL 1411) Botany. (3-3). Credit 4. I** Structure, physiology and development of plants with an emphasis on seed plants. (Not open to students who have taken BIOL 111 and 112 or BIOL 113.) Course includes laboratory that reinforces and provides supplemental information related to the lecture topics.
107. **(BIOL 1313 and 1113, 1413) Zoology. (3-3). Credit 4. I, II** Survey of animal life with respect to cell organization, genetics, evolution, diversity of invertebrates/vertebrates, anatomy/physiology, and interaction of animals with their environment; course includes laboratory that reinforces and provides supplemental information related to lecture topics. (Not open to students who have taken BIOL 111 and BIOL 112 or BIOL 113).
111. **(BIOL 1306 and 1106, 1406) Introductory Biology I. (3-3). Credit 4.** First half of an introductory two-semester survey of contemporary biology that covers the chemical basis of life, structure and biology of the cell, molecular biology and genetics. Course includes laboratory that reinforces and provides supplemental information related to the lecture topics.
112. **(BIOL 1307 and 1107, 1407) Introductory Biology II. (3-3). Credit 4.** The second half of an introductory two-semester survey of contemporary biology that covers evolution, history of life, diversity and form and function of organisms. Course includes laboratory that reinforces and provides supplemental information related to the lecture topics. Prerequisite: BIOL 111.
113. **Introductory Biology. (3-0). Credit 3. I, II, S** One-semester survey of basic biological principles, including chemical basis of life, cell biology, bioenergetics, genetics, evolution, anatomy and physiology, reproduction and development, and interaction with the environment. Not suitable for students who plan to take additional courses in the Biology Department. BIOL 123 is the corresponding laboratory course.
114. **Introductory Biology. (3-0). Credit 3. I, II, S** Continuation of a two-semester course in biological concepts; BIOL 114 will emphasize organismal diversity, comparative physiology, ecology and evolution. BIOL 124 is the laboratory course for this lecture course. Prerequisite: BIOL 113.

123. **Introductory Biology Laboratory. (0-3). Credit 1. I, II, S** One-semester course for non-majors; covers the basic biological principles; includes cell biology, genetics, ecology and evolution, biodiversity and anatomy and physiology. Prerequisites: BIOL 113 or concurrent registration in BIOL 113.
124. **Introductory Biology Laboratory. (0-3). Credit 1. I, II, S** Laboratory studies of topics covered in BIOL 114; diversity of life, comparative anatomy and physiology, and ecology and evolution. Prerequisites: BIOL 113, 123, 114 or concurrent registration in BIOL 114.
206. **(BIOL 2421) Introductory Microbiology. (3-4). Credit 4. I, II, S** Basic microbiology of prokaryotes and eukaryotes; main topics include morphology, physiology, genetics, taxonomy, ecology, medically important species and immunology; mandatory laboratory designed to give hands-on experience and to reinforce basic principles. Prerequisites: CHEM 102 or 104; BIOL 111 or biology equivalent. May not be used for credit by biology, molecular and cell biology, microbiology, zoology, pre dentistry or premedicine majors.
213. **Molecular Cell Biology. (3-0). Credit 3. I, II** Explores the molecular basis of cell structure, function and evolution; gene regulation, cell division cycle, cancer, immunity, differentiation, multicellularity and photosynthesis. Students may not take concurrently with, or after the completion of, BIOL 413. Prerequisites: BIOL 112; CHEM 227 or concurrent enrollment.
214. **Genes, Ecology and Evolution. (3-0). Credit 3. I, II** A genetically-based introduction to the study of ecology and evolution; emphasis on the interactions of organisms with each other and with their environment. Prerequisite: BIOL 112.
225. **Physical Anthropology. (3-3). Credit 4. I, II, S** Human biology to include examination of evolutionary processes acting on human populations; human genetics; non-human primate anatomy, classification and ecology of primates; the primate paleontological record, and human variation and adaptation. Prerequisites: BIOL 111; BIOL 107 or equivalent. Cross-listed with ANTH 225. Credit cannot be given for both ANTH 225 and BIOL 225.
281. **Seminar in Quantitative Biology. (1-0). Credit 1.** Designed to familiarize students with connections to the biological and mathematical worlds; weekly presentations on recent advances in quantitative biology for assessment and discussions; restricted to freshmen and sophomores in biology, botany, microbiology, molecular and cell biology, zoology, math and applied mathematical sciences. Cross-listed with MATH 281.
285. **Directed Studies. Credit 1 to 4. I, II, S** Problems in various phases of plant, animal and microbial science. Prerequisites: Freshman or sophomore classification; approval of ranking professor in field chosen and Undergraduate Advising Office.
289. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of biology. May be repeated for credit. Prerequisite: Approval of instructor.
291. **Research. Credit 1 to 4.** Active research of basic nature under the supervision of a Department of Biology faculty member. May be repeated for credit. Prerequisites: Freshman or sophomore classification and approval of faculty member.
301. **Taxonomy of Flowering Plants. (3-3). Credit 4. I, II** Use of keys and identification of flowering plants, family characteristics and relationships and other applied phases of plant science. Prerequisites: BIOL 101 or BIOL 111 and 112 or equivalent.
304. **Comparative Biology of Plants. (3-3). Credit 4. I, II, S** A comparison of chemistry, cytology, life strategies, nutrition, relevance, reproduction and structure of the major groups of prokaryotes, protists, fungi and plants. Prerequisite: BIOL 101 or BIOL 111.
318. **Chordate Anatomy. (3-3). Credit 4. I** Classification, phylogeny, comparative anatomy, and biology of chordates; diversity, protochordates, vertebrate skeletons, shark and cat anatomy studied in laboratory. Animals: Protochordates, fish, amphibia and mammals studied in laboratory. Prerequisite: BIOL 112.
319. **Integrated Human Anatomy and Physiology I. (3-3). Credit 4. I, S** Integrated approach to cellular, neural, skeletal, muscular anatomy and physiology; includes some histology, histopathology, radiology and clinical correlations. Prerequisite: BIOL 111; BIOL 112 strongly recommended.
320. **Integrated Human Anatomy and Physiology II. (3-3). Credit 4. II** Continuation of BIOL 319. Integrated approach to endocrine, cardiovascular, respiratory, digestive, urinary, reproductive and developmental anatomy and physiology; includes some histology, histopathology, radiology and clinical correlations. Prerequisite: BIOL 319 or approval of instructor.

328. **Plants and People.** (2-3). **Credit 3.** Development and uses of principal economically important plants of world; plants and plant parts used in production of important commodities; vascular plants. Prerequisite: BIOL 101 or BIOL 111 or 112 or approval of instructor.
330. **Molecules and Life.** (3-0). **Credit 3. II** Survey of major biological concepts; readings, integrated lectures and discussions of selected topics such as evolution, developmental biology, recombinant DNA, sociobiology and human origins. Prerequisite: Junior classification.
335. **Invertebrate Zoology.** (3-3). **Credit 4. II** Morphology, taxonomy, natural history and phylogeny of invertebrate animals, with emphasis on biodiversity; class includes both lecture and lab; lab includes study of preserved material and demonstration of living animals in aquaria and terraria. Prerequisite: BIOL 112 or approval of instructor.
344. **Embryology.** (3-3). **Credit 4. II** Introduction to general and comparative embryology; molecular and cellular mechanisms of development; genetics and early development of selected invertebrates (*C. elegans*, *Drosophila* and sea urchin) and emphasis on vertebrates (frog, fish, chick and mouse). Prerequisite: BIOL 213 or GENE 302.
351. **Fundamentals of Microbiology.** (3-4). **Credit 4. I, II, S** Introduction to modern microbiology with emphasis on prokaryotes; includes microbial cell structure, function, and physiology; genetics, evolution, and taxonomy; bacteriophage and viruses; pathogenesis and immunity; and ecology and biotechnology; includes laboratory experience with microbial growth and identification. Not open to BIMS majors. Prerequisites: BIOL 112; CHEM 227 and 237; or approval of instructor.
352. **Diagnostic Bacteriology.** (2-6). **Credit 4. S** Practical experience in handling, isolation and identification of pathogenic microorganisms using biochemical tests and rapid identification. Prerequisite: BIOL 206 or 351.
357. **Ecology.** (3-0). **Credit 3. I, II, S** Analysis of ecosystems at organismal, population, interspecific and community levels. BIOL 358 is the laboratory for this lecture course. Prerequisite: BIOL 112 or approval of instructor.
358. **Ecology Laboratory.** (0-3). **Credit 1. I, II, S** Analyses of freshwater, marine and terrestrial ecosystems; field studies emphasized. Prerequisite: BIOL 112 or approval of instructor.
388. **Principles of Animal Physiology.** (3-3). **Credit 4. II** Introduction to how animals function, including basics of neurophysiology, endocrinology, muscular, cardiovascular, respiratory, osmoregulatory, and metabolic physiology; broadly comparative in scope and encompassing adaptation of physiological systems to diverse environments; the laboratory stresses techniques used for monitoring and investigating physiological mechanisms and responses to environmental changes. Prerequisites: BIOL 111 and 112; CHEM 228.
401. **Critical Writing in Biology.** (1-0). **Credit 1.** Reading scientific papers and writing short synopses of papers with a focus on learning how to think and write like a scientist; fills the current Writing Intensive "W" course requirement for biology. Prerequisites: BIOL 213 and 214; junior or senior classification.
405. **Comparative Endocrinology.** (3-0). **Credit 3. I** Basic principles of endocrinology including structure and functions of hormones in vertebrates; hormonal control of growth, metabolism, osmoregulation, and reproduction; endocrine techniques and mechanism of hormone action. Prerequisites: BIOL 319; WFSC 416 or BIOL 388 or approval of instructor.
406. **Bacterial Genetics.** (3-0). **Credit 3. I, II** A problem oriented course surveying the manipulation and mechanisms of genetic systems in bacteria; recombination, structure and regulation of bacterial genes, plasmids and phages. Prerequisites: BIOL 351; GENE 302. Cross-listed with GENE 406.
413. **Cell Biology.** (3-0). **Credit 3. I, II, S** Structure, function, and biogenesis of cells and their components; interpretation of dynamic processes of cells, including protein trafficking, motility, signaling and proliferation. Prerequisite: BIOL 213 and BICH 410.
414. **Developmental Biology.** (3-0). **Credit 3. I** Concepts of development in systems ranging from bacteriophage to the mammalian embryo; use of recombinant DNA technology and embryo engineering to unravel the relationships between growth and differentiation, morphogenesis and commitment, aging and cancer. Prerequisite: BIOL 413 or concurrent enrollment or approval of instructor.
423. **Cell Biology Laboratory.** (0-3). **Credit 1. I, II** Modern methods of study of cell structure and cell function. Prerequisites: BIOL 413 and BICH 412 or registration therein; approval of instructor.

430. **Biological Imaging.** (3-3). **Credit 4. II** Still and video photography and photomicrography, computer-based digital image analysis and processing of biological images; theory and principles of light and electron microscopy including transmission and scanning electron microscopy; optical contrast methods for light microscopy including phase contrast, DIC, polarizing light and confocal laser scanning microscopy. Prerequisite: Junior classification or approval of instructor.
434. **Regulatory and Behavioral Neuroscience.** (3-0). **Credit 3. I** Bioelectricity, nerve cell functions, brain functions; physiologic basis of behavior. Prerequisites: BIOL 319; WFSC 416 or BIOL 388. Cross-listed with NRSC 434.
435. **Laboratory for Regulatory and Behavioral Neuroscience.** (0-3). **Credit 1. I** Laboratory study of topics covered in BIOL 434; principles of hormone action, bioelectricity, nerve cell function, brain function and physiological bases for behavior. Prerequisite: BIOL 434 or concurrent enrollment.
438. **Bacterial Physiology.** (2-6). **Credit 4. I** Metabolic pathways, regulatory mechanisms and fine structure of the procaryotic and eucaryotic cell. Laboratory includes use of radioactive isotopes in growth and respiratory studies and enzyme assays. Prerequisites: BIOL 351 and 406; BICH 410 and 431 strongly recommended.
439. **Growth of Biological Thought.** (3-0). **Credit 3.** Development of biological thought from the ancient Greeks to the present. Prerequisite: 8 hours of biological science or approval of instructor.
440. **Marine Biology.** (3-3). **Credit 4. I** Introduction to biology of common organisms inhabiting bays, beaches and near-shore oceanic waters with special reference to Gulf of Mexico biota; emphasis on classification, distribution, history, ecology, physiology, mutualism, predation, major community types and economic aspects of marine organisms. Prerequisite: BIOL 112 or approval of instructor.
445. **Biology of Viruses.** (3-0). **Credit 3. I** Introduction to the life cycles of structure, composition and viruses; their interaction with in host cells; the mechanisms of pathogenicity on cellular transformation; the responses of the host to viral infection and vaccine applications; followed by an indepth study of the life cycles of the major classes of viruses and discussion of emerging viruses. Prerequisite: BIOL 213 or 351 or approval of instructor.
450. **Introduction to Genomics.** (3-0). **Credit 3.** Introductory genomics course designed to provide a basic understanding of the science of genomics, the study of genome data; major emphasis placed on the logic behind genomic approaches and the capabilities and limitations of these approaches to investigate biological processes; discussion of genomics as another extension of the science of genetics. Prerequisite: Junior or senior classification in Biology, Genetics or Biochemistry. Cross-listed with BICH 450.
451. **Bioinformatics.** (3-0). **Credit 3.** Introduction to the entire field of bioinformatics; theoretical background of computational algorithms, with an emphasis on application of computational tools related to modern molecular biological research. Prerequisite: Junior or senior classification, or approval of instructor.
453. **Plant Anatomy.** (2-6). **Credit 4. I** Anatomy of vegetative and reproductive organs of plants; development of tissue types. Prerequisites: BIOL 101 or BIOL 111 and 112; junior classification.
454. **Immunology.** (3-0). **Credit 3. II** Introduction to basic immunological concepts and principles of serology. Prerequisite: BIOL 351 or equivalent or approval of instructor.
455. **Laboratory in Immunology.** (0-6). **Credit 2. II** Practical application of serological principles which include precipitation, agglutination and blood banking principles; techniques in tissue culture and hybridoma technology also included. Prerequisite: BIOL 454 or registration therein.
456. **Medical Microbiology.** (4-0). **Credit 4. I** Microbiology, epidemiology and pathology of human pathogens with an emphasis on bacterial agents. Prerequisite: BIOL 351 or approval of instructor.
460. **Microbial Biotechnology.** (3-0). **Credit 3. II** An interdisciplinary overview of biotechnology which presents the roles of microorganisms in diverse commercial applications; emphasis on the use of recombinant DNA methodology in this field. Prerequisites: BIOL 351.
466. **Principles of Evolution.** (3-0). **Credit 3. II** Evolutionary patterns, mechanisms and processes at the organismal, chromosomal and molecular levels; modes of adaptation and the behavior of genes in populations. Prerequisite: GENE 302 or approval of instructor.
481. **Seminar in Biology.** (1-0). **Credit 1. I, II, S** Recent advances. Restricted to senior undergraduate majors in biology, microbiology, botany or zoology.
484. **Internship.** **Credit 1 to 4.** Directed internship in a private firm or public agency to provide research experience appropriate to the student's degree program and career objectives. May be taken two times. Prerequisite: Approval of internship agency and advising office.

485. **Directed Studies. Credit 1 or more. I, II, S** Problems in various phases of plant, animal and bacteriological science. Prerequisites: Junior classification; approval of ranking professor in field chosen and Undergraduate Advising Office.
489. **Special Topics in... Credit 1 to 4. I, II** Selected topics in an identified area of biology. May be repeated once for credit.
491. **Research. Credit 1 to 4.** Active research of basic nature under the supervision of a Department of Biology faculty member. May be taken two times. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisite: Approval of departmental faculty member.

*Field trips may be required for which departmental fees may be assessed to cover costs.

Department of Biomedical Engineering

Professors G. L. Coté (Head), J. D. Humphrey, W. A. Hyman, J. E. Moore, Jr., K. R. Rajagopal, S. M. Wright, H. Wu; Associate Professors J. C. Criscione, C. S. Lessard, D. J. Maitland, M. J. McShane; Assistant Professors B. E. Applegate, E. M. Cosgriff-Hernandez, M. A. Grunlan, M. S. Hahn, A. Han, W. Hwang, A. Jayaraman, J. A. Jo, R. R. Kaunas, K. C. Maitland, M. P. McDougall, K. E. Meissner, C. M. Quick, A. T. Yeh; Associate Research Professor T. P. Hedmon

Biomedical Engineering (BMEN)

101. **Introduction to Biomedical Engineering. (1-0). Credit 1. I** Overview of biomedical engineering and the biomedical engineering industry, including specialties, degree requirements and scholastic programs in the Department of Biomedical Engineering. Prerequisite: Freshman or sophomore classification.
231. **Foundations of Biomechanics. (3-0). Credit 3. I** Introduction of biomechanics in formulating and solving problems in basic science, medical device development, and clinical intervention: emphasis on deriving differential equations in one spatial dimension for the five basic postulates of continuum biomechanics, identifying illustrative constitutive relations, and providing a unified approach to studying biosolid mechanics, biofluid mechanics, bioheat and mass transport, and biothermomechanics. Prerequisite: Admitted to major degree sequence in biomedical engineering.
240. **Biosolid Mechanics. (3-0). Credit 3. II** Introduction to the mechanics of deformable media in biomedical engineering, including medical devices, biomaterials, and soft and hard biological tissues: emphasis on biomechanics and mechanobiology and formulation of problems within the context of basic continuum biomechanics; problems include analytical solutions for stress-strain analysis of extension, distension, bending, buckling, and torsion of biosolids. Prerequisites: Admitted to major degree sequence in biomedical engineering; BMEN 231.
282. **Engineering Biology. (3-0). Credit 3.** Application of engineering principles to biological function at the molecular and cellular level. Prerequisites: Admitted to major degree sequence and CHEM 101 or 107. Cross-listed with CHEN 282.
285. **Directed Studies. Credit 1 to 4.** Permits students to undertake special projects in biomedical engineering at an earlier point in their studies than required for BMEN 485. Prerequisite: Approval of program chair.
289. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of biomedical engineering. May be repeated for credit. Prerequisite: Approval of instructor.
291. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in biomedical engineering. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
302. **Biomechanics. (3-0). Credit 3. II** Stress and strain in biological systems and medical devices; properties of biomedical engineering materials and design of related equipment. Prerequisites: VTPP 434; Corequisites: MATH 308; VTPP 435.
305. **Bioinstrumentation. (0-3). Credit 1. I** Introduction to biomedical instrumentation design; hands on acquisition of biomedical signals; design, building and testing of bioinstrumentation circuits including analog signal amplifiers and analog filter circuits. Prerequisites: Admitted to major degree sequence in biomedical engineering; ECEN 214, VTPP 434 and 435; junior or senior classification.

306. **Biomeasurements Lab. (0-3). Credit 1. II** Introduction into experimental methods useful in biomedical engineering; includes the role of empiricism in biomedical research and development; the differences between observation and experimentation; and how to acquire, reduce, interpret, and present data. Prerequisites: Admitted to major degree sequence in biomedical engineering; BMEN 240 and 341.
308. **Biomedical Electronics. (2-3). Credit 4. I** Introduction to basic circuit analysis; characteristics of linear and non-linear circuit elements, design of basic electronic circuits and principles in biomedical engineering and practice of bioelectronic measurements. Prerequisites: ECEN 214; VTPP 434 and 435.
309. **Signal Processors for Biomedical Measurements. (3-3). Credit 4. II** Design and application of analog and digital signal processors in biomedical engineering; characteristics of operational amplifiers and selected special purpose integrated circuits; design considerations for analog-to-digital and digital-to-analog circuitry. Prerequisites: BMEN 308; VTPP 434 and 435.
310. **Clinical Engineering. (3-0). Credit 3. II** Equipment control concepts and techniques and their application in hospitals and in the medical profession; device evaluation specifications; preventative maintenance and service; calibration, regulation and medical product liability. Prerequisite: Admitted to major degree sequence in biomedical engineering; BMEN 321.
321. **Biomedical Electronics. (3-0). Credit 3. I** Introduction to biomedical signals; basic circuit analysis for biomedical signals; design of bioamplifier circuits; characteristics of linear and nonlinear circuit elements; design of basic electronic circuits, principles and practice of bioelectronic measurements. Prerequisites: ECEN 214, VTPP 434 and 435; junior or senior classification.
322. **Biosignal Analysis. (3-0). Credit 3. II** Design and application of analog and digital signal analysis in biomedical engineering; characteristics of biomedical signals; design considerations for analog-to-digital and digital-to-analog circuitry; biosignal transformation methods; analog and digital filter design for biomedical signals. Prerequisites: BMEN 321, VTPP 434 and 435; junior or senior classification.
331. **Theoretical Analysis. (3-0). Credit 3. I** Equations and numerical analysis techniques important to the description of living systems and medical devices; solution alternatives and limitations. Prerequisite: MATH 308.
341. **Biofluid Mechanics. (3-0). Credit 3. I** Introduction into the mechanics of fluids in biomechanics, including blood, synovial fluid and physiological solutions, with an emphasis on the importance of mechanobiology and the formation of biological problems within the context of 1) kinematics, 2) the concept of stress, 3) linear momentum balance, 4) constitutive relations, and 5) boundary conditions. Prerequisites: BMEN 240; junior or senior classification.
342. **Biomaterials and Medical Devices. (3-0). Credit 3. II** Selection and use of materials in implantable and tissue contacting medical devices; mass transport in medical devices; regulation and testing of medical devices. Prerequisites: VTPP 435 and BMEN 341; junior or senior classification.
343. **Introduction to Biomaterials. (3-0). Credit 3. I** Properties of natural and man-made materials commonly encountered in biomedicine and biomedical engineering; an integrated approach in the presentation of material structures, characteristics and properties; the basics of material structures, including crystalline and chemical structure, and microstructure; and bulk properties and characteristics of the materials developed from the microscopic origins. Prerequisites: BMEN 240, MATH 308, PHYS 208 and junior or senior classification.
401. **Principles and Analysis of Biological Control Systems. (3-0). Credit 3. I** Techniques for generating quantitative mathematical models of physiological control systems and devices; the behavior of physiological control systems using both time and frequency domain methods. Prerequisites: BMEN 321; MATH 308; VTPP 434 and 435.
405. **Virtual Instrumentation Design for Medical Systems. (2-3). Credit 3.** Design of medical systems using graphics programming language of LabVIEW including the designing and programming of three virtual systems as follows: cardiac monitor, electromyogram system for biomechanics, and sleep stage analyses from electroencephalograms. Prerequisites: BMEN 321 and 322.
410. **Advanced Clinical Engineering. (2-3). Credit 3. I** Training in clinical engineering through hospital-based experience in medical systems technical knowledge, clinical engineering management, technology assessment, and hospital management. Prerequisite: BMEN 310.
420. **Medical Imaging. (3-0). Credit 3. I** The principles of the major imaging modalities including x-ray radiography, x-ray computed tomography (CT), ultrasonography and magnetic resonance imaging; including a brief discussion on other emerging imaging technologies such as nuclear imaging (PET and SPECT). Prerequisites: MATH 253; junior or senior classification.

421. **Biofluid Dynamics.** (3-0). **Credit 3. I** Biofluid dynamics; derivation of mass and momentum equations; analysis of fluid motion in biomedical engineering systems; dimensional analysis; application of turbulence and boundary layer analysis in biomedical engineering. Prerequisites: BMEN 240; MATH 308; VTPP 434 and 435.
422. **Biomaterials and Artificial Internal Organs.** (3-0). **Credit 3. I** Current practice of material selection and design of artificial internal organs including orthopedic, cardiovascular and other implant applications. Regulations, standards and testing. Prerequisites: BMEN 240; VTPP 434 and 435.
423. **Microscale Bio-Optic Applications.** (3-0). **Credit 3. I** Introduction to biomedical applications of lasers to manipulation, detection and visualization on (sub-) cellular length scales; emphasis on the governing principles on which applications are founded; includes applications from recent literature. Prerequisites: BMEN 306 and 322; junior or senior classification.
424. **Biomedical Sensing and Imaging at the Nanoscale.** (3-0). **Credit 3. II** Introduction to nanotechnology with an emphasis on biomedical techniques and medical applications; basic physics of contrast agents to the engineering of current sensing and imaging systems applied at the nanoscale. Prerequisite: Senior classification or approval of instructor.
430. **Medical Device Regulation.** (3-0). **Credit 3. I** Introduction to the regulations of the U.S. Food and Drug Administration pertaining to testing and marketing medical devices. Prerequisites: BMEN 310; junior or senior classification.
431. **Thermodynamics of Biomolecular Systems.** (3-0). **Credit 3. I** Introduces equilibrium and non-equilibrium statistical mechanics and applies them to understand various biomolecular systems; including ensemble theory, reaction kinetics, nonlinear dynamics and stochastic processes; applied examples such as enzyme-ligand binding kinetics, conformational dynamic of proteins and nucleic acids, population dynamics, and noise in biological signals. Prerequisites: BMEN 240, PHYS 208 and MATH 308.
432. **Molecular and Cellular Biomechanics.** (3-0). **Credit 3. II** Introduces biomolecules and their assemblies that play structural and dynamical roles in subcellular to cellular level mechanics; emphasis on quantitative/theoretical descriptions; discussions of the relevant experiment approaches to probe these nano to micro-scale phenomena; includes topics in self-assembly of cytoskeleton and biomembranes, molecular motors, cell motility, and mechanotransduction. Prerequisites: BMEN 240, MATH 304; junior or senior classification.
440. **Design of Medical Devices.** (3-0). **Credit 3. II** Overview of the multiple issues in designing a marketable medical device, including the design process from clinical problem definition through prototype and clinical testing to market readiness; includes FDA regulation, human factors and system safety considerations and medical product liability. Prerequisites: BMEN 342; senior classification in engineering.
441. **Analysis and Design Project I.** (0-9). **Credit 3. I, II, S** Individual or group biomedical engineering analysis and design project involving problem statement, alternative approaches for solution, specific system analysis and design. Prerequisites: BMEN 322 and 341.
442. **Analysis and Design Project II.** (0-9). **Credit 3. I, II, S** Continuation of BMEN 441. Prerequisite: BMEN 441 or 453.
450. **Case Studies.** (1-0). **Credit 1. II** Examines process through which clinically defined problems are addressed from the perspective of biomedical engineering through the use of case studies; includes issues of technology transfer and clinical evaluation. Prerequisites: BMEN 240, 305 and 342; junior or senior classification.
452. **Mass and Energy Transfer in Biosystems.** (3-0). **Credit 3. II** Transport phenomena associated with physiological systems and their interaction with medical devices; exchange processes in artificial life support systems and diagnostic equipment. Prerequisites: BMEN 341; MATH 308; VTPP 334 and 335.
453. **Analysis and Design Project I.** (2-0). **Credit 2. I, II, S** Group or team biomedical engineering analysis and design project involving problem statement, alternative approaches for solution, specific system analysis and design. Prerequisites: BMEN 321, 322 and 342; senior classification.
454. **Analysis and Design Project II.** (2-0). **Credit 2. I, II, S** Continuation of BMEN 453. Prerequisites: BMEN 321, 322, 342 and 453; senior classification.
460. **Vascular Mechanics.** (3-0). **Credit 3.** Application of continuum mechanics to the study of the heart arteries; emphasis on the measurement and quantification of material properties, and the calculation of vascular stresses; analysis of several cardiovascular devices to reinforce the need for careful analysis in the device design. Prerequisites: BMEN 240 and 421.

461. **Cardiac Mechanics.** (3-0). **Credit 3.** Application of continuum mechanics and computational solid mechanics to the study of the mammalian heart; utilization of continuum mechanics and finite element analysis in solving non-linear boundary value problems in biomechanics. Prerequisites: BMEN 240, 341, and 463; approval of instructor.
462. **Vascular Fluid Mechanics.** (3-0). **Credit 3.** Bio-fluid mechanics of the human circulatory system including examination of disease development and medical treatments. Prerequisites: BMEN 240 or equivalent; junior or senior classification.
463. **Soft Tissue Mechanics and Finite Element Methods.** (3-0). **Credit 3.** Application of continuum mechanics and finite element methods to the study of the mechanical behavior of soft tissues and associative applications in biomedicine. Prerequisites: BMEN 240 or equivalent; junior or senior classification.
468. **Biothermomechanics.** (3-0). **Credit 3.** Introduction to a continuum thermomechanics approach to quantifying soft tissue behavior in response to combined thermal and mechanical loads including thermoelasticity and thermal damage. Prerequisites: BMEN 240 and 341; junior or senior classification.
469. **Entrepreneurial Issues in Biomedical Engineering.** (3-0). **Credit 3.** I Description and analysis of issues associated with initiating business ventures to transfer biomedical technologies into the health care sector, including intellectual property protection, seed funding alternatives, and business strategies relevant to the biomedical engineering technology area; utilizing recent case studies of previous ventures. Prerequisite: Admitted to major degree sequence (upper-level) in biomedical engineering.
470. **Introduction of Biomedical Optics.** (3-0). **Credit 3.** Fundamentals of biomedical optics; basic engineering principles used in optical therapeutics, optical diagnostics and optical biosensing. Prerequisites: MATH 308; PHYS 208. Cross-listed with CHEN 470.
480. **Biomedical Engineering of Tissues.** (3-0). **Credit 3.** Introduction to aspects of tissue engineering with and emphasis placed on tissue level topics including tissue organization and biological processes, with insights from recent literature (state-of-the-art). Prerequisite: Admitted to major degree sequence (upper-level) in biomedical engineering.
482. **Polymeric Biomaterials.** (3-0). **Credit 3.** Preparation, properties, and biomedical applications of polymers including: polymerization; structure-property relationships; molecular weight and measurement; morphology; thermal transitions; network formation; mechanical behavior; polymeric surface modification; polymer biocompatibility and bioadhesion; polymers in medicine, dentistry, and surgery; polymers for drug delivery; polymeric hydrogels; and biodegradable polymers. Prerequisite: BMEN 342 or approval of instructor; junior or senior classification.
485. **Directed Studies.** **Credit 1 to 6.** I, II, S Permits students to undertake special projects in biomedical engineering. Prerequisite: Approval of program chair.
489. **Special Topics in...** **Credit 1 to 4.** I, II, S New or unique areas of biomedical engineering which are of interest to biomedical engineering and other undergraduate students.
491. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in biomedical engineering. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor.

College of Veterinary Medicine and Biomedical Sciences

Biomedical Science (BIMS)

101. **Introduction to Biomedical Science.** (1-0). **Credit 1.** I Areas and opportunities in the varied fields of applied biology, professional programs, and the allied health industry. Open to all majors interested in the life sciences as related to health and disease.
291. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in biomedical sciences. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
301. **Biomedical Sciences Study Abroad.** **Credit 1 to 12.** For students in approved programs abroad. May be repeated for credit. Maximum 6 hours free elective credit in the BIMS degree plan. Must be taken on a satisfactory/unsatisfactory basis.

320. **Biomedical Genetics.** (3-0). **Credit 3.** Fundamental genetic principles as applied to biomedical science; Mendelian inheritance, linkage and genetic mapping, mutagenesis and pedigree analysis; molecular basis of gene function and inherited disease; gene therapy and genetic counseling. Credit cannot be given for both GENE 301 and GENE 320. Prerequisites: Junior or senior classification; BIMS major with a minimum overall 2.5 TAMU GPA. Cross-listed with GENE 320.
392. **Cooperative Education in Biomedical Science.** **Credit 2. I, II, S** Educational work assignment by a student in the field of his or her career interest and course of study. Supervision of the student will be by the cooperating employer and the instructor. A technical report, approved by the instructor, on a related subject area will be assigned. May be repeated for credit. Prerequisites: Approval of the college coordinator of cooperative education; BIMS major with a minimum overall 2.5 TAMU GPA.
405. **Mammalian Genetics.** (3-0). **Credit 3.** Comparative mammalian genetic systems with emphasis on laboratory animals; organization and expression of mammalian genes; development and use of genetically defined animals in biomedical and genetic research. Prerequisites: GENE 301, BIMS 320 or GENE 320; junior or senior classification. Cross-listed with GENE 405.
421. **Advanced Human Genetics.** (3-0). **Credit 3.** A rigorous, analytical approach to genetic analysis of humans including diagnosis and management of genetic disease in humans; transmission of genes in human populations; human cytogenetics; the structure of human genes; human gene mapping; molecular analysis of genetic disease; genetics screening and counseling. Prerequisites: BIMS 320 or GENE 320; BICH 410 or 440; junior or senior classification. Cross-listed with GENE 421.
452. **Modifying Mammalian Genomes for Biomedical Research.** (3-0). **Credit 3.** Review advances in the production of transgenic animals, the manipulation of embryonic stem cells for transgenics and therapeutics, the modification of specific genes in mammalian species by homologous recombination and RNA interference; special emphasis on genetic manipulation of cells and animals for biomedical research, stem-cell and gene therapy. Prerequisite: BIMS 320, GENE 301 or 320. Cross-listed with GENE 452.
470. **Science and Technology Processes and Policies in Biomedical Research.** (3-0). **Credit 3.** For science and non-science majors who want to know more about science practices and policies, how and why research is done, ethics and responsibility in research, communication in science, and science and technology policy at various levels of government and industry. Prerequisites: Junior or senior classification; BIMS major with a minimum overall 2.5 TAMU GPA.
481. **Seminar in Biomedical Science.** (1-0). **Credit 1.** Recent advances in biomedical sciences. To be taken on a satisfactory/unsatisfactory basis. Prerequisites: Junior or senior classification in life sciences majors; BIMS major with a minimum overall 2.5 TAMU GPA.
484. **Biomedical Science Field Experience.** **Credit 2.** On-the-job training in the Biomedical Science industry; development of objectives and goals; evaluation by supervisor required. Prerequisite: Approval of department head; BIMS major with a minimum overall 2.5 TAMU GPA.
485. **Directed Studies.** **Credit 1 to 4.** Directed individual study of problems in the biomedical sciences with emphasis in the allied health professions, hospital administration, and the health-related industry approved by the instructor. Prerequisites: Junior or senior classification; approval of instructor; BIMS major with a minimum overall 2.5 TAMU GPA.
489. **Special Topics in...** **Credit 1 to 4. I, II** Selected topics in an identified area of biomedical science. May be repeated for credit. Prerequisite: Junior or senior classification; BIMS major with a minimum overall 2.5 TAMU GPA.
491. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in biomedical sciences. May be repeated 2 times for credit. Prerequisites: 3.0 TAMU GPA; BIMS 485; junior or senior classification and approval of instructor.
492. **Cooperative Education in Biomedical Science.** **Credit 2. I, II, S** Educational work assignment by a student in the field of his or her career interest and course of study. Supervision of the student will be by the cooperating employer and the instructor. A technical report, approved by the instructor, on a related subject area will be assigned. May be repeated for credit. Prerequisites: BIMS 392 and approval of the college coordinator of cooperative education; BIMS major with a minimum overall 2.5 TAMU GPA.

Botany

(faculty, see page 634)

(BOTN)

- 289. **Special Topics in...** Credit 1 to 4. Selected topics in an identified area of botany. May be repeated for credit. Prerequisite: Approval of instructor.
- 291. **Research.** Credit 1 to 4. Active research of basic nature under the supervision of a Department of Biology faculty member. Prerequisite: Freshman or sophomore classification and approval of instructor.
- 485. **Directed Studies.** Credit 1 or more. I, II, S Problems in various phases of plant, animal and bacteriological science. Prerequisites: Junior classification; approval of ranking professor in field chosen and Undergraduate Advising Office.
- 491. **Research.** Credit 1 to 4. Active research of basic nature under the supervision of a Department of Biology faculty member. Prerequisite: Junior or senior classification and approval of instructor.

Mays Business School

(BUSN)

- 100. **Careers in Business.** (1-0). Credit 1. Survey of careers open to business majors; development of decision making and goal setting skills for choosing a major field of study. Course must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Freshman or sophomore classification; business or general studies major.
- 101. **Freshman Business Seminar.** (2-0). Credit 2. Freshman orientation seminar to business; introduction to resources and opportunities in Mays Business School; emphasis on career opportunities and development of personal and professional competencies; includes ethics, development of skills in leadership, teamwork, critical thinking and problem solving. Prerequisites: Freshman admitted to Mays Business School; selection for program.
- 125. **Business Learning Community I.** (3-0). Credit 3. Focuses on the base competencies that relate to effectively managing people, tasks and organizations, and change and innovation; develops skills in personal and professional competencies, analytical and critical thinking skills, written and oral communication skills, interpersonal skills and problem-solving skills; research emphasis. Prerequisite: Selection for Mays Business School Honors Program.
- 126. **Business Learning Community II.** (3-0). Credit 3. Focuses on the competencies that relate to managing people and organizations, and to managing change and innovation; field trips with other learning communities to explore intellectual and cultural themes in various interdisciplinary fields; research and communication skills practice. Prerequisite: Selection for Mays Business School Honors Program.
- 201. **Sophomore Business Seminar.** (1-0). Credit 1. Sophomore seminar to encourage an appreciation for a diverse knowledge base for business majors; includes guest faculty from departments throughout the University, required readings, team meetings and discussion groups. Prerequisite: Sophomore standing in Mays Business School.
- 285. **Directed Studies.** Credit 1 to 4. Directed study of selected problem in business not covered in other courses. May be taken two times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
- 289. **Special Topics in...** Credit 1 to 4. Selected topics in an identified area of business and public service. May be repeated for credit. Prerequisite: Freshman or sophomore in business.
- 291. **Research.** Credit 1 to 4. Research conducted under the direction of faculty member in Mays Business School. May be repeated 1 time for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
- 300. **Career Planning in Business.** (1-0). Credit 1. Survey of professional options, methods, strategies and skills involved in business career planning; explores social, cultural, economic, family and personal dimensions of various career paths; addresses goal setting and decision making. Course must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Junior classification; business major.
- 392. **Cooperative Education in Business.** Credit 2. I, II, S Educational work assignment in the field in which the student is interested. Supervision will be by employer with technical report required at semester's end. Can be taken no more than three times for credit.

401. **Mays Business Fellows I. (3-0). Credit 3.** A seminar for the development of leadership and management skills. Prerequisite: Selection for Mays Business Fellows Program.
402. **Mays Business Fellows II. (3-0). Credit 3.** Continuation of BUAD 401. Prerequisite: Selection for Mays Business Fellows Program.
467. **Ethics in Business. (1-0). Credit 1.** Integration of ethical reasoning integrity, objectivity and other core values in the development of professionals engaged in business; analyze ethical lapses that have occurred in multiple business disciplines. Prerequisites: Admission to upper division in Mays Business School.
484. **Internship. Credit 1 to 3.** Professional internship or practical experience in a field in which the student is interested, under the direction of the business honors director or a business school faculty member. Prerequisite: Business honors major or approval of instructor.
485. **Directed Studies. Credit 1 to 6.** Directed study on selected problems in the area of business administration not covered in other courses. May be repeated for credit. Prerequisites: Admission to upper division in Mays Business School; approval of instructor.
489. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of business and public service. May be repeated for credit. Prerequisite: Junior or senior in business.
491. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in Mays Business School. May be repeated 1 times for credit. Prerequisites: Junior or senior classification and approval of instructor.

Artie McFerrin Department of Chemical Engineering

Professors P. B. Balbuena, M. A. Barrufet, D. B. Bukur, T. Cagin, M. M. El-Halwagi, C. J. Glover, K. R. Hall, J. C. Holste, M. T. Holtzapple, Y. Kuo, M. S. Mannan, Z. Nikolov, M. V. Pishko (Head), M. O. Scully, J. M. Seminario, T. K. Wood; **Associate Professors** D. F. Shantz, V. M. Ugaz; **Assistant Professors** Z. Cheng, J. C. Grunlan, J. Hahn, M. S. Hahn, A. Jayaraman, H. K. Jeong, C. Laird, J. A. Silas; **Senior Lecturers** J. T. Baldwin, J. L. Bradshaw, L. Yurttas

Chemical Engineering (CHEN)

204. **Elementary Chemical Engineering. (2-3). Credit 3. I, II** Solution of elementary problems by application of mass balances, energy balances and equilibrium relationships. Prerequisite: Admission to upper-level chemical engineering.
205. **Chemical Engineering Thermodynamics I. (3-0). Credit 3. I, II** First and second laws of thermodynamics; volumetric properties of pure fluids; heat effects; applications to flow processes, power cycles, refrigeration. Prerequisites: CHEN 204; MATH 251.
282. **Engineering Biology. (3-0). Credit 3.** Application of engineering principles to biological function at the molecular and cellular level. Prerequisite: Admitted to upper level Chemical Engineering. Cross-listed with BMEN 282.
285. **Directed Studies. Credit 1 to 4.** Directed study of special projects or studies in chemical engineering processes or operations, for lower division students. Credit not applicable to degree requirements in chemical engineering. Prerequisites: Freshman or sophomore classification; approval of department head.
289. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of chemical engineering for lower division students. May be repeated for credit. Credit not applicable to degree requirements in chemical engineering. Prerequisite: Approval of instructor.
304. **Chemical Engineering Fluid Operations. (3-0). Credit 3. I, II** Fundamentals of fluid mechanics with applications to design and analysis of process equipment. Prerequisites: CHEN 205; MATH 308.
313. **Chemical Engineering Materials. (3-0). Credit 3. I, II** Overview of materials science with particular emphasis on classes of materials relevant to chemical engineers. Prerequisite: MATH 251 or registration therein, CHEN 205 or registration therein.
320. **Numerical Analysis for Chemical Engineers. (3-0). Credit 3. I, II** Applications of numerical analysis techniques to mathematical models of processes common to chemical and associated industries; computational methods and software for analysis of chemical engineering processes. Prerequisites: CHEN 205, MATH 308 or approval of instructor.

323. **Chemical Engineering Heat Transfer Operations.** (3-0). Credit 3. I, II Continuation of CHEN 304. Heat transfer operations. Prerequisite: CHEN 304.
354. **Chemical Engineering Thermodynamics II.** (3-0). Credit 3. I, II Applications of thermodynamics to pure and mixed fluids; phase equilibria and chemical reaction equilibria. Prerequisites: CHEN 205; CHEN 320 or registration therein; MATH 308.
409. **Mathematical Models of Chemical Processes.** (3-0). Credit 3. Development of the mathematical models of chemical and physical processes common to the petroleum processing, chemical and associated industries. Prerequisite: CHEN 424.
414. **Chemical Engineering Laboratory I.** (0-3). Credit 1. I, II Laboratory work based on CHEN 304 and 323. Prerequisites: CHEN 304 and 323; ENGL 210 or 301.
424. **Chemical Engineering Mass Transfer Operations.** (3-0). Credit 3. I, II Introduction to mass transfer operations with applications to design and analysis of process equipment. Prerequisites: CHEN 323 and 354.
425. **Process Integration, Simulation and Economics.** (2-3). Credit 3. I, II Integration, simulation, and economic methods involved in the design of chemical processes and equipment. Prerequisite: Senior level in chemical engineering or approval of instructor.
426. **Chemical Engineering Plant Design.** (1-6). Credit 3. I, II Integration of material from other chemical engineering courses with applications to the design of plants and processes representative of the chemical and related process industries. Prerequisites: CHEN 424 and 425; graduating senior or approval of instructor.
430. **Risk Analysis in Safety Engineering.** (3-0). Credit 3. Concepts of risk and risk assessment, which uses all available information to provide a foundation for risk-informed and cost-effective engineering practices; examples and exercises are drawn from a variety of engineering areas. Prerequisite: Junior or senior classification. Cross-listed with SENG 430.
433. **Chemical Engineering Laboratory II.** (0-3). Credit 1. I, II Laboratory work based on CHEN 424, 461 and 464. Prerequisites: CHEN 414 and 424; CHEN 461 and 464 or registration therein.
440. **Introduction to Transport Phenomena.** (3-0). Credit 3. Unifying principles and analytical description of phenomena of momentum transport (viscous flow), energy transport (heat conduction and convection) and mass transport (diffusion) in continuous media; similarities and differences in these phenomena. Prerequisite: Senior classification or approval of instructor.
450. **Microfabrication and Microfluidics Technology.** (3-0). Credit 3. Micro Electro Mechanical Systems (MEMS) technology; study the fundamentals of fluidics, heat and mass transfer, surface chemistry, and electrochemical interactions. Prerequisite: Junior or senior classification.
451. **Introduction to Polymer Engineering.** (3-0). Credit 3. Fundamentals of polymer reaction kinetics, morphology, chemical and rheological properties with applications to polymer synthesis, production and processing operations. Prerequisite: Senior classification in chemical engineering or approval of instructor.
455. **Process Safety Engineering.** (3-0). Credit 3. I, II Applications of engineering principles to process safety and hazards analysis, mitigation, and prevention, with special emphasis on the chemical process industries; includes source modeling for leakage rates, dispersion, analysis, relief valve sizing, fire and explosion damage analysis, hazards identification, risk analysis, accident investigations. Prerequisite: Senior classification in any engineering major. Cross-listed with SENG 455.
458. **Fundamentals of Environmental Remediation Processes.** (3-0). Credit 3. Fundamental approach to various remediation technologies; topics in environmental thermodynamics and mass transfer; adsorption, desorption, ion exchange, air stripping extractions, chemical oxidation, biodegradation. Prerequisites: CHEN 354 and 424.
459. **Gas and Petroleum Processing.** (3-0). Credit 3. Design and operation of petroleum and gas processing facilities including hydrate suppression, dehydration, sweetening, sulfur recovery, LPG and liquid recovery, refining operations; analysis of the design and operations involving a large degree of process simulation. Prerequisites: CHEN 323.
460. **Quantitative Risk Analysis in Safety Engineering.** (3-0). Credit 3. Fundamental concepts, techniques, and applications of risk analysis and risk-informed decision making for engineering students; practical uses of probabilistic methods are demonstrated in exercises and case studies from diverse engineering areas. Prerequisite: Senior or graduate classification. Cross-listed with SENG 460.
461. **Process Dynamics and Control.** (3-0). Credit 3. I, II Analysis of process dynamics and methods for the design of automatic control systems for chemical process plants. Prerequisite: CHEN 320.

464. **Chemical Engineering Kinetics.** (3-0). **Credit 3. I, II** Introduction to kinetics of reactions and application of fundamental principles to design and operation of commercial reactors. Prerequisites: CHEN 320, 323, 354 or approval of instructor.
470. **Introduction of Biomedical Optics.** (3-0). **Credit 3.** Fundamentals of biomedical optics; basic engineering principles used in optical therapeutics, optical diagnostics and optical biosensing. Prerequisites: MATH 308; PHYS 208. Cross-listed with BMEN 470.
471. **Introduction to Biochemical Engineering.** (3-0). **Credit 3.** Fundamentals of microbial and enzyme processes; application of biochemical reaction kinetics, transport phenomena and chemical reactor design principles to design and analysis of enzyme reactors and fermentation systems. Prerequisite: Senior classification in engineering or approval of instructor. Cross-listed with BAEN 471.
474. **Unit Operations in Food Processing.** (2-2). **Credit 3.** Design of food process engineering systems; basic concepts of rheology and physical properties of foods; fundamentals of heat and mass transfer and process control. Prerequisites: CHEN 205 and 304, or ENGR 214. Cross-listed with BAEN 474.
475. **Microelectronics Process Engineering.** (3-0). **Credit 3.** State-of-the-art process engineering principles on microelectronics, especially for the fabrication of very large scale integrated circuits (VLSICs); fundamental unit processes, such as thin film deposition, thermal growth, lithography, etching and doping, material structures and properties, and basic device operation principles. Prerequisites: CHEN 354 and 464 or approval of instructor; CHEM 322.
481. **Seminar.** (0-2). **Credit 1. I, II** Preparation of oral and written reports on selected topics from recent technical publications. Prerequisites: Senior classification in chemical engineering, ENGL 210 or 301.
485. **Directed Studies.** **Credit 1 to 5. I, II, S** Work covers one or more problems in chemical engineering processes or operations. Prerequisite: Approval of department head.
489. **Special Topics in...** **Credit 1 to 4. I, II, S** Selected topics in an identified area of chemical engineering. May be repeated for credit. Prerequisite: Senior classification in chemical engineering or approval of instructor.

Department of Chemistry

Professors D. E. Bergbreiter, J. W. Bevan, J. F. Bluemel, K. Burgess, A. Clearfield, P. S. Cremer, D. J. Darensbourg, M. Y. Darensbourg, K. R. Dunbar, J. P. Fackler, Jr., P. F. Fitzpatrick, F. P. Gabbai, J. A. Gladysz, D. W. Goodman, M. B. Hall, K. E. Harding, D. R. Herschbach, T. R. Hughbanks, A. E. Johnson, J. Laane, P. A. Lindahl, R. R. Lucchese, R. D. Macfarlane, J. B. Natowitz, S. W. North, F. M. Rauschel, D. Romo, M. P. Rosynek, M. W. Rowe, D. H. Russell (Head), J. C. Sacchetti, E. A. Schweikert, M. O. Scully, E. E. Simanek, D. A. Singleton, M. P. Soriaga, G. Vigh, R. L. Watson, D. L. Yeager, S. J. Yennello, R. Zhang; **Associate Professors** J. D. Batteas, C. M. H. Watanabe; **Assistant Professors** D. P. Barondeau, B. Connell, Y. Q. Gao, C. B. Hilty, W. Liu, D. H. Son, J. Yang; **Senior Lecturers** E. Binamira-Soriaga, L. S. Brown, H. Gaede, G. Gopalakrishnan, M. Hyman, W. Keeney-Kennicutt, E. J. Mawk, M. S. Mohan, C. Mullen, C. A. Murillo, J. G. Pellois, J. D. Pennington, T. H. Tiner, V. M. Williamson; **Lecturers** R. A. Hildreth, K. Ponnampuram, G. W. Rabe, P. J. Santander, E. Stone, M. Tichy

Chemistry (CHEM)

100. **Horizons in Chemistry.** (1-0). **Credit 1. I** An introduction to chemistry and its relationship to and influence on society; emphasis on chemical demonstrations and the practical application of chemical phenomena. For chemistry majors. Prerequisite: Major in chemistry or approval of instructor.
101. **Fundamentals of Chemistry I.*** (3-0). **Credit 3. I, II, S** Introduction to modern theories of atomic structure and chemical bonding; chemical reactions; stoichiometry; states of matter; solutions; equilibrium; acids and bases; coordination chemistry. Prerequisite: Concurrent registration in CHEM 111 suggested.
102. **Fundamentals of Chemistry II.*** (3-0). **Credit 3. I, II, S** Theory and applications of oxidation-reduction systems; thermodynamics and kinetics; complex equilibria and solubility product; nuclear chemistry; descriptive inorganic and organic chemistry. Prerequisites: CHEM 101, 111 or their equivalent. Concurrent registration in CHEM 112 suggested.
103. **Structure and Bonding.** (3-0). **Credit 3. I** Rigorous treatment of chemical principles and their application. Prerequisite: For entering students with satisfactory scores on math and chemistry placement examinations.

104. **Chemistry of the Elements.** (3-0). **Credit 3. II** Continuation of CHEM 103. Prerequisite: CHEM 103.
106. **(CHEM 1305, 1405*) Molecular Science for Citizens.** (3-0). **Credit 3. I, II** Molecules that control daily life explored via a conceptual approach to molecular science; properties, synthesis, transformations and utility of important molecules and fuels, fibers, metals, pharmaceuticals, foods, biomolecules and structural materials; pollution, consumerism, energy production, disease, biotechnology and risk-benefit analysis considered.
107. **General Chemistry for Engineering Students.** (3-3). **Credit 4. I, II** Introduction to important concepts and principles of chemistry; emphasis on areas considered most relevant in an engineering context; practical applications of chemical principles in engineering and technology. Students completing CHEM 107 and changing majors to curricula requiring CHEM 101 and CHEM 102 may substitute CHEM 107 for CHEM 101. Students may not receive credit for both CHEM 107 and CHEM 101.
111. **Fundamentals of Chemistry Laboratory I.*** (0-3). **Credit 1. I, II, S** Introduction to methods and techniques of chemical experimentation; qualitative and semiquantitative procedures applied to investigative situations. Prerequisite: CHEM 101 or registration therein.
112. **Fundamentals of Chemistry Laboratory II.*** (0-3). **Credit 1. I, II, S** Introduction to analytical and synthetic methods and to quantitative techniques to both inorganic and organic compounds with emphasis on an investigative approach. Prerequisites: CHEM 101, 111; CHEM 102 or registration therein.
113. **Physical and Chemical Principles.** (0-3). **Credit 1. I** Elementary experiments in physical chemistry and quantitative analysis. Prerequisite: CHEM 103 or registration therein.
114. **Qualitative Analysis.** (0-3). **Credit 1. II** Qualitative analysis, elementary inorganic syntheses and quantitative aspects of chemical equilibrium. Prerequisites: CHEM 104 or registration therein; CHEM 113.
116. **(CHEM 1105, 1405*) Molecular Science for Citizens Laboratory.** (0-3). **Credit 1. I, II** The importance of molecular science to daily life illustrated by using experiments, demonstration and videos; designed to accompany CHEM 106. Prerequisite: CHEM 106 or registration therein.
222. **Elements of Organic and Biological Chemistry.** (3-0). **Credit 3. I, II, S** Organic chemistry and its applications to biological and agricultural chemistry, including chemistry of functional groups, acid-base and redox chemistry, stereochemistry and chemistry of important biological compounds. Not to be used as the basis for further study in organic chemistry or biochemistry. Prerequisite: CHEM 101 or 103.
227. **(CHEM 2323, 2423*) Organic Chemistry I.** (3-0). **Credit 3. I, II, S** Introduction to chemistry of compounds of carbon; general principles and their application to various industrial and biological processes. Prerequisite: CHEM 102 or 104. Concurrent registration in CHEM 237 is suggested.
228. **(CHEM 2325, 2425*) Organic Chemistry II.** (3-0). **Credit 3. I, II, S** Continuation of CHEM 227. Prerequisite: CHEM 227. Concurrent registration in CHEM 238 is suggested.
231. **Techniques of Organic Chemistry.** (1-3). **Credit 2. I** Techniques of organic chemistry; preparation, properties of typical organic compounds; separation, purification, analysis, and characterization of organic compounds. Prerequisites: CHEM 102 or 114; CHEM 227 or registration therein.
234. **Organic Synthesis and Analysis IV.** (1-6). **Credit 3. I, II** The synthesis of significant types of organic compounds and study of their properties; laboratory separations of mixtures of organic substances, identification of compounds by functional group tests and preparation of derivatives; instrumental methods of separation, identification and analysis. Prerequisites: CHEM 228 or registration therein; CHEM 237 or 231.
237. **(CHEM 2123, 2223, 2423*) Organic Chemistry Laboratory.** (0-3). **Credit 1. I, II, S** Operations and techniques of elementary organic chemistry laboratory; preparation, reactions and properties of representative organic compounds. Prerequisites: CHEM 102 or 114; CHEM 227 or registration therein.
238. **(CHEM 2125, 2225, 2425*) Organic Chemistry Laboratory.** (0-3). **Credit 1. I, II, S** Continuation of CHEM 237. Prerequisites: CHEM 228 or registration therein; CHEM 237.
242. **Elementary Organic Chemistry Laboratory.** (0-3). **Credit 1. II** Operations and techniques of elementary organic chemistry laboratory with emphasis on experiments for students of agriculture. Prerequisite: CHEM 222 or registration therein.
285. **Directed Studies.** **Credit 1 to 4.** Introduction to research, library and laboratory work designed for the freshman or sophomore student. Prerequisite: Approval of department head.

289. **Special Topics in...** Credit 1 to 4. Selected topics in an identified area of chemistry. May be repeated for credit. Prerequisite: Approval of instructor.
291. **Research.** Credit 1 to 4. Research conducted under the direction of faculty member in chemistry. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
315. **Quantitative Analysis.** (3-0). Credit 3. I, II Introduction to quantitative methods of analysis; solution chemistry; chemical equilibrium of analytically useful reactions and of processes important in advanced analytical methods including electrochemistry, separations and kinetic methods. Prerequisite: CHEM 102 or 104.
316. **Quantitative Analysis.** (2-0). Credit 2. I, II, S Introduction to methods of chemical analysis; chemical equilibrium. Prerequisite: CHEM 102 or 104.
317. **Quantitative Analysis.** (2-0). Credit 2. I, II Introduction to the fundamental principles and applications of modern instrumental techniques of quantitative analysis, with emphasis on spectroscopic and chromatographic methods. Prerequisite: CHEM 316.
318. **Quantitative Analysis Laboratory.** (0-3). Credit 1. I, II, S Laboratory work consists of selected experiments in quantitative analysis designed to typify operations of general application; work is primarily volumetric with limited gravimetric experiments. Prerequisites: CHEM 102 or 114; CHEM 315 or 316 or registration therein.
320. **Instrumental Analysis Laboratory.** (0-6). Credit 2. I, II Experimental studies using modern spectroscopic, chromatographic and electroanalytical methods. Prerequisites: CHEM 317 or registration therein; CHEM 318.
322. **Physical Chemistry for Engineers.** (3-0). Credit 3. I, II Quantum theory, spectroscopy, statistical mechanics, kinetic theory, reaction kinetics, electrochemistry and macromolecules. Prerequisites: CHEM 102 or 104; CHEN 205 and 354; MATH 152 or equivalent.
325. **Physical Chemistry Laboratory I.** (0-3). Credit 1. I, II, S Quantitative experiments involving physical chemistry principles in areas such as thermodynamics, electrochemistry, molecular structure and equilibria using modern instrumentation. Prerequisite: CHEM 327 or registration therein.
326. **Physical Chemistry Laboratory II.** (0-3). Credit 1. I, II, S Quantitative experiments involving physical chemistry principles in such areas as kinetics, properties of gases, phase equilibria and macromolecules using modern instrumentation. Prerequisite: CHEM 328 or registration therein.
327. **Physical Chemistry I.** (3-0). Credit 3. I, II, S Introduction to quantum mechanics, exactly solvable model problems; many electron systems and approximate methods; chemical bonding and the electronic structure of molecules; rotational, vibrational, and electronic spectroscopy; molecular symmetry. Prerequisite: MATH 172 or 152; MATH 221, 251 or 253 encouraged. Replaces CHEM 324 in previous catalogs.
328. **Physical Chemistry II.** (3-0). Credit 3. I, II, S A rigorous treatment of first, second, and third laws of thermodynamics; applications to gases (both ideal and real), liquids, solutions and phase equilibria; statistical thermodynamics; kinetic theory of gases; introduction to chemical kinetics. Prerequisite: CHEM 327. Replaces CHEM 323 in previous catalogs.
334. **Experimental Physical Chemistry II.** (0-6). Credit 2. I Experiments include solution thermodynamics, molecular spectroscopy and structure, electrochemistry and the physical properties of polymers. Prerequisites: CHEM 328 or registration therein; CHEM 325.
362. **Descriptive Inorganic Chemistry.** (3-0). Credit 3. II Introduction to inorganic chemistry with a focus in descriptive inorganic chemistry, bonding theories in inorganic molecules and in the solid state, redox chemistry, descriptive main group and transition metal chemistry; ligand field theory, molecular magnetism and electronic spectra in transition metal complexes. Prerequisites: CHEM 102, 104 or equivalent.
383. **Chemistry of Environmental Pollution.** (3-0). Credit 3. II Chemical pollutants in the air, in water and on land: their generation, chemical reactivity, action on environment and disappearance through chemical mechanisms; chemistry of existing pollution abatement. Prerequisites: CHEM 102 or 104; junior or senior classification.
415. **Analytical Chemistry.** (3-0). Credit 3. I Theory and practical aspects of modern instrumental methods of quantitative analysis; instrumental approaches to selectivity and sensitivity; examples of major, minor and trace component analysis. Prerequisite: CHEM 315.

433. **Advanced Inorganic Chemistry Laboratory. (0-6). Credit 2. I** Preparation, characterization and properties of bioinorganic, organometallic and macromolecular inorganic compounds; special techniques (glove box manipulations and double-manifold Schlenk lines) for handling air-sensitive materials. Prerequisite: CHEM 362 or registration therein.
434. **Analytical Instrumentation Laboratory. (0-6). Credit 2. II** Practical application of modern instrumental methods of quantitative analysis; atomic and molecular techniques to conduct chemical characterizations and analyses. Prerequisite: CHEM 415 or registration therein.
446. **Organic Chemistry III. (3-0). Credit 3. II** Principles and applications for students in chemistry, chemical engineering and biological and physical sciences; bonding, chemical reactivity, stereochemistry and synthesis. Prerequisites: CHEM 228 and 324 or concurrent enrollment in CHEM 324.
462. **Inorganic Chemistry. (3-0). Credit 3. II** Periodic relationship of elements, their compounds, principles of their bonding and applications. Prerequisites: CHEM 328, 362.
464. **Nuclear Chemistry. (3-0). Credit 3. I** Introduction to properties of the nucleus, particularly radioactivity, and the application of nuclear methods to solution of non-nuclear problems. Prerequisites: CHEM 315 and 324 or approval of instructor.
466. **Polymer Chemistry. (3-0). Credit 3. II** Mechanisms of polymerization reactions of monomers and molecular weight distributions of products; principles, limitations and advantages of most important methods of molecular weight determination; relationship of physical properties to structure and composition: correlations of applications with chemical constitution. Prerequisites: CHEM 228 and 315 or equivalents.
470. **Industrial Chemistry. (3-0). Credit 3. II** Applications of organic and inorganic chemical reactions in the manufacture of commercial products; chemistry of petroleum refining and petrochemical processing; industrial polymerization processes; commodity and fine chemical production; influence of kinetics and thermodynamics on economics of industrial chemical production; pollution abatement technology. Prerequisites: CHEM 228; junior or senior classification.
474. **Experimental Nuclear and Radiochemistry. (0-3). Credit 1. I** Experimental studies of nuclear radiations with modern nuclear detectors (such as semiconductor devices) and modern nuclear electronics; properties of nuclear reactions; atomic and molecular consequences of a nuclear process; application of radiochemical methods to thermodynamics, analytical chemistry, Mossbauer spectroscopy and statistical theory. Prerequisite: Enrollment in CHEM 464.
481. **Seminar. (1-0). Credit 1. I, II** Oral discussion of selected topics from technical publications.
485. **Directed Studies. Credit 1 or more. I, II, S** Introduction to research, library and laboratory work. Prerequisites: Senior classification and approval of chemistry advisor.
489. **Special Topics in... Credit 1 to 4. I, II, S** Selected topics in an identified area of chemistry. May be repeated for credit.
491. **Research. Credit 1 or more. I, II, S** Active research of basic nature under the supervision of Department of Chemistry faculty member. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Chemistry major; junior classification or approval of chemistry advisor.

* See Texas Common Course Numbering System (TCCNS) on page 982.

Chinese (CHIN)

Lecturers W. Shi, C. Zhao

101. **Beginning Chinese I. (3-2). Credit 4.** Introduction to Chinese language, culture and history; development of communicative skills in daily conversation; ability to read and write some commonly used Chinese characters.
102. **Beginning Chinese II. (3-2). Credit 4.** Further development of communicative skills in different aspects of daily Chinese conversation; ability to read and write about 150 commonly used characters. Prerequisite: CHIN 101 with a grade of C or better.
201. **Intermediate Chinese I. (3-0). Credit 3.** Development of comprehension and production of spoken Chinese, with emphasis on connected discourse; acquisition of advanced language points; ability to read and write 250 or more characters. Prerequisite: CHIN 102 with a grade of C or better.

202. **Intermediate Chinese II. (3-0). Credit 3.** Continued development of effective communication skills in different daily situations; ability to read and write simple, short paragraphs in Chinese. Prerequisite: CHIN 201 with a grade of C or better.
289. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of Chinese studies. May be repeated for credit. Prerequisite: Approval of instructor.
489. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of Chinese studies. May be repeated for credit. Prerequisite: Approval of instructor.

Zachry Department of Civil Engineering

Civil Engineering: Professors S. D. Anderson, R. L. Autenrieth, B. Batchelor, J. M. Bracci, J. L. Briaud, H.-C. Chen, B. L. Edge, R. W. Hann, M.-H. Kim, D. N. Little, Jr., L. L. Lowery, Jr., R. L. Lytton, J. B. Mander, D. A. Maxwell, R. S. Mercier, J. M. Niedzwecki, R. E. Randall, J. N. Reddy, K. F. Reinschmidt, J. M. Roessel, P. N. Roschke, D. V. Rosowsky (Head), R. E. Smith, N. Stubbs, T. K. Wood, R. A. Wurbs, J. Zhang, D. G. Zollinger; **Associate Professors** C. P. Aubeny, L. R. Barroso, W. L. Beason, G. Biscontin, M. W. Burris, A. T. Cahill, K.-A. Chang, A. Epps Martin, D. N. Ford, G. T. Fry, H. E. Hawkins, Jr., M. B. D. Hueste, R. W. James, H. L. Jones, P. B. Keating, P. J. Lynett, E. A. Masad, J. R. Morgan, F. Olivera, D. Trejo; **Assistant Professors** R. Abu Al-Rub, B. Boulanger, J. K. Brumbelow, K. Chu, I. Damjanovic, P. Gardoni, Z. Grasley, M. Hite, S. Hurlbausa, J. Irish, J. Kaihatu, D. Lord, L. Quadrifoglio, S. A. Socolofsky, J. A. Sweetman, J. Walewski, O. Ying, E. Zechman, Y. Zhang; **Senior Lecturers** R. F. Bruner, C. P. Cotton, T. L. Kohutek

Ocean Engineering: Professors H.-C. Chen, B. L. Edge, J. M. Falzarano, M.-H. Kim, R. S. Mercier, J. M. Niedzwecki, R. E. Randall, J. M. Roessel, J. Zhang (Program Head); **Associate Professor** K.-A. Chang, P. J. Lynett, ; **Assistant Professors** J. Irish, J. Kaihatu, S. A. Socolofsky

Civil Engineering (CVEN)

201. **(ENGR 1307) Plane Surveying. (2-3). Credit 3. I, II, S** Principles of surveying, basic measuring procedures, error analysis, leveling, traverse, mapping, horizontal curves, vertical curves and earthwork. Prerequisite: MATH 142.
207. **Introduction to the Civil Engineering Profession. (1-0). Credit 1. I, II** Introduction to the study and practice of civil engineering; specialized subdisciplines of civil engineering; professionalism and professional registration; engineering ethics; exercises in engineering technical communications. Prerequisite: ENGL 104.
221. **Engineering Mechanics: Statics. (2-2). Credit 3. I, II** General principles of mechanics; concurrent force systems; statics of particles; equivalent force/moment systems; centroids and center of gravity; equilibrium of rigid bodies; trusses, frames, and machines; internal forces in structural members; friction; second moments of areas. Prerequisites: MATH 251 or 253 or registration therein; PHYS 218.
289. **Special Topics in... Credit 1 to 4. I, II, S** Selected topics in an identified area of civil engineering. May be repeated for credit. Prerequisite: Approval of department head.
301. **Environmental Engineering. (3-0). Credit 3. I, II** Water quality; material balances; chemical, physical and biological processes; water quality modeling; water and wastewater treatment; air quality; solid and hazardous waste management. Prerequisites: CHEM 107; CVEN 302 or registration therein; MATH 308 or registration therein.
302. **Computer Applications in Engineering and Construction. (3-0). Credit 3. I, II, S** Application of computers to solution of civil engineering problems using various numerical methods; mathematical modeling and error analysis; solution of algebraic and differential equations; numerical differentiation and integration; curve-fitting. Prerequisites: ENGR 112; MATH 308 or registration therein.
303. **Civil Engineering Measurement. (2-3). Credit 3. I, II, S** Introduction to geodetic positions, datums, map projections; theory of civil engineering measurements and errors applied to horizontal and vertical control, curves, earthwork and mapping using state-of-the-art technology for data capture; processing and presentation of result. Prerequisite: MATH 151.

305. **Mechanics of Materials. (3-0). Credit 3. I, II, S** Applications of conservation principles and stress/deformation relationships for continuous media to structural members; axially loaded members; thin-walled pressure vessels; torsional and flexural members; shear; moment; deflection of members; combined loadings; stability of columns; nonsymmetrical bending, shear center; indeterminate members; elastic foundations. Prerequisite: CVEN 221.
306. **Materials Engineering for Civil Engineers. (2-2). Credit 3. I, II** Introduction to scientific concepts of civil engineering materials; relationship between macroscopic material properties and response and microscopic properties; physical, mechanical, surface, fracture, and rheological properties of civil engineering materials including metals, composites, and polymers. Prerequisites: CHEM 107, PHYS 208, CVEN 221; MATH 308 or registration therein; CVEN 305 or registration therein.
307. **Transportation Engineering. (3-0). Credit 3. I, II** Fundamental principles and methods in planning, design, and operation of transportation systems; driver and vehicle performance capabilities; highway geometric and pavement design principles; traffic analysis and transportation planning. Prerequisites: CVEN 302 or registration therein.
311. **Fluid Dynamics. (3-0). Credit 3. I, II, S** Fluid properties; statics; kinematics; basic conservation principles of continuity, energy and momentum; similitude and hydraulic models; incompressible flow in pipes; fluid dynamic drag. Prerequisites: MATH 251 and CVEN 221; CVEN 302 or registration therein.
322. **Civil Engineering Systems. (3-0). Credit 3. I, II S** Economic analysis and evaluation of engineering projects; application of systems analysis to civil engineering design; systems synthesis and optimization techniques; assignments apply engineering economics, statistical methods and optimization techniques to civil engineering problems. Prerequisite: STAT 211 or registration therein; CVEN 302 or registration therein.
333. **Project Management for Engineers. (3-0). Credit 3. I, II** Basic project management for engineering undergraduates; project development and economic justification; estimating; scheduling; network methods; critical path analysis; earned value management; recycling and rework; project organizational structures; project risk assessment; resource allocation; ethics; characteristics of project managers. Prerequisite: Junior or senior classification in Dwight Look College of Engineering. Cross-listed with ISEN 333 and MEEN 333.
336. **Fluid Dynamics Laboratory. (0-2). Credit 1. I, II** Introduction to laboratory techniques, calibration principles, reports and fluid measurements; determination of fluid properties; visualization of types of flow; experiments in closed conduit flow of air, water and oil; fluid drag and turbomachinery tests; open channel and gravity wave demonstrations. Prerequisite: CVEN 311 or registration therein.
339. **Water Resources Engineering. (3-0). Credit 3. I, II** Quantitative hydrology, precipitation, hydrograph analysis, reservoir and stream routing; groundwater, Darcy equation, well equation, well design; probability concepts in design; water law; dams; reservoirs; spillways; open channel and pipe network hydraulics; pumps; urban stormwater drainage; flood damage mitigation. Prerequisite: CVEN 311.
342. **Materials of Construction. (2-3). Credit 3. I, II** Physical and mechanical properties of construction materials; portland cement concrete, bituminous materials, wood, ferrous and non-ferrous metals, glass, plastics and masonry units; proportioning of concrete mixtures including admixtures. Prerequisites: CVEN 302 or registration therein; CVEN 305 and 306; ENGL 203, 210, 241 or 301.
343. **Portland Cement Concrete Materials for Civil Engineers. (2-3). Credit 3. I, II** Physical and chemical characteristics of Portland cement concrete systems; constituent materials; mixture proportioning; fresh concrete characteristics; hardened concrete properties; durability characteristics; and concrete construction methods. Prerequisites: CVEN 302 or registration therein; CVEN 305 and 306; ENGL 203, 210, 241 or 301.
345. **Theory of Structures. (3-0). Credit 3. I, II, S** Structural engineering—functions of structure, design loads, reactions and force systems; analysis of statically determinate structures including beams, trusses and arches; energy methods of determining deflections of structures; influence lines and criteria for moving loads; analysis of statically indeterminate structures including continuous beams and frames. Prerequisites: CVEN 302 or registration therein; CVEN 305.
349. **Civil Engineering Project Management. (3-0). Credit 3. I, II** Basic elements of management of civil engineering projects; roles of all participants in the process—owners, designers, contractors and suppliers; emphasis on contractual aspect of the process—project estimating, planning and controls. Prerequisite: CVEN 302 or registration therein; CVEN 322 or 422.

363. **Engineering Mechanics: Dynamics.** (2-2). **Credit 3. I, II** Application of first principles to model dynamic particles and rigid body systems with ordinary differential equations; solutions to models using analytical and numerical approaches; interpreting solutions/performance measures; linear vibrations; modeling of civil engineering systems and evaluating dynamic response to natural hazards. Prerequisites: CVEN 302, 305 and MATH 308.
365. **Introduction to Geotechnical Engineering.** (2-3). **Credit 3. I, II, S** Physical properties of soils, classification systems, soil exploration, permeability, consolidation, compaction and shear strength; laboratory tests conducted to determine the physical and engineering soil properties needed for application in geotechnical engineering design. Prerequisites: CVEN 302 or registration therein; CVEN 305; ENGL 203, 210, 241 or 301.
400. **Design Problems in Civil Engineering.** (2-3). **Credit 3. I, II, S** Applications of civil engineering principles to the design and preparation of the plans and specifications of civil engineering projects. Prerequisites: CVEN 303 and 345; CVEN 322 or 422; senior classification; or approval of instructor.
402. **Engineered Environmental Systems.** (3-0). **Credit 3. I** Unit operations and processes in environmental engineering; physical, chemical and biological treatment of water and wastewater; treatment system analysis and design. Prerequisite: CVEN 301.
403. **Applied Civil Engineering Surveying.** (0-6). **Credit 2.** Application of land surveying principles; topographic surveying, boundary surveying, and construction staking through field exercises using state-of-the-art equipment and data capture/analysis techniques; preparation of topographic and boundary maps with related documents; presentation of results. Prerequisites: CVEN 303; junior or senior classification.
405. **Construction Management of Field Operations.** (3-0). **Credit 3. I** Effects of industrialization on construction methods and resultant construction management problems. Prerequisite: CVEN 349.
406. **Environmental Protection and Public Health.** (3-0). **Credit 3. II** Communicable and noncommunicable diseases; environmental risk assessment; environmental assessments; comprehensive environmental planning; small water and wastewater systems; solid waste management; hazardous spills and waste management; vector control; environmental administration. Prerequisite: CVEN 301 or approval of instructor.
413. **Natural Environmental Systems.** (3-0). **Credit 3.** Water quality assessment of natural environmental systems; development and calibration of models to describe fate and transport of contaminants in aquatic systems; application of models to design of water quality control facilities. Prerequisite: CVEN 301.
417. **Bituminous Materials** (2-3). **Credit 3. I** Origin, production, specifications and tests of bituminous materials and paving mixtures used in construction and maintenance of roads and pavements, pavement surface properties, pavement distress and correction alternatives. Prerequisites: Senior classification in engineering; CVEN 342 or 343 or approval of instructor.
418. **Highway Materials and Pavement Design.** (3-0). **Credit 3. II** Theory and practice in pavement design; pavement performance; structural design of pavement layers; types of materials used in pavement layers; characterization of pavement layer materials; introduction to pavement management concepts. Prerequisites: CVEN 307; CVEN 342 or 343.
421. **Civil Engineering Systems I.** (3-0). **Credit 3.** Probabilistic considerations in civil engineering systems design; models and modeling; systems engineering language and communication; probability concepts; probabilistic models of civil engineering systems; decision-making under uncertainty. Prerequisite: CVEN 302 or registration therein.
423. **Geomatics for Civil Engineering.** (2-3). **Credit 3.** Use of GIS, GPS, Survey and Remotely-sensed data integrated with predictive models for infrastructure management systems. Prerequisite: CVEN 303 or approval of instructor.
424. **Civil Engineering Professional Practice.** (1-2). **Credit 2.** Professional practice issues; current civil engineering issues that impact design, construction, and operation of the civil engineer facilities; developing engineering solutions that better serve society; business and public policy concerns; life-long learning; problem solving; professional licensure. Prerequisites: CVEN 322; senior classification in civil engineering or ocean engineering.
435. **Geotechnical Engineering Design.** (2-3). **Credit 3. I** A design course covering prediction of settlement, analysis of the stability of slopes, prediction of bearing capacity of shallow and deep foundations and determination of earth pressures acting on retaining structures; a general course in geotechnical engineering design for undergraduates and for graduate students not primarily interested in the geotechnical field, but desiring additional study beyond the introductory undergraduate level. Prerequisite: CVEN 365.

436. **Case Histories in Geotechnical Engineering.** (2-2). **Credit 3.** Examination of geotechnical problems through the use of case studies associated with foundations, waste disposal, slope stability, retaining structures, soil improvement and other civil engineering works. Prerequisite: CVEN 365.
444. **Structural Concrete Design.** (3-0). **Credit 3. I, II** Behavior, design, and detailing of reinforced concrete structural members according to the ACI Building Code Requirements. Design for ultimate limit states (flexible, shear, and axial loads) and serviceability requirements (cracking and deflection) Applications include continuous beams and moment frames. Prerequisites: CVEN 345; CVEN 342 or 343 or registration therein.
445. **Matrix Methods of Structural Analysis.** (3-0). **Credit 3. I, II** Analysis of framed structures using linear algebra concepts; matrix algebra and solution of linear algebraic equations; energy principles and virtual work; stiffness; coordinate transformations; use of commercial software for structural analysis. Prerequisite: CVEN 345 and 363.
446. **Structural Steel Design.** (3-0). **Credit 3. I, II** Design of structural steel elements found in building structures, including tension members, compression members, beams, beam-columns and base plates; design of bolted and welded simple connections; design of bolted eccentric connections; design of bolted and welded partially and fully restrained connections. Prerequisite: CVEN 345.
451. **Public Works Engineering.** (3-0). **Credit 3. II** Public works engineering; service demand estimates; water, wastewater and solid waste collection systems; urban drainage; code enforcement and public decision making. Prerequisites: CVEN 301 and 339.
454. **Urban Planning for Engineers.** (2-3). **Credit 3. II** Urban planning from an engineering point of view; determinants of land use patterns, planning data collection and analysis; location and design requirements for various land uses; interrelationship of transportation and land use; and methods of plan development. Prerequisite: CVEN 307.
455. **Urban Stormwater Management.** (3-0). **Credit 3.** Hydrologic, hydraulic, and general civil engineering design and implementation of stormwater systems including drainage and detention storage facilities, flood-plain regulation measures, and flood control structures; stormwater aspects of land development and public works engineering; flood hydrology and hydraulics; institutional aspects of urban stormwater management. Prerequisite: CVEN 339 or approval of instructor.
456. **Highway Design.** (2-3). **Credit 3. I** Theory and practice in highway design; highway classification and design criteria, location studies, design of vertical and horizontal alignment, cross section, pavement, intersections and highway drainage elements. Prerequisite: CVEN 307.
457. **Urban Traffic Facilities.** (3-0). **Credit 3. I** Driver, vehicle and roadway characteristics related to design and operation of traffic facilities; selection and design of traffic control devices and information systems for streets and highways; accident analysis and tort liability related to traffic engineering. Prerequisite: CVEN 307.
458. **Hydraulic Engineering of Water Distribution Systems.** (3-0). **Credit 3.** Pressure conduit hydraulics; design, modeling, and analysis of water conveyance and distribution systems including pipelines, pipe networks, and pumps. CVEN 339 or approval of instructor.
463. **Engineering Hydrology.** (3-0). **Credit 3.** Occurrence, distribution and properties of natural waters of the earth; measurement and engineering analysis of hydrologic phenomena including precipitation, streamflow and groundwater, hydrologic design of water resources development and management projects. Prerequisite: CVEN 339.
473. **Engineering Project Estimating and Planning.** (2-3). **Credit 3. I, II** Application of cost estimating and planning techniques for civil engineering projects; introduction to labor, materials and equipment costing; productivity analysis; indirect and general overhead costs; preparation of approximate and definitive estimates; and integration of time/cost relationships through critical path method and resource leveling. Prerequisites: CVEN 349; senior classification.
483. **Analysis and Design of Structures.** (2-3). **Credit 3. I, II** Overall procedure of analysis and design including functions, loads, layouts of force systems; analysis, specifications, cost comparisons and maintenance as applied to typical building structures. Prerequisites: CVEN 365 or registration therein; CVEN 444 and 446.
485. **Directed Studies.** **Credit 1 to 3 each semester. I, II, S** Research and design problems of limited scope approved on an individual basis intended to promote independent study; results of study presented in writing. Prerequisite: Approval of department head.

489. **Special Topics in...** Credit 1 to 4. **I, II, S** Selected topics in an identified area of civil engineering. May be repeated for credit. Prerequisite: Approval of department head.
491. **Research.** Credit 1 to 4. Research conducted under the direction of faculty members in civil engineering. May be repeated 2 times for credit. Prerequisite: Junior or senior classification and approval of instructor.

(See page 767 for the civil engineering course in applied mechanics.)

Classics

(faculty, see page 698)

(CLAS)

101. **(GREE 1411) Beginning Classical Greek I.** (4-0). Credit 4. Introduction to the language and culture of Greece; basic grammar and vocabulary; readings and slide lectures designed to place language study in its cultural and artistic context.
102. **(GREE 1412) Beginning Classical Greek II.** (4-0). Credit 4. Continuation of CLAS 101; basic grammar and vocabulary; readings and slide lectures designed to place language study in its cultural and artistic context. Prerequisite: CLAS 101.
121. **(LATI 1411) Beginning Latin I.** (4-0). Credit 4. **I, II** Introduction to grammar and vocabulary with a contrastive approach; reading of graded material.
122. **(LATI 1412) Beginning Latin II.** (4-0). Credit 4. **I, II** Completion of elementary grammatical structures; introduction to Latin historians. Prerequisite: CLAS 121.
211. **Intermediate Greek.** (3-0). Credit 3. Completion of study of grammar and syntax; introduction to reading ancient Greek authors in the original language. Prerequisite: CLAS 102.
215. **Etymological Principles for the Health Sciences.** (3-0). Credit 3. Systematic introduction to the vocabulary of the health sciences and to the linguistic principles of word study. Prerequisite: ENGL 104 or approval of instructor.
221. **(LATI 2311) Intermediate Latin I.** (3-0). Credit 3. **I, II** Practice in reading Latin prose writings, especially historical writings and letters. Prerequisite: CLAS 122.
222. **Intermediate Latin II.** (3-0). Credit 3. **I, II** Practice in reading Latin poetry writings, especially Vergil, Horace and Ovid. Prerequisite: CLAS 221.
285. **Directed Studies.** Credit 1 to 4. Individual supervision of readings or assigned projects in Classical Languages, selected for each student individually. Prerequisite: Approval of instructor and department head.
289. **Special Topics in...** Credit 1 to 4. Selected topics in an identified area of Classical Languages. May be repeated for credit. Prerequisite: Approval of instructor.
311. **Advanced Greek: New Testament.** (3-0). Credit 3. Readings of the New Testament and works contemporary with it in the original language; introduction to the linguistic, historical, literary and cultural background of the New Testament. May be repeated for credit with different readings. Prerequisites: CLAS 211.
312. **Advanced Classical Greek.** (3-0). Credit 3. Readings of selections from ancient Greek authors in the original language; discussion of the intellectual, historical and literary background of the works, and of the lives and thoughts of the writers. May be repeated for credit with different readings. Prerequisites: CLAS 211.
321. **Advanced Latin Prose.** (3-0). Credit 3. Readings of selections from ancient Roman authors of prose (history, oratory, letters, philosophy) in the original language; discussion of the intellectual, historical and literary background of the works, and of the lives and thought of the writers. May be repeated for credit with different readings. Prerequisite: CLAS 222 or equivalent.
322. **Advanced Latin Poetry.** (3-0). Credit 3. Readings of selections from ancient Roman authors of poetry (lyric, satire, epic, or drama) in the original language; discussion of the intellectual, historical, and literary background of the works, and the lives and thought of the writers. May be repeated for credit with different readings. Prerequisite: CLAS 222 or equivalent.

330. **Women in Ancient Greece and Rome. (3-0). Credit 3.** Survey of women in classical Greece and Rome; emphases on female occupations and family relationships, legal and political status, traditional values, notorious women, how women were viewed and how they viewed themselves. Prerequisite: Junior or senior classification. Cross-listed with HIST 330 and WMST 330.
351. **Classical Mythology. (3-0). Credit 3.** Introduction to the most important myths of the Greeks and Romans; ancient and modern methods of interpreting myths; the role of myths in ancient literature; readings in English. Cross-listed with RELS 351.
352. **Greek and Roman Drama. (3-0). Credit 3.** Dramatic literature of Ancient Greece and Rome; works of the major classical playwrights; the origins of comedy and tragedy; visual and musical aspects of production; political and intellectual ideas as reflected in the plays; readings in English.
353. **Archaeology of Ancient Greece. (3-0). Credit 3.** Archaeology of ancient Greece from the Stone Age until the ascent of Rome in the Hellenistic Period; remains of ancient Greek art (sculpture, mosaic, painting), architecture (temples, homes, civic structures), religion (figurines, votive offerings), and social history (coins, inscriptions). Prerequisite: Junior or senior classification. Cross-listed with ANTH 353.
354. **Archaeology of Ancient Italy. (3-0). Credit 3.** Archaeology of ancient Italy from the Stone Age until the collapse of the Roman Empire in the fourth century; remains of ancient Etruscan and Roman art (sculpture, mosaic, painting), architecture (temples, homes, civic structures), religion (figurines, votive offerings), and social history (coins, inscriptions). Prerequisite: Junior or senior classification. Cross-listed with ANTH 354.
361. **Greek Literature in Translation. (3-0). Credit 3.** Literature of ancient Greece in its cultural context; Greek life and thought as revealed by its writers; development of the various genres of prose and poetry; readings in English.
371. **In Search of Homer and the Trojan War. (3-0). Credit 3.** The nature, background, authorship and historicity of the Iliad and the Odyssey; Aegean culture in the Stone, Bronze and early Iron ages; the value of Greek epics as historical documents; oral poetry; the Trojan War in Greek literature; readings in English.
372. **Greek and Roman Epic. (3-0). Credit 3.** Study of the ancient epic in its historical and cultural context; oral poetry; Homer, archaeology, and history; creation of Greek mythology; Alexandrian written epic; early Latin epic; Vergil's Aeneid as national epic; Vergil and the Homeric tradition; Silver Age Latin epics; readings in English. Prerequisite: Sophomore classification or approval of instructor.
381. **Ancient Athletics. (3-0). Credit 3.** Study of Greek and Roman athletics in their cultural and historical contexts through the examination of ancient literary, archaeological, and artistic sources; readings in English.
426. **The Ancient Greeks. (3-0). Credit 3.** Greek History and civilization from the Archaic Age to Alexander the Great (8th–late 4th century B.C.). Prerequisite: 3 hours in history, or junior or senior classification, or approval of instructor. Cross-listed with HIST 426.
428. **The Roman Republic. (3-0). Credit 3.** Roman History and civilization from the beginnings (7th century B.C.) to the late 1st century B.C. Prerequisite: 3 hours in history, or junior or senior classification, or approval of instructor. Cross-listed with HIST 428.
429. **The Roman Empire. (3-0). Credit 3.** Roman History and civilization of the Imperial Period (1st century B.C.–6th century A.D.). Prerequisite: 3 hours in history, or junior or senior classification, or approval of instructor. Cross-listed with HIST 429.
485. **Directed Studies. Credit 1 to 4.** Individual supervision of readings or assigned projects, selected for each student individually. Prerequisite: Approval of instructor and department head.
489. **Special Topics in... Credit 1 to 4.** Selected topics in an intensified area of classical languages and culture. May be repeated for credit. Prerequisite: Approval of instructor.
491. **Research. Credit 1 to 3.** Research conducted under the direction of faculty member in classical studies. Prerequisites: 23 hours of Classics with at least 9 at 300-level or above; approval of department head.

Department of Communication

Professors J. A. Aune, C. R. Conrad, K. I. Miller, K. W. Ritter, E. W. Rothenbuhler, B. F. Sharf, R. L. Street (Head); **Associate Professors** L. G. Dorsey, A. C. La Pastina, M. T. Stephenson, R. S. Sumpter, I. G. Weber; **Assistant Professors** P. Burkart, H. A. Campbell, T. N. Dubriwny, J. O. Iverson, J. R. Mercieca, S. Ramasubramanian, C. N. Swift; **Senior Lecturer** N. J. Street

Communication (COMM)

101. (SPCH 1311) **Introduction to Communication.** (3-0). **Credit 3.** I Survey of communication topics, research, and contexts of communicative practice; overview of communication from both humanities and social science perspectives.
203. (SPCH 1315) **Public Speaking.** (3-0). **Credit 3.** I, II, S Training in speeches of social and technical interest designed to teach students to develop and illustrate ideas and information and to inform, stimulate, and persuade their audiences.
205. **Communication for Technical Professions.** (3-0). **Credit 3.** Design and presentation of oral reports for technical professions; incorporation of visual and graphic materials into presentation required; written reports required. Prerequisite: ENGL 104.
210. **Group Communication and Discussion.** (3-0). **Credit 3.** I, II Definition, structure, and functions of groups; group productivity, codes in verbal and nonverbal communication; problem-solving, role-playing, decision-making; leadership and organization; interview principles and techniques.
215. **Interviewing: Principles and Practice.** (3-0). **Credit 3.** II Theory and practice of methods in selected interview settings; emphasis on communication between two persons, questioning techniques, and the logical and psychological bases of interpersonal persuasion.
230. **Communication Technology Skills.** (3-0). **Credit 3.** Introduction to new technologies, including the Internet, teleconferencing and videoconferencing; addresses communication in web page design, teleconferences and videoconferences, and emerging communication technologies. Prerequisite: Speech communication or telecommunication media studies majors.
240. **Rhetorical Criticism.** (3-0). **Credit 3.** Principles and practice of the analysis of speeches and other forms of public discourse; compares systems of rhetorical criticism, such as neo-classical analysis, mythic analysis, rhetorical genres and close textual analysis.
243. (SPCH 2335) **Argumentation and Debate.** (3-0). **Credit 3.** I, II Principles of argumentation and skills of debate, including reasoning, evidence, refutation, and briefing.
289. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of communication. May be repeated for credit. Prerequisite: Approval of instructor.
290. (SPCH 1144, 1145, 2144, 2145) **Speech Practicum.** (0-4). **Credit 1.** Participation in departmental speaking activities, such as parliamentary debates and student speakers' bureau, under the supervision of the speech communication faculty. May be taken three times.
291. **Research.** **Credit 1 to 3.** Research conducted under the direction of faculty member in the department of communication. May be repeated 3 times for credit. Prerequisites: GPA 2.5 or higher; freshman or sophomore classification and approval of instructor and department head.
301. **Rhetoric in Western Thought.** (3-0). **Credit 3.** I, II Historical and critical evaluation of rhetorical theory from the classical era to the contemporary period—from Aristotle to Kenneth Burke. Major theories of communication and persuasion developed in Europe and America.
305. **Theories of Communication.** (3-0). **Credit 3.** I, II Theoretical approaches to human communication, including selected theories of language behavior, interpersonal and small group interaction, and persuasion. Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.
307. **Mass Communication, Law, and Society.** (3-0). **Credit 3.** Mass media as social institutions; social responsibility and ethics of the press; history, constitutional development, and law of the First Amendment. Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor. Cross-listed with JOUR 301.

308. **Research Methods in Communication.** (3-0). **Credit 3.** Survey of methods used in communication research including quantitative, interpretive and rhetorical methods; formulating research questions, determining the appropriate method, planning and designing the research, data collection, and data analysis and interpretation. Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.
315. **Interpersonal Communication.** (3-0). **Credit 3. II** Speech interaction in person-to-person settings; concepts of perception, attraction, self-disclosure, listening, and conflict management through communication; speech interaction patterns and stages in the development of interpersonal communication.
320. **Organizational Communication.** (3-0). **Credit 3. I** Speech communication behavior and networks within organizations; recent research on speech communication systems, communication climate, and communication barriers in organizational settings.
325. **Persuasion.** (3-0). **Credit 3. I** Theory of effective persuasive communication in interpersonal, small group, and public settings; audience analysis, ethics of persuasion, motivational factors, psychological and rhetorical principles, source credibility, and theories of attitude change.
327. **American Oratory.** (3-0). **Credit 3. I, II** Survey of significant American oratory; critical analysis of important speeches in their historical, political, social, and philosophical contexts.
330. **Technology and Human Communication.** (3-0). **Credit 3.** Nontechnical survey of how modern technologies influence human communication including an introduction to communication technologies; the influence of technology on interpersonal communication, group decision-making and public communication; an analysis of argumentation and persuasion in technological issues.
335. **Intercultural Communication.** (3-0). **Credit 3.** Communication variables in intercultural contexts including culture and meaning, nonverbal styles across cultures, patterns of symbolic transfer, culture shock and communication, values in intercultural dialogue. Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.
340. **Communication and Popular Culture.** (3-0). **Credit 3.** Survey of theories and concepts of popular culture; dynamic relationships between pop culture and television, film, sports, politics and leisure. Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.
345. **Media Industries.** (3-0). **Credit 3.** Survey of the business organization, economic structures and processes, and regulations of the media industry. Prerequisites: Any lower-division communication course, or junior classification, or approval of instructor.
350. **Theories of Mediated Communication.** (3-0). **Credit 3.** Survey of different theories of mediated communication processes and effects; functions of theories in social scientific research on media and mediated processes. Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.
354. **Political Economy of Telecommunication.** (3-0). **Credit 3.** Survey of the political economy of the telecommunication industries both at the national and global level, including regulations and policies, global infrastructure and types of networks. Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.
360. **Cultural History of the Media.** (3-0). **Credit 3.** Origins and development of the mass media; their influence on social, political, and cultural change; history of mass communication from historical, sociological, and cultural perspectives. Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.
365. **International Communication.** (3-0). **Credit 3.** Mass media, international, and cross-cultural audiences; theoretical, pragmatic, political and ethical issues; including cultural differences, comparative media systems, development communication, patterns of world news flow, political propaganda, impact of international advertising and other issues. Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.
370. **Health Communication.** (3-0). **Credit 3.** Survey of theory and research in health communication, including interaction between patients and providers, communication in health care organizations, health care campaigns, and cultural meanings of health and illness. Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.
375. **Media Audiences.** (3-0). **Credit 3.** Media audiences; research and theory; processes and effects of mass communication; audience members' uses and interpretations of media; topics including political media, news, and entertainment, health and information campaigns, children and other special audiences. Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.

407. **Women, Minorities and the Mass Media.** (3-0). **Credit 3.** The contributions of women and ethnic groups to the evolution of the media; the portrayal of women and ethnic groups in the mass media; issues resulting from the recognition of women and ethnic groups as media audiences. Prerequisites: Junior or senior classification and approval of instructor. Cross-listed with WMST 407. Majors only or approval of program coordinator.*
410. **Radio, Records, and Popular Music.** (3-0). **Credit 3.** History of radio and record industries; communication technology and media industries related to American popular music; interaction of communication technologies, media industries, social and cultural processes in evolution of popular music. Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.
411. **Representations of Motherhood.** (3-0). **Credit 3.** Examination of understandings of motherhood from a humanities perspective and over a variety of cultures and time periods, as reflected in written, media and/or oral texts. Prerequisites: Junior or senior classification or approval of instructor. Cross-listed with WMST 411.
415. **New Media and Civil Society.** (3-0). **Credit 3.** Critical analysis of new media technologies, civic participation, and social capital in democratic, non-democratic, and nascent civil societies around the world. Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.
420. **Gender and Communication.** (3-0). **Credit 3.** Survey of the role of gender in communication processes; focus on communication differences between men and women in contexts such as the family, school and work organizations; discussion of media influence in gender stereotypes. Cross-listed with WMST 420.
425. **Rhetoric of the Civil Rights Movement.** (3-0). **Credit 3.** Rhetorical evaluation of theoretical literature and pragmatic episodes that shaped the U.S. Civil Rights Movement; examination of significant speeches, documents, and protest activities in their historical, political, and social contexts.
431. **Rhetoric of Social Movements.** (3-0). **Credit 3.** Survey of events and rhetorical documents of major U.S. social movements, including abolitionist, labor, socialist, women's rights, civil rights, pro-life, gay and lesbian, and student movements. Prerequisite: COMM 301; junior or senior classification.
435. **Rhetoric of Television and Film.** (3-0). **Credit 3.** Critical analysis of television and film; close readings of such mediated texts; special attention to writing television and film criticism.
440. **Political Communication.** (3-0). **Credit 3.** Rhetorical analysis of messages, media and speakers in political campaigns, institutions and movements.
443. **Communication and Conflict.** (3-0). **Credit 3.** Communication principles for addressing conflict situations through such practices as negotiation, mediation and arbitration: the study of strategies, influence and language in conflict management approaches. Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.
446. **Communication, Organizations and Society.** (3-0). **Credit 3.** Communicative processes through which organizations influence and are influenced by the societies from which they draw their members. Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.
447. **Communication, Group Processes and Collaboration.** (3-0). **Credit 3.** Communication processes in teamwork including collaboration in dyads, teams, and group processes that contribute to or detract from team effectiveness. Prerequisites: COMM 210; junior or senior classification.
450. **Media Campaigns.** (3-0). **Credit 3.** Principles of designing media campaigns as applied to commercial advertising, political advertising and health campaigns; processes that drive the planning and execution of these campaigns. Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.
454. **Telecommunication Policy.** (3-0). **Credit 3.** Telecommunication policy, including intellectual property, first amendment protections, privacy, universal service, government support, national information policy, standard setting and deregulation; implications for managers and consumers of telecommunication. Prerequisites: COMM 354; junior or senior classification.
456. **Telecommunication and Media Management.** (3-0). **Credit 3.** Issues in the management of telecommunication industries, including finance, human resources, marketing, public policy, broadcasting, cable industry and Internet services. Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.

458. **Global Media.** (3-0). **Credit 3.** The study of globalization through media ownership. Content, flow, cultural values, political power and technological impact; implications of globalization for local economies and audiences. Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.
460. **Communication and Contemporary Issues.** (3-0). **Credit 3.** Rhetorical and other critical approaches to study how communication practices influence the construction of social issues. May be taken two times.
470. **Communication in Health Care Contexts.** (3-0). **Credit 3.** Principles of health communication applied in situations ranging from physician-patient communication to public health campaign theory, design, implementation and evaluation. May be taken two times.
480. **Religious Communication.** (3-0). **Credit 3.** The role of religious communication as manifested in speeches, sermons, debates, campaigns, and social movements throughout history. May be taken two times.
484. **Internship in Communication.** **Credit 1. I, II, S** Directed internship in a public or private organization to provide students with on-the-job training and applied research experience; application of communication theory and practice in career settings; designed to enhance and clarify students' career objectives. May be repeated for credit. Must be taken S/U. Prerequisite: Cumulative GPR of 2.5 or higher for credits taken in residence; approval of department head.
485. **Directed Studies.** **Credit 1 to 3 each semester. I, II, S** Directed individual study of identified topics in communication; may include specific research, readings or other approved project in any area of communication; written report is required. May be repeated for credit. Prerequisites: Cumulative GPR of 2.5 or higher; approval of instructor and department head.
489. **Special Topics in...** **Credit 1 to 4. I, II, S** Selected topics in an identified area of communication. May be repeated for credit.
491. **Research.** **Credit 1 to 3.** Research conducted under the direction of faculty member in the department of communication. May be repeated 3 times for credit. Prerequisites: GPA 2.5 or higher; junior or senior classification and approval of instructor and department head.
497. **Independent Honors Studies.** **Credit 1 to 3 each semester. I, II** Directed independent studies for upper division Honors students, regardless of academic major, in select aspects of communication. May be repeated for credit. Prerequisites: Junior or senior classification either as Honors student or with GPR of 3.25; letter of approval from head of student's department.

Department of Computer Science

Professors N. M. Amato, R. Bettati, J. Chen, D. K. Friesen, R. Furuta, J. J. Leggett, J. S. Liu, W. M. Lively, M. S. Pilant, U. W. Pooch, L. Rauchwerger, W. Rundell, F. M. Shipman, P. F. Stiller, B. Stroustrup, V. E. Taylor (Head), D. M. H. Walker, J. L. Welch, G. N. Williams; Associate Professors Y. Choe, R. Gutierrez-Osuna, T. R. Ioerger, A. Kerne, J. C. Keyser, A. Klappenecker, D. Loguinov, R. Mahapatra, V. Sarin, S. Sze; Assistant Professors J. Caverlee, J. Chai, G. Dos Reis, T. A. Hammond, J. Jarvi, A. Jiang, E. J. Kim, S. M. Pike, S. Schaefer, D. Song, R. Stoleru, T. L. Williams; Senior Lecturers W. C. Daugherty, J. D. Hurley, T. S. Leyk, Z. Leyk, W. F. Marti, S. Yurttas; Lecturer R. Ward

Computer Science (CPSC)

110. **Programming I.** (3-2). **Credit 4. I, II, S** Basic concepts, nomenclature and historical perspective of computers and computing; internal representation of data; software design principles and practices; structured programming in Pascal; use of terminals, operation of editors and execution of student-written programs.
111. **Introduction to Computer Science Concepts and Programming.** (3-2). **Credit 4.** Basic concepts, nomenclature, and historical perspective of computers and computing; problem solving and software design principles, including abstraction, modularity, data representation, documentation, portability, structured and object oriented programming; software engineering concepts including requirements definition, testing, and maintenance considerations; development and execution of student written programs. Prerequisite: Course in Pascal or C (high school or college) or approval of instructor.

113. **Intermediate Programming and Design. (1-3). Credit 2.** Continuation of ENGR 112; programming and design with C++; topics include design and implementation of functions, classes, and class hierarchies; software development strategies; error handling and exceptions; testing and debugging; type safety; strings; templates and the STL; graphics and GUIs; mathematical computation; and principles of object-oriented programming. Prerequisites: Knowledge of C++ programming, class design, portable graphics, and parameterized types and their implementations.
121. **Introduction to Program Design and Concepts. (3-2). Credit 4.** Computer programming syntax for primitive types, control structures, vectors, strings, structs, classes, functions, file I/O, exceptions and other programming constructs, plus the use of class libraries; practice in solving problems with computers; includes the execution of student written programs in C++. Prerequisite: Programming course (high school or college).
181. **Introduction to Computing. (1-0). Credit 1.** Introduce entering students to the broad field of computing; presentations from industry and academia about how computer science concepts are used in research and end products; includes a major writing component.
203. **(COSC 1317, 1417) Introduction to Computing. (3-0). Credit 3. I, II, S** Algorithms, programs and computers; basic programming and program structure; data representation; computer solution of numerical and non-numerical problems using FORTRAN.
206. **(BCIS 1420, COSC 1420) Structured Programming in C. (3-2). Credit 4.** Basic concepts, nomenclature and historical perspective of computers and computing; internal representation of data; software design principles and practice; structured and object-oriented programming in C; use of terminals, operation of editors and executions of student-written programs.
211. **Data Structures and Their Implementations. (3-2). Credit 4.** Specification and implementation of basic data structures and abstract data types—linked lists, stacks, queues, trees and tables; performance tradeoffs of different implementations; asymptotic analysis of running time and memory usage; compares and contrasts object-oriented language (typically, Java) and non-object-oriented languages (typically, C); emphasis on adherence to good software engineering principles. Prerequisite: CPSC 111 or approval of instructor.
221. **Data Structures and Algorithms. (3-2). Credit 4.** Specification and implementation of basic abstract data types and their associated algorithms: stacks, queues, lists, sorting and selection, searching, graphs, and hashing; performance tradeoffs of different implementations and asymptotic analysis of running time and memory usage; includes the execution of student programs written in C++. Prerequisite: CPSC 113 or 121; corequisite MATH 202.
285. **Directed Studies. Credit 1 to 4.** Special project in computer science. Project must be approved by the department. Prerequisite: Approval of department head.
289. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of computer science. May be repeated for credit. Prerequisite: Approval of instructor.
291. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in computer science. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
310. **Database Systems. (3-0). Credit 3. I, II, S** File structures and access methods; database modeling, design and user interface; components of database management systems; information storage and retrieval, query languages, high-level language interface with database systems. Prerequisite: CPSC 211 or 221.
311. **Analysis of Algorithms. (3-0). Credit 3. I, II, S** Design of computer algorithms for numeric and non-numeric problems; relation of data structures to algorithms; analysis of time and space requirements of algorithms; complexity and correctness of algorithms. Prerequisites: MATH 302; CPSC 211.
312. **Computer Organization. (3-2). Credit 4.** Introduction to computer systems from programmer's perspective: simple logic design, data representation and processor architecture, programming of processors, memory, control flow, input/output, and performance measurements; hands-on lab assignments. Prerequisite: CPSC 221.
313. **Introduction to Computer Systems. (3-2). Credit 4.** Introduction to system support for application programs, both on single node and over network: OS application interface, inter-process communication, introduction to system and network programming, and simple computer security concepts; hands-on lab assignments. Prerequisite: CPSC 312 or corequisite CPSC 350.

314. **Programming Languages.** (3-0). **Credit 3.** Explores the design space of programming languages via an in-depth study of two programming languages, one subject-oriented (Java), one functional (Haskell); focuses on idiomatic uses of each language, and on features characteristic for each language. Prerequisite: CPSC 221.
315. **Programming Studio.** (2-2). **Credit 3.** Intensive programming experience that integrates core concepts in Computer Science and familiarizes students with a variety of programming/development tools and techniques; students work on 2 or 3 month-long projects each emphasizing a different specialization within Computer Science; focuses on programming techniques to ease code integration, reusability, and clarity. Prerequisites: CPSC 312 and 314; or CPSC 350; corequisite CPSC 313.
321. **Computer Architecture.** (3-2). **Credit 4. I, II, S** Basic hardware/software components, assembly language, and functional architecture design of computers; syntax and semantics of a typical microprocessor assembly language; instruction sets, construction and execution of an assembly program; the design of I/O modules, memory, control unit and arithmetic unit. Prerequisite: ECEN 220 or 248.
332. **Programming Language Design.** (3-0). **Credit 3. I, II** Design of high-level languages; criteria for language selection; specification techniques for syntax and semantics; trends in high-level language design and introduction to programming in LISP. Prerequisite: CPSC 211 or 221.
350. **Computer Architecture and Design.** (3-3). **Credit 4.** Computer architecture and design; use of register transfer languages and simulation tools to describe and simulate computer operations; central processing unit organization; microprogramming; input/output and memory system architectures. Prerequisite: ECEN 248. Cross-listed with ECEN 350.
410. **Operating Systems.** (3-0). **Credit 3. I, II, S** Hardware/software evolution leading to contemporary operating systems; basic operating systems concepts; methods of operating systems design and construction: algorithms for CPU scheduling, memory and general resource allocation, process coordination and management; case studies of several operating systems. Prerequisite: CPSC 315.
411. **Design and Analysis of Algorithms.** (3-0). **Credit 3.** Study of computer algorithms for numeric and non-numeric problems; design paradigms; analysis of time and space requirements of algorithms; correctness of algorithms; NP-completeness and undecidability of problems. Prerequisites: CPSC 221, 315; MATH 302.
420. **Artificial Intelligence.** (3-0). **Credit 3. I, II, S** Fundamental concepts and techniques of intelligent systems; representation and interpretation of knowledge on a computer; search strategies and control; active research areas and applications such as notational systems, natural language understanding, vision systems, planning algorithms, intelligent agents and expert systems. Prerequisite: CPSC 315 or approval of instructor.
431. **Software Engineering.** (2-2). **Credit 3. I, II, S** Application of engineering approach to computer software design and development; life cycle models, software requirements and specification; conceptual model design; detailed design; validation and verification; design quality assurance; software design/development environments and project management. Prerequisite: CPSC 315 or approval of instructor.
433. **Formal Languages and Automata.** (3-0). **Credit 3. I** Basic types of abstract languages and their acceptors; the Chomsky hierarchy; solvability and recursive function theory; application of theoretical results to practical problems. Prerequisite: CPSC 315 or approval of instructor.
434. **Compiler Design.** (3-0). **Credit 3. II** Programming language translation: functions and general organization of compiler design and interpreters; theoretical and implementation aspects of lexical scanners; parsing of context free languages; code generation and optimization; error recovery. Prerequisite: CPSC 315 or approval of instructor.
435. **Structured Programming in Ada.** (3-0). **Credit 3.** The Ada programming language; history and motivation; scalar and composite types; type and object attributes; control constructs; subprograms; packages and abstract types; numeric types; I/O; program structure; overloading and visibility; tasking; generics; programming style using Ada, Ada Programming Support Environments; bindings to common utilities, including GKS, SQL. Prerequisite: CPSC 211 or approval of instructor.
436. **Computer-Human Interaction.** (3-0). **Credit 3.** Comprehensive study of the Computer-Human Interaction (CHI) area; includes history and importance of CHI; CHI design theories; modeling of computer users and interfaces; empirical techniques for task analysis and interface design; styles of interaction and future directions of CHI including hypermedia and computer-supported collaborative work. Prerequisite: CPSC 315 or approval of instructor.

437. **Engineering Software Products.** (3-0). **Credit 3.** Links theory and practice in providing hands-on experience in development of growth-oriented new software products; student teams prepare and present a plan for a new software product; skills conducive to new software product success are developed including team building; organizing; planning; integrating and persuading. Prerequisites: Senior classification and approval of instructor.
438. **Distributed Objects Programming.** (3-0). **Credit 3.** Principles of distributed computing and programming with current paradigms, protocols, and application programming interfaces including Sockets, RMI, CORBA, IDL, Servlets, Web Services; security issues with public/private keys, digital signatures, forms and GUI based applications with multi-tier components, database connectivity and storing/streaming data structured using XML. Prerequisites: CPSC 315 or approval of instructor.
440. **Quantum Algorithms.** (3-0). **Credit 3.** Introduction to the design and analysis of quantum algorithms; basic principles of the quantum circuit model; gives a gentle introduction to basic quantum algorithms; reviews recent results in quantum information processing. Prerequisite: CPSC 315 or approval of instructor.
441. **Computer Graphics.** (3-0). **Credit 3. I, II** Principles of interactive computer graphics; 2-D and 3-D rendering pipelines, including geometric object and view transformations, projections, hidden surface removal, and rasterization; lighting models for local and global illumination; hierarchical models of 3-D objects; systems and libraries supporting display and user interaction. Prerequisites: CPSC 211 or 221 or approval of instructor.
442. **Scientific Programming.** (3-0). **Credit 3. II** Introduction to numerical algorithms fundamental to scientific and engineering applications of computers; elementary discussion of error; algorithms, efficiency; polynomial approximations, quadrature and systems of algebraic and differential equations. Prerequisites: Knowledge of C, C++ or Fortran; MATH 304 or 308 or concurrent enrollment in one of these.
444. **Structures of Interactive Information.** (3-0). **Credit 3.** A systems approach to the programming, design, authoring and theory of hypermedia; object-oriented visual and interactive programming; visual design, including color, space, text and layering; the reference as a metadisciplinary structure; collecting and sampling; ontologies, maps and navigation as means of structuring information; create dynamic hypermedia that is expressive and interpretive. Prerequisites: CPSC 315 or approval of instructor.
452. **Robotics and Spatial Intelligence.** (3-0). **Credit 3. II** Algorithms for executing spatial tasks; path planning and obstacle avoidance in two- and three-dimensional robots—configuration space, potential field, free-space decomposition methods; stable grasping and manipulation; dealing with uncertainty; knowledge representation for planning—geometric and symbolic models of the environment; task-level programming; learning. Prerequisite: CPSC 315 or approval of instructor.
456. **Real-Time Computing.** (3-3). **Credit 4.** Introduction to principles and applications of real-time computing; system architecture; D/A and A/D conversion; synchronous data acquisition and analysis; computers in real-time control; asynchronous monitoring and control; resource scheduling; interfacing issues; lectures and laboratory. Prerequisites: ECEN 220 or 248; MATH 251; knowledge of C or Ada, or approval of instructor.
462. **Microcomputer Systems.** (2-2). **Credit 3. II** Microcomputers as components of systems; VLSI processor and coprocessor architectures, addressing and instruction sets; I/O interfaces and supervisory control; VLSI architectures for signal processing; integrating special purpose processors into a system. Prerequisite: CPSC 313.
463. **Networks and Distributed Processing.** (3-0). **Credit 3. I, II** Basic hardware/software, architectural components for computer communications; computer networks, switching, routing, protocols and security; multiprocessing and distributed processing; interfacing operating systems and networks; case studies of existing networks and network architectures. Prerequisite: CPSC 315 or approval of instructor.
469. **Advanced Computer Architecture.** (3-0). **Credit 3.** Introduction to advanced computer architectures including memory designs, pipeline techniques, and parallel structures such as vector computers and multiprocessors. Prerequisite: CPSC 321 or ECEN 350. Cross-listed with ECEN 469.
470. **Information Storage and Retrieval.** (3-0). **Credit 3.** Representation of, storage of and access to very large multimedia document collections; fundamental data structures and algorithms of current information storage and retrieval systems and relates various techniques to design and evaluation of complete retrieval systems. Prerequisite: CPSC 315 or approval of instructor.
481. **Seminar.** (0-2). **Credit 1. I, II, S** Investigation and report by students on topics of current interest in computer science. Prerequisite: Junior or senior classification.

482. **Senior Capstone Design.** (1-6). **Credit 3.** Project-based course to develop system integration skills for solving real-world problems in computer science; significant team software project that integrates advanced concepts across computer science specializations; projects require design, implementation, documentation and demonstration, as well as design methodology, management process and teamwork. Prerequisites: Senior classification; at least two CPSC courses from one track including 411.
483. **Computer Systems Design.** (1-6). **Credit 3.** Engineering design; working as a design-team member, conceptual design methodology, design evaluations, total project planning and management techniques, design optimization, systems manufacturing costs considerations; emphasis placed upon students' activities as design professionals. Prerequisites: CPSC 315 and 462; senior classification.
485. **Directed Studies.** **Credit 1 to 6.** I, II, S Permits work on special project in computer science. Project must be approved by the department. Prerequisite: Senior classification.
489. **Special Topics in...** **Credit 1 to 4.** Special topics in computer science that are new or unique that are not covered in existing courses.
491. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in the computer science. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor.

Department of Construction Science

Professors D. L. Bilbo, C. W. Graham, M. E. Haque, R. O. Segner, Jr., J. C. Smith; Associate Professors J. A. Bryant, R. A. Burt, I. M. Choudhury, M. L. Coody, N. L. Holland, J. P. Horlen (Head), J. R. Jackson, J. Kang, K. C. Williamson III, P. K. Woods; Assistant Professors L. Acquaye, J. L. Fernandez-Solis, Y. Hatipkarasulu, S. Lavy-Leibovich, J. M. Nichols, R. J. Peterson; Senior Lecturers S. P. Byrne, D. R. Ellis, L. H. Feigenbaum, S. S. Morgan; Lecturer K. Carlson

Construction Science (COSC)

153. **Introduction to the Construction Industry.** (3-0). **Credit 3.** I, II Characteristics of the construction industry; types of construction companies; contracts; people involved in a project, their responsibilities and interrelationships; evolution of a project; interpreting working drawings; construction bonds; contract documents.
253. **(ARCH 2312) Construction Materials and Methods I.** (3-0). **Credit 3.** I, II Materials, methods and sequences of the construction process; emphasis on design, specification, purchase and use of concrete, masonry and wood.
254. **Construction Materials and Methods II.** (3-0). **Credit 3.** I, II Analysis of materials and methods used in the design and construction of buildings with a particular emphasis on structures using structural steel reinforced concrete and dimensional framing lumber. Prerequisite: COSC 253.
275. **Estimating I.** (2-4). **Credit 4.** Systems approach to determining required quantities of construction materials; quantification of various types of foundation systems, structural systems and building envelope systems; excerpts of contract documents from a variety of different building projects. Prerequisite: Admission to lower level in Construction Science; completion or concurrent enrollment in COSC 254.
285. **Directed Studies.** **Credit 1 to 3.** Special project in construction science. Project must be approved by the department. Prerequisite: Approval of department head.
291. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in construction science. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification; approval of instructor.
301. **Construction Surveying.** (1-3). **Credit 2.** Practical applications of surveying to the practice of construction project management; distance, grade and angular measurement; surveying equipment and its application to construction layout and control; surveying documentation and field work; introduction to other three dimensional measurement and positioning systems. Prerequisite: Admission to upper level in Construction Science.

321. **Structural Systems I. (2-3). Credit 3.** Introduction to the physical principles that govern classical statics and strengths of materials through the design of timber and steel components of architectural structures; with computer applications. Prerequisite: Admission to upper level in Construction Science.
323. **Soils in Construction. (1-3). Credit 2.** Introduction to soils as used in construction projects; engineering properties, soil classification, soil exploration, embankment control, dewatering, excavation supports, foundations. Prerequisite: Admission to upper level in Construction Science.
325. **Environmental Control Systems I. (3-0). Credit 3. I, II** Building environmental systems with a major emphasis on the design and control of the heating, ventilation and cooling system, site planning and acoustical treatments. Prerequisite: Admission to upper level in Construction Science.
326. **Environmental Control Systems II. (3-0). Credit 3. I, II** Building environmental systems with major emphasis on the design of plumbing and drainage systems, electrical, fire and lightening protection and lighting; design opportunities, calculations, equipment selection and economics as they relate to design and construction. Prerequisite: COSC 325.
351. **Construction Equipment and Methods. (3-0). Credit 3.** Management principles of construction equipment selection, operation and safety; development of skills necessary to select an equipment mix that yields maximum productivity and best value. Prerequisite: COSC 323.
353. **Construction Project Management. (3-0). Credit 3. I, II** An introduction to construction project management covering concepts of project selection, estimating bidding, scheduling, subcontracting practices, cost controls, project documentation, construction bonds, insurance, payments and the elements of close out; development of professional communication skills through student prepared multi-media presentations. Prerequisite: Admission to upper level in Construction Science.
364. **Construction Safety I. (1-0). Credit 1.** Administration and application of the OSHA Act in the construction industry; includes standards, the general duty clause, competent person, and hazard identification; fulfills the requirements for the ten-hour OSHA certifications. Prerequisite: Admission to upper level in Construction Science.
375. **Estimating II. (2-3). Credit 3. I, II** Quantification and pricing of direct field costs and general condition costs from construction documents; the preparation of complete lump sum bid package ready for project execution; complete set of contract documents required. Prerequisite: Admission to upper level in Construction Science; COSC 275.
381. **Construction Industry Professional Studies. (1-0). Credit 1.** Exploration of various professional options across the breadth and diversity of the construction industry; staff lectures and guest speakers from various construction companies and industry segments; responsibilities, obligations, career paths for a professional constructor; professional ethics; introduction to professional societies. Prerequisite: Admission to upper level in Construction Science; concurrent enrollment in COSC 364.
421. **Structural Systems II. (3-0). Credit 3.** Analysis and design of structural members in steel and concrete and their relationship to building design and construction; with computer analysis and design of specific topics. Prerequisite: COSC 321.
422. **Structural Systems III. (3-0). Credit 3.** Structural principles applied to the design and construction of architectural reinforced concrete structures, reinforced masonry structures, and other selected topics. Prerequisite: COSC 421.
440. **Interdisciplinary Capstone. (2-3). Credit 3.** A senior capstone for students preparing to enter the design-build sector of the construction industry; integration of the design and construction processes into a single, cohesive project delivery system, starting with project inception, and carrying through construction, operation and maintenance of various types of construction projects. Prerequisites: COSC 475; must be taken last full semester or summer before graduation.
441. **Residential Capstone. (2-3). Credit 3. II** A senior capstone course for students preparing to enter the residential construction industry; project management of residential projects, including: market analysis, site analysis, residential design, building codes, estimating, scheduling, financing, subcontracting, marketing, business planning and current trends in design and construction. Prerequisites: COSC 475; must be taken last full semester or summer before graduation.
442. **Commercial Capstone. (2-3). Credit 3.** A senior capstone course for students preparing to enter the commercial construction sector; project management of commercial construction projects, including: aspects of design, bidding/estimating. Presentation, value engineering, contracts/negotiation, subcontractor relations, cost controls, management during construction, close out, and post-construction requirements. Prerequisites: COSC 475; must be taken last full semester or summer before graduation.

443. **Industrial Capstone. (2-3). Credit 3.** A senior capstone course for students preparing to enter the industrial construction sector; project management of industrial construction projects including: project acquisition, planning and staffing, engineering, procurement, construction, start-up, close out, operations and maintenance, and turn-arounds. Prerequisites: COSC 475; must be taken last full semester or summer before graduation.
444. **Highway/Heavy Capstone. (2-3). Credit 3.** A senior capstone course for students preparing to enter the heavy/highway sector; project management of heavy/highway projects including: utilization principles for earthmoving, paving and lifting equipment; elements of paving design; unit price bidding methods; management during construction of crews and procurement; progress pavements and cash flow management; close out of warranty work. Prerequisites: COSC 475; must be taken last full semester or summer before graduation.
446. **Specialty Capstone. (2-3). Credit 3.** Senior capstone course for students preparing to enter the mechanical, electrical or other specialty construction company; project management of specialty contracts, including: project acquisition, schematic system design, estimating/bidding, scheduling, systems integration, value engineering, management during construction of crews and procurement, contract administration, business planning and current industry issues. Prerequisites: COSC 475; must be taken last full semester or summer before graduation.
455. **Alternative Construction Delivery Systems. (3-0). Credit 3.** Introduces students to non-traditional construction delivery systems including: design-build; job order contracting; performance-based procurement and public/private partnerships. Prerequisite: COSC 353.
463. **Construction Law and Ethics. (3-0). Credit 3.** Introduction to basic contract and tort issues and their application in the construction industry; delineation of the various types of contracts and remedies available to parties involved in a construction project; additional related topics including bidding, delays, mechanics liens, site conditions, warranties and the Uniform Commercial Code as it relates to the construction industry, introduction to legal research and reasoning as used by professional constructors. Prerequisite: Admission to upper level in Construction Science.
464. **Construction Safety II. (3-0). Credit 3.** Administration and application of the Occupational Safety and Health Administration Act in the construction industry; includes: OSHA standards, the general duty clause, competent person, and hazard identification; fulfills the requirements for the thirty-hour OSHA, CPR and First Aid certifications. Prerequisite: Admission to upper-level in Construction Science.
465. **Advanced Topics in Construction Law. (3-0). Credit 3. I, II** Legal issues affecting construction, including the parties to construction work, contracting, responsibilities and risk, risk management, damages, handling of claims and disputes, indemnification, bonds, insurance, bankruptcy, labor and employment, and subcontract management; litigation and alternative dispute resolution methods regularly used in the construction industry. Prerequisite: COSC 463.
466. **Construction Business Development I. (2-0). Credit 2.** Processes used by the construction industry in the acquisition of new business; marketing and sales as practiced by the industry; responding to an invitation for a bid or a request for proposal; parametric estimating and scheduling of a construction project; proposal and presentation principles; case study presentation. Prerequisites: COSC 353; concurrent enrollment in COSC 375.
467. **Construction Business Development II. (1-0). Credit 1.** Continuation of COSC 466. Case study presentation using the principles learned in COSC 466. Prerequisite: COSC 466.
475. **Construction Project Planning. (2-3). Credit 3. I, II** Development of parameter cost estimates for activities that relate to the construction of a building project; work packages sequenced, planned and leveled to develop a working project execution document; development of procedures to monitor actual field progress. Prerequisite: COSC 375.
477. **Construction Project Controls. (3-0). Credit 3.** Introduction to construction related financial documents including: schedule of values, labor and operations cost reports, income statements, balance sheets and construction budgets; emphasis on the development of techniques required to effectively monitor the financial aspects of a construction project. Prerequisites: COSC 353.
481. **Seminar. (1-0). Credit 1. I, II** Seminar discussion of construction equipment selection, utilization maintenance and operating cost. Prerequisite: Must be taken last full semester or summer before graduation.
483. **Construction Industry Contemporary Issues. (1-0). Credit 1.** Introduces graduating seniors to contemporary issues in the construction industry. Prerequisite: Must be taken last full semester or summer before graduation.

484. **Summer Internship. Credit 3.** Summer internship (12 week, 500 hours) with a construction or construction-related company that exposes the student to construction-related activities; daily logs, monthly reports, final report and completion letter required; distance education course with non-resident status. No other TAMU courses may be taken while enrolled in COSC 484. Prerequisites: COSC 364 and 381; approval of internship faculty coordinator.
485. **Directed Studies. Credit 1 to 5 each semester. I, II** Special problems in building construction. Prerequisite: Admission to upper-level in College of Architecture.
489. **Special Topics in... Credit 1 to 4. I, II, S** Selected topics in an identified field of construction science. May be repeated for credit.
491. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in construction science. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor.
494. **Internship. Credit 6.** An internship (18 week, 750 hours) with a construction or construction-related company that exposes the student to construction-related activities; daily logs, monthly reports, final report and completion letter required; distance education course with non-resident status. No other TAMU courses may be taken while enrolled in COSC 494. Prerequisites: COSC 364 and 381; approval of internship faculty coordinator.

Dairy Science

(faculty, see page 614)

(DASC)

202. (AGRI 1311) **Dairying. (2-2). Credit 3. II** Survey of dairy industry; dairy breeds, standards for selection and culling, herd replacements, feeding, management, physiology and health maintenance; food value of milk, tests for composition and quality, use and processing of market milk and dairy products.
204. **Modern Dairy Cattle Appraisal. (0-2). Credit 1. I** Appraisal of modern dairy cattle using pedigrees, production records and live animal evaluation; selection of breeding and producing animals for the most economical production of milk; procedures and techniques for merchandising cattle. Prerequisite: Sophomore classification.
312. **Food Chemistry. (3-0). Credit 3. II** The fundamental and relevant chemistry and functionality of the major food constituents (water, carbohydrates, lipids, proteins, phytochemical nutraceuticals) and study of food emulsion systems, acids, enzymes, gels, colors, flavors and toxins. Prerequisite: CHEM 222 or 228 or approval of department head. Cross-listed with FSTC 312.
313. **Food Chemistry Laboratory. (0-3). Credit 1. II** Laboratory exercises investigating specific molecules, such as food acids, enzymes, pigments and flavors, and chemical interactions in foods, such as oxidation reactions, emulsion systems, and functional properties from a fundamental chemistry rather than an analytical perspective. Prerequisite: CHEM 238 or 242. Cross-listed with FSTC 313.
314. **Food Analysis. (1-4). Credit 3. I** Selected standard methods for assay of food components; principles and methodology of both classical and instrumental techniques for food analysis. Prerequisite: CHEM 238 or 242. Cross-listed with FSTC 314.
326. **Food Bacteriology. (3-0). Credit 3. I, II, S** Microbiology of human foods and accessory substances; raw and processed foods; physical, chemical and biological phases of spoilage; standard industry techniques of inspection and control. Prerequisite: BIOL 206 or approval of department head. Cross-listed with FSTC 326.
327. **Food Bacteriology Lab. (0-3). Credit 1. I, II, S** Laboratory to accompany DASC 326. Cross-listed with FSTC 327.
330. **Dairy and Food Technology. (3-3). Credit 4. I** Principles and practices involved in processing of milk into market milk, butter, cheese and cheese foods; fundamental principles of these processes as related to their design and control. Cross-listed with FSTC 330.
331. **Dairy and Food Technology. (3-3). Credit 4. I** Manufacture of frozen, freeze-dehydrated, concentrated and dehydrated dairy foods; fundamental aspects of freezing, concentration and dehydration of foods. Prerequisite: DASC 330. Cross-listed with FSTC 331.

400. **Animal Science Industry Studies.** Credit 1 to 3. I, II, S Organized instruction based on well-planned visits to selected industry operations which produce, process or market animal and dairy products, or produce and market supplies and materials to support animal industries; acquaint students with such operations, to reinforce campus-based instruction and to acquaint prospective employers with Texas A&M students. Field trips will normally be made during holidays or between sessions for which departmental fees may be assessed to cover costs. Prerequisites: Junior or senior classification; approval of instructor organizing study tour; 2.0 GPR in major and overall. Cross-listed with ANSC 400.
418. **Feeding and Management of Dairy Cattle. (3-2). Credit 4.** II Dairy farm management; feeding and care of the dairy herd; raising calves for dairy replacements and for beef; developing dairy heifers; care of dry and fresh cows; optimum return rations for milk production; disease control; forage handling and storage; buildings and related topics. Prerequisites: ANSC 318; DASC 202; DASC 400 also to be taken concurrently or approval of instructor.
485. **Directed Studies.** Credit 1 to 4. I, II, S Special problems in dairy production or dairy manufacturing. Prerequisites: Junior or senior classification; written approval of professor supervising the activity; 2.0 GPR in major and overall.

Dance Education

(faculty, see page 721)

(DCED)

161. **Visual and Performing Arts—Ballet II. (0-4). Credit 2.** Intermediate study of ballet; historical background and the knowledge and understanding of its cultural heritage; increased level of difficulty in barre, center and across the floor; concentration and continual refinement of body/spatial awareness, musicality, alignment and execution of correct classical technique; placement exam required on the second day of class. Prerequisite: KINE 160 or approval of instructor.
162. **Visual and Performing Arts—Ballet III. (0-4). Credit 2.** Technical study of classical and contemporary ballet; elevated barre work, traditional components including turns, footwork, adagios, advanced center/floor phrases; study of Cecchetti, Vaganova, and collaborative methods; focus on strength, concentration and correct technique on performance combinations; placement exam required on the second day of class. Prerequisite: DCED 161 or approval of instructor.
168. **Visual and Performing Arts—Jazz Dance III. (0-4). Credit 2.** Advanced study of jazz dance; reviews historical background and cultural heritage including significant jazz artists and their influence on jazz dance and society; increased development of coordination, endurance and flexibility necessary to performing extensive jazz combinations; placement exam required on the second day of class. Prerequisite: KINE 167 or approval of instructor.
172. **Visual and Performing Arts—Modern Dance II. (0-4). Credit 2.** Intermediate study of modern dance; reviews, historical background and its development within society; continual study and understanding of modern dance concepts; fall/recovery, contract/release, use of breath and weight, spine work, inversion and spatial awareness; placement exam required on the second day of class. Prerequisite: KINE 171 or approval of instructor.
173. **Visual and Performing Arts—Modern Dance III. (0-4). Credit 2.** Physical and artistic exploration of both traditional and contemporary training methods; understand and utilize three dimensional spine work, inversion, floor work and dynamics; placement exam required on the second day of class. Prerequisite: DCED 172 or approval of instructor.
200. **Dance in Society. (3-0). Credit 3.** Introduction to dance art, entertainment and culture; emphasis on appreciation and understanding of movement as an art form; emphasis on expression of human values; historical, cultural values and traditions; current issues in dance.
301. **Dance History. (3-0). Credit 3.** Overview of current dance scene, career fields, education; development of theatrical, social, educational dance from lineage based to contemporary cultures; emphasis on dance in America, genres, roots, heritage, pioneers, crusading artists; impacts, influences, growth, development, trends and continual metamorphosis in the art world. Prerequisites: DCED 200 or approval of instructor.
302. **Dance Production. (3-0). Credit 3.** Overview of philosophy, major aspects and common elements in producing dance concerts; lighting, sound, stage design, terminology, costuming, management, production designs, practical experience with on-stage performances. Prerequisite: Junior or senior classification; must have prior dance experience or approval of instructor.

303. **Health Practices for Dancers. (3-0). Credit 3.** Focuses on health issues common to the dancer; basic anatomy in relation to proper dance technique, misalignments, imbalances and injuries common to the dancer; proper nutrition for dancers based on their rehearsal/performance schedules.
304. **Creative Dance for Children. (3-0). Credit 3.** Theory and practice of creative movement classes for children; the development stages and learning outcomes of creative movement; incorporation of creative movement into children's classes; dance elements and benefits of creative movement; lesson plans and student assessment. Prerequisite: Junior or senior classification or approval of instructor.
305. **Human Movement in Relation to Dance. (3-0). Credit 3.** Exploration and evaluation of dance experiences through movement, video, journals, live performances, critiques, literature; study of dance as activity in education through elements, qualities, concepts, responses, patterns, spatial awareness of human movement relating to dance; study of aesthetics of life, culture, society and education relating to human movement/dance. Prerequisite: Junior or senior classification or approval of instructor.
306. **Dance Composition I. (2-0). Credit 2.** Introduces choreographic devices in solo and duet movement studies; exploration of design principles; creating multiple movement studies using various elements of choreography. Prerequisites: KINE 172 or DCED 172 or approval of instructor.
400. **Dance Composition II. (3-0). Credit 3.** Introduces choreographic devices related to group movement studies; explore and create movement studies as a means of first and second function art, use choreographic tools in the dance making process as it relates to group work. Prerequisites: DCED 306; KINE 175 or approval of instructor.
401. **Dance Pedagogy. (3-0). Credit 3.** Study of dance pedagogy; major aspects of a dance teacher including knowledge of injury prevention, correct technique, preparation, presentation, evaluation of dance materials, levels and technique class; focus on various teaching methods, tools, planning, communication/instructional skills and learning experiences/styles. Prerequisites: DCED 200; 301 and 400 or approval of instructor; junior or senior classification.

Department of Teaching, Learning and Culture

Professors N. P. Carter, F. E. Clark, J. J. Denton, J. P. Helfeldt, R. M. Joshi, S. L. Knight, J. B. Kracht, G. O. Kulm, P. J. Larke, R. E. McBride, D. E. Norton, W. H. Rupley, M. C. Sadoski, J. F. Schielack, D. C. Simmons, G. P. Slattery, Jr., D. L. Smith (Head), H. C. Waxman, V. L. Willson; Associate Professors L. M. Burlbaw, R. M. Capraro, B. S. Carpenter, L. D. Cifuentes, Z. R. Eslami, E. S. Foster, D. S. Kaplan, C. W. Lewis, Y. Li, C. C. Loving, V. P. Schielack, S. Slough, C. L. Stuessy, L. M. Walters, G. Webb-Johnson; Assistant Professors M. M. Capraro, T. E. Collins, T. J. Davis, L. Q. Dixon, E. M. McTigue, B. Quiroz, B. Yalvac; Clinical Professor B. K. Erwin; Clinical Associate Professors C. K. Boettcher, D. S. Goldsby, L. J. Kelly, D. R. Parker, R. Viruru; Clinical Assistant Professors J. E. Hammer, V. L. Hill-Jackson, T. Jimarez, R. A. Rackley, N. S. Self, P. Wiese; Lecturers L. G. Butler, E. Cassell, K. Eidson, C. McCallum, T. Raulerson, R. Thomas

Early Childhood Education (ECHE)

244. **School, Family and Community Dynamics in Early Childhood Education. (3-0). Credit 3.** Study of the family unit, home-school relationships; strategies for building cooperative activities with parents in the education of their children; healthy parent-school-community relationships; developing collaboration, communication, leadership and advocacy skills; increased sensitivity to cross-cultural issues and strategies for collaboration.
291. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in early childhood education. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
321. **The Young Child and Early Childhood Education. (2-3). Credit 3.** Examines the world of the contemporary child, its demographics and diversity; explores the philosophical and historical foundation of early childhood education; examines early childhood programs and practices serving young children from birth through age nine; translates child development theory into developmentally appropriate practice. Prerequisites: ECHE 244; junior classification. Corequisite: ECHE 331.

331. **Creative Inquiry Through the Arts for the Young Child. (2-3). Credit 3.** Explores the roles of the arts in the education of young children; examines theoretical stages in children employing both graphic and musical expression; understanding Gardner's "Frames of Mind," the dynamics of creativity and its development in young children; explores strategies for enhancing creative development, inquiry and expression of young children. Prerequisite: Junior classification. Corequisite: ECHE 321.
332. **Planning and Curriculum Development for Early Childhood Education. (2-6). Credit 3.** Field-based course that addresses curriculum development, planning and delivery strategies; examines curriculum from a variety of cultural and philosophical perspectives; explores a range of instructional strategies for enhancing, guiding and stimulating learning, and creating effective learning environments in EC-4 context. Prerequisites: ECHE 321, 331; junior classification.
342. **Strategies for Teaching Young Children. (2-6). Credit 3.** Application of sound principles of early childhood pedagogical best practices informed by research, child development and clinical literature; explores developmentally appropriate instructional strategies practiced at each age and grade level; examines effective learning environments, teacher-child interaction, cooperative grouping and inquiry strategies for teaching and learning. Prerequisites: ECHE 244, 321, 331; junior classification. Corequisite: ECHE 332.
491. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in early childhood education. May be repeated 2 times for credit. Prerequisites: Junior or senior classification and approval of instructor.

Early Childhood Education Field Based (ECFB)

400. **Social Studies Methods in Early Childhood Education. (2-6). Credit 3.** Trends and procedures related to early childhood/elementary curriculum development and instruction in social studies and humanities; integration of content, planning, teaching/learning experiences and evaluation. Prerequisites: ECHE 332; admission to teacher education; senior classification. Corequisites: ECFB 420 and 440; RDNG 440.
420. **Science Methods in Early Childhood Education. (2-6). Credit 3.** Problems-based learning course integrating science content, scientific inquiry skills and field-based instruction; technology-mediated teaching, learning and assessment in EC-4 classrooms. Prerequisites: ECHE 332; senior classification. Corequisites: ECFB 400 and 440; RDNG 440.
430. **Organization, Motivation and Management in Early Childhood Education. (2-6). Credit 3.** Studies classroom management and the social, emotional and educational development of young children; discipline and organizational strategies that facilitate learning and motivation in young children; procedures for creating an effective learning community. Prerequisites: ECHE 332; admission to teacher education; junior or senior classification.
440. **Mathematics Methods in Early Childhood Education. (2-6). Credit 3.** Analyzes contemporary curricula; implementation of methods relevant for active, authentic learning and age appropriate teaching of mathematics to young learners; considers state and national standards related to teaching and learning mathematics. Prerequisites: ECHE 332; admission to teacher education; senior classification. Corequisites: ECFB 400 and 420; RDNG 440.
497. **Residency in Early Childhood Education. (0-30).Credit 6.** Observation and participation in an accredited public school early childhood grades classroom; techniques of teaching and appropriate instructional strategies for assigned student population in fulfillment of certification requirements. May be taken two times. Prerequisites: Completion of all methods courses; admission to teacher education; senior classification.

Econometrics

(faculty, see below)

(ECMT)

Courses in econometrics (including mathematical economics) are administered by the Department of Economics and jointly sponsored by the Department of Statistics.

- 463. Introduction to Econometrics. (3-0). Credit 3.** Application of mathematics and statistics to interpret economic phenomena; elementary econometric models and estimation techniques useful for estimating economic relationships and theories. Prerequisites: CPSC 203 or INFO 209; ECON 323; MATH 131 or 142; STAT 211 or 303.
- 475. Economic Forecasting. (3-0). Credit 3.** Econometric approach to prediction and forecasting; data mining and in-sample overfitting; exploratory data analysis; model selection; recursive techniques; structural change; nonlinear models; causality; forecast evaluation and combination; practical issues in real world prediction and forecasting. Prerequisites: ECMT 463; junior or senior classification.

Department of Economics

Professors J. W. Allen, R. K. Anderson, L. Auernheimer, E. K. Browning, Y. Chang (Head), T. J. Gronberg, J. R. Hanson II, H. S. Hwang, D. W. Jansen, Q. Li, J. R. Moroney, J. Y. Park, R. Sarin, T. R. Saving, G. Tian, J. B. Van Huyck, S. N. Wiggins; **Associate Professors** L. Gan, A. J. Glass, S. L. Puller, M. Ureta; **Assistant Professors** B. Grosskopf, P. Hernandez-Verme, A. Mayer, T. L. Turocy; **Lecturers** J. Edwardson, C. S. Nelson, M. Nelson

Economics

(ECON)

- 202. (ECON 2302) Principles of Economics. (3-0). Credit 3.** Elementary principles of economics; the economic problem and the price system; theory of demand, theory of production and the firm, theory of supply; the interaction of demand and supply.
- 203. (ECON 2301) Principles of Economics. (3-0). Credit 3.** Measurement and determination of national income, employment and price; introduction to monetary and fiscal policy analysis; the effects of government deficits and debt, exchange rates and trade balances. Prerequisite: ECON 202 or approval of undergraduate advisor.
- 311. Money and Banking. (3-0). Credit 3.** Fundamental principles of money, credit and banking; arbitrage conditions in domestic and international capital markets; theoretical and institutional analysis of money markets. Prerequisite: ECON 203.
- 312. Poverty, Inequality and Social Policy. (3-0). Credit 3.** Determinants of inequality in market earnings; philosophical and economic reasons for redistributing income; issues in measurement of inequality and poverty; examination of major social insurance and welfare programs and how they affect income distribution and performance of the economy. Prerequisites: ECON 323 or concurrent enrollment.
- 319. Economic Development of the United States. (3-0). Credit 3.** Economic development of United States from colonial times to present. Prerequisites: ECON 202 and 203.
- 320. Economic Development of Europe. (3-0). Credit 3.** Development of wage system expansion of markets, Industrial Revolution, relation of industrial development to political policy. Prerequisites: ECON 202 and 203.
- 322. Applied Microeconomic Theory. (3-0). Credit 3.** Use of microeconomic theory in the analysis of problems that would face decision makers, not only in business but also in government, non-profit firms and other institutions. Prerequisite: ECON 202. May not be counted toward a major in economics.
- 323. Microeconomic Theory. (3-0). Credit 3.** Determination of prices and their role in directing consumption, production and distribution under both competitive and non-competitive market situations. Prerequisite: ECON 202; MATH 142.
- 324. Comparative Economic Systems. (3-0). Credit 3.** Foundations of the market economy, market socialism, and economic planning; comparative performance of these alternative institutional arrangements; economies in transition. Prerequisites: ECON 202 and 203.
- 330. Economic Development. (3-0). Credit 3.** A study of the less developed world; economic problems and solutions. Prerequisites: ECON 202 and 203.

410. **Macroeconomic Theory.** (3-0). **Credit 3.** Theory of the determination of aggregate levels of national income, employment and prices; monetary and fiscal policy analysis, effects of government debt and deficits. Prerequisite: ECON 203.
412. **Public Finance.** (3-0). **Credit 3.** Economic role of governments; the choice of public sector output in a democracy and the effects of various taxes on resource allocation and income distribution. Prerequisite: ECON 323.
415. **History of Economic Thought.** (3-0). **Credit 3.** Survey of main strands of economic thinking from medieval times through the 20th century; classical, socialist, neoclassical and modern thinkers and the doctrine of the eras. Prerequisite: ECON 323.
418. **Economics of Labor.** (3-0). **Credit 3.** Economics of the labor market: factors affecting the economy's demand for labor and the supply of labor; labor market problems such as unemployment and poverty; the economics of trade unions and collective bargaining. Prerequisite: ECON 323.
420. **Law and Economics.** (3-0). **Credit 3.** Mutual interaction of the prevailing legal system and economic phenomena; development of a series of testable hypotheses concerning the effects of laws and regulations on incentives and economic behavior, the allocation of resources and the distribution of income. Prerequisite: ECON 323.
425. **The Organization of Industry.** (3-0). **Credit 3.** Relationships between structure, conduct and performance of industries in the American economy using both theoretical and empirical material; antitrust regulation, pricing, product characteristics, advertising, technical change and environmental effects; the American experience contrasted with that of other countries; growth of international industries. Prerequisite: ECON 323.
426. **Economics of Antitrust and Regulation.** (3-0). **Credit 3.** Bureaucratic and judicial impact of antitrust laws and other regulatory means on the American economy; efficiency gains and losses associated with price discrimination, predation, cartelization, horizontal merger, vertical integration, resale price maintenance; Supreme Court opinions delivered in landmark antitrust cases. Prerequisite: ECON 323.
435. **Economics of Resource Scarcity.** (3-0). **Credit 3.** Natural resource management and use; problems of renewable and non-renewable resources including scarcity and market responses, role of property rights, externalities, benefit-cost analysis and energy policy. Prerequisite: ECON 323.
436. **Environmental Economics.** (3-0). **Credit 3.** Economic theory and public policy as applied to environmental problems; role of market failure in explaining the existence of pollution; alternative strategies for pollution control and environmental management; global environmental issues. Prerequisites: ECON 323; Economic majors only.
440. **Experimental Economics.** (3-0). **Credit 3.** Experimental techniques in economics and survey of literature in experimental economics; credibility of experimental data and criteria for determining reliability; application of statistical treatment to experimental data. Prerequisite: ECON 323.
442. **Personnel Economics.** (3-0). **Credit 3.** Exploration of the economics of incentives and information through the employment relationship; motivation of workers through incentive pay, promotion tournaments and threats; ways to avoid adverse selection in the hiring process; attracting and retaining employees; downsizing. Prerequisite: ECON 323.
445. **Financial Economics.** (3-0). **Credit 3.** Economic analysis of money and financial markets; market structures, efficiency, institutional features; international markets; arbitrage; derivative securities; asset pricing in complete and incomplete markets; relation to rest of economy. Prerequisites: ECON 323; STAT 211 or 303; junior or senior classification.
449. **Economics of Decision-Making Strategy.** (3-0). **Credit 3.** Introduction to principles of decision-making and analysis of strategic interaction; formal modeling of decision problems involving one or more agents, integrating preferences, risk, and uncertainty into analysis, and using principles of game theory to advise choices; applications include search, signaling, design of contracts, agendas and repeated interaction. Prerequisites: ECON 323; junior or senior classification.
452. **International Trade Theory and Policy.** (3-0). **Credit 3.** Basis for trade; theory of comparative advantage; determination of product and factor prices; gains from international trade; commercial policy and its implications for income distribution; concept of effective protection; market distortions, policy generated distortions and the arguments for tariffs. Prerequisite: ECON 322 or 323.

459. **Games and Economic Behavior.** (3-0). **Credit 3.** Introduction to game theory for advanced undergraduates; definition and existence of an equilibrium point for strategic, repeated and extensive form games; strategic and evolutionary equilibrium refinements; equilibrium selection; applications include auctions, bargaining, oligopoly, strategic market games, team production, voting and behavioral game theory. Prerequisites: ECON 323; MATH 142 or equivalent or approval of instructor.
460. **Introduction to Mathematical Economics.** (3-0). **Credit 3.** Introduction to mathematical economics; application of mathematical tools in economic theory; fundamental results from differential and integral calculus; duality theory in consumer and producer theory; classical optimization techniques, elementary differential equations and stability analysis. Prerequisites: ECON 323 and 410; MATH 131 or 142; junior or senior classification.
465. **Contemporary Economic Issues.** (3-0). **Credit 3.** Application of microeconomic and macroeconomic analyses to evaluate contemporary economic issues. Prerequisites: ECON 323 and 410.
485. **Directed Studies.** **Credit 1 to 6.** Research and design of specific problem areas approved on an individual basis with the intention of promoting independent study and to supplement existing course offerings. Results of study presented in writing. Prerequisites: Major or minor in economics; approval of undergraduate advisor.
489. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of economics. May be repeated for credit. Prerequisite: Approval of undergraduate advisor.

College of Education and Human Development (CEHD)

291. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in the College of Education and Human Development. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
300. **Education and Human Development Study Abroad.** **Credit 1 to 18.** For students in approved programs to study abroad. May be repeated for credit. Prerequisites: Approval of department head; junior or Senior classification.
491. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in the College of Education and Human Development. May be repeated 2 times for credit. Prerequisites: Junior or senior classification and approval of instructor.

Educational Curriculum and Instruction (faculty, see page 668) (EDCI)

285. **Directed Studies.** **Credit 1 to 4.** I, II, S Research problems and readings in areas selected to supplement existing offerings; individual reports, oral and written, required. Prerequisites: Freshman or sophomore classification; approval of instructor.
289. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of educational curriculum and instruction. May be repeated for credit. Prerequisite: Approval of department head.
364. **Creativity and the Young Child.** (3-0). **Credit 3.** I, II Creative expression in young children with a focus on artistic and musical expression, creative movement and creative dramatics; creativity as related to development of the right hemisphere of the brain. Prerequisites: EPSY 320; concurrent enrollment in EDCI 453.
453. **Early Childhood Education.** (3-0). **Credit 3.** I, II Early childhood approaches and instructional materials appropriate for early childhood school programs, kindergarten and primary grades. Prerequisites: EPSY 320; concurrent enrollment in EDCI 364.
454. **Curriculum for Young Children.** (3-0). **Credit 3.** I, II Curriculum models used in educational environments designed for young children; assessment application. State-adopted curriculum materials, their use and expansion; curriculum organization and essential elements for young children. Prerequisites: EDCI 364 and 453; admission to teacher education.

455. **Home-School Involvement in Early Childhood Education.** (3-0). **Credit 3. I, II, S** The family unit, home-school relationships and strategies for building cooperative activities with parents in the education of their children; experience with the development of parent involvement materials. Prerequisites: EDCI 364 and 453; admission to teacher education.
469. **Inter/Intra-Personal Communication Skills in the Early Childhood Classroom.** (3-0). **Credit 3. I, II** A study of inter/intra-personal communication skills as they relate to the principles of child development that influence the establishment of a positive educational environment in which Pre-K–K–Grade 3 children may develop self-esteem, self-control, success and responsibility. Prerequisites: EDCI 364 and 453; admission to teacher education.
485. **Directed Studies. Credit 1 to 4 each semester. I, II, S** Research problems and readings in areas selected to supplement existing offerings; individual reports, oral and written, required. Prerequisites: Junior or senior classification; approval of instructor.
489. **Special Topics in...** **Credit 1 to 4. I, II, S** Study of selected topics in an identified area of curriculum and instruction. May be repeated for credit. Prerequisite: Approval of department head.

Department of Educational Administration and Human Resource Development

Professors B. R. Cole, E. J. Davis, T. Guerrero, J. R. Hoyle, Y. S. Lincoln, G. N. Mclean, J. F. McNamara, J. Scheurich (Head), L. Skrla, C. A. Stanley, H. Tolson; **Associate Professors** M. Alfred, F. Bonner, J. L. Callahan, M. C. Clark, L. M. Dooley, S. Lynham, J. Madsen, F. Nafukho, A. Rolle, G. Webb-Johnson; **Assistant Professors** D. Chlup, T. M. Egan, V. Lechuga, K. B. McKenzie, M. S. Torres, T. T. Vanzant, J. Wang; **Clinical Associate Professors** V. Collier, L. Zellner; **Clinical Assistant Professors** G. Guerrero, A. Gundy, K. Peck-Parrott, J. R. Sandlin; **Senior Lecturer** J. R. Woosley

Educational Human Resource Development (EHRD)

101. **Introduction to Leadership Development in Higher Education.** (1-0). **Credit 1.** Exploration of leadership definitions and models focusing on leadership as a relational process; examination of the “how” and “why” and the interplay of relationships between leadership and the environment; discussion of complex organizations, community-building, and importance of coalitions; introduction of concept of renewal and maintaining a dynamic state.
102. **Introduction to Voluntary Student Organization Management in Higher Education I.** (1-0). **Credit 1.** Study current management practices used in voluntary student organizations in higher education; explore organizational theory, structure, dynamics and outcomes; review history, nature and types of organizations; discuss application of best practices.
103. **Management of Voluntary Student Organizations in Higher Education II.** (1-0). **Credit 1.** Review theory, structure and dynamics of voluntary student organizations in higher education; examine various decision-making models; establish framework to address adversity and apply decision-making models; identify role of voluntary student organizations in the enhancement of educational, cultural and social university environments.
104. **Service Learning.** (1-0). **Credit 1.** Discuss societal issues and citizens’ responsibility to address issues; create and participate in opportunities that relate academic study directly to community service; reflect on and process service experiences with emphasis on linking academic assignments with hands-on service; engage student in actions resulting in the common good.
105. **Social Justice Issues in Higher Education.** (1-0). **Credit 1.** Enable students to critically examine theoretical components of social justice issues in higher education; use critical pedagogy as an investigative tool to develop multiple perspectives of social justice issues; examine social systems at work; build skilled peer educators who can address issues of intergroup relations in multicultural contexts.
107. **Voices of the Civil Rights Movement.** (1-0). **Credit 1.** Explore political, social, psychological and economic influences of the Civil Rights era; discuss strategies, theories and leadership concepts employed during the movement; includes a tour to travel throughout southeastern United States; opportunity to meet key movement individuals, experience American history and cooperative leadership first-hand.

108. **Values Based Organizations in Higher Education. (1-0). Credit 1.** Explore history, core ideology, challenges and success of values based on organizational leadership; apply concepts with a focus on present and future implications; discuss leading companies' values based strategies and the resulting impact on public perception; translate principle applications to voluntary student organizations in higher education.
285. **Directed Studies. Credit 1 to 4.** Directed studies in specific problem areas of educational human resource development. Prerequisite: Approval of department head.
289. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of educational human resource development. May be repeated for credit. Prerequisite: Approval of instructor.
291. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in educational human resource development. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
301. **Methods of Teaching and Class Management. (3-0). Credit 3. I** Introduction to fundamentals of teaching as applied to industrial subjects; management of classes, equipment and supplies. Prerequisite: Junior or senior classification and approval of instructor.
303. **Foundations of Human Resource Development. (3-0). Credit 3.** Overview of the discipline and field of human resource development focus on how individuals and groups learn and interact with organizations including motivation, group dynamics, system theory, organizational culture, learning and change. Not intended for majors in business. Prerequisite: Junior or senior classification and approval of instructor.
310. **Course Making. (2-0). Credit 2. II** Methods of outlining courses of study to meet needs of different types of classes. Each student will prepare a complete course of study for some practical subject. Prerequisite: Junior or senior classification and approval of instructor.
345. **Computer Applications for Training and Development. (3-0). Credit 3.** Computer applications in human resource development; use of technology in solving organizational problems; application of computer technology to particular problems using pre-written application-development software. Prerequisite: Junior or senior classification and approval of instructor.
371. **Applied Learning Principles. (3-0). Credit 3.** The overarching purpose of the course is to influence adult educators to make more intentional choices toward developmental growth in their work with adult learners; focus on adult learning theories and work strategies; meets writing intensive course requirement. Prerequisite: Junior or senior classification and approval of instructor.
372. **Training and Development in HRD. (3-0). Credit 3.** Theory and applications of training and development in organizations; focus on rapid changes in technology, alterations in the cultures of organizations, dynamic market conditions, and the need for information sharing, planning for ongoing skill development in the for-profit and non-profit sectors. Prerequisite: Junior or senior classification and approval of instructor.
374. **Organizational Development. (3-0). Credit 3.** Introduction to major theories, concepts, skills and techniques for organization development in business and industry, education and the public sector. Prerequisite: Junior or senior classification and approval of instructor.
405. **Principles and Practices of Leadership in HRD. (3-0). Credit 3.** Theories and concepts associated with learning in individuals and organizations; overview of leadership theories and learning theories within a context of developing leadership programs. Prerequisite: Junior or senior classification and approval of instructor.
408. **Diversity Issues and Practices in HRD. (3-0). Credit 3.** Intended to help educators in HRD contexts to identify and understand diversity issues in work and community settings; emphasis on application of knowledge to professional practice of employees, educators, trainers and managers in an HRD context. Prerequisite: Junior or senior classification and approval of instructor.
465. **Television Production for Training and Development. (3-0). Credit 3.** Development of knowledge and skills towards the application of television production techniques in public education and corporate training settings; focus on practices, techniques, and tools for managers of training and development. Prerequisite: Junior or senior classification and approval of instructor.
466. **Advanced Television Production for Training and Development. (3-0). Credit 3.** Development of advanced knowledge and skills towards the application of television production techniques in public education and corporate training settings; focus on high level practices, techniques, and tools for managers of training and development. Prerequisite: Junior or senior classification and approval of instructor.

473. **Introduction to Distance Learning.** (3-0). **Credit 3.** Introduction to the field of distance learning; application of distance learning principles to educational and training settings via a variety of distance learning modalities. Prerequisite: Junior or senior classification and approval of instructor.
474. **Distance Networking for Training and Development.** (3-0). **Credit 3.** Development of knowledge towards application of telecommunication networking in public education and corporate training settings; technical alternatives for delivery of subject matter for educators and trainers. Prerequisite: Junior or senior classification and approval of instructor.
475. **Multimedia Development for Training and Instruction.** (3-0). **Credit 3.** Introduction to the development of multimedia as it applies to training and development; examine the application of multimedia principles to educational and training settings for both "face-to-face" and distance applications. Prerequisite: Junior or senior classification and approval of instructor.
476. **Managing Technical Networks.** (3-0). **Credit 3.** Development of knowledge and skills towards the application of technical network management in public education and corporate training settings; focus on practices, techniques and tools for managers of technical networks. Prerequisite: Junior or senior classification and approval of instructor.
479. **Grants and Contracts.** (3-0). **Credit 3.** Identify funding sources that support research and development activities; identify methods of securing funding; study state, national and private funding sources and how to become successful in submitting to each; complete a proposal to a funding agency and a management plan for a funded project. Prerequisite: Junior or senior classification and approval of instructor.
481. **Human Resource Development Seminar.** (3-0). **Credit 3.** Transition from an academic environment to a professional business environment; preparation of an individual professional portfolio; steps in searching and securing an internship position. Prerequisite: Junior or senior classification and approval of instructor.
484. **Professional Internship.** **Credit 1 to 12.** Directed internship in an organization to provide students with a learning experience supervised by professionals in organizational settings appropriate to the student's professional objectives; meets writing intensive course requirement. Prerequisites: EHRD 481; senior classification in major and approval of program advisor.
485. **Directed Studies.** **Credit 1 to 12 each semester. I, II, S** Directed readings or research problems in industrial education. Term report required. Prerequisite: Approval of department head.
489. **Special Topics in...** **Credit 1 to 4. I, II, S** Selected topics in an identified area of industrial education. May be repeated for credit. Prerequisite: Approval of instructor.
491. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in educational human resource development. May be repeated 2 times for credit. Prerequisites: Junior or senior classification and approval of instructor.

Department of Educational Psychology

Professors M. J. Ash, L. T. Benjamin, M. R. Benz (Head), M. Duffy, T. R. Elliott, E. T. Goetz, J. N. Hughes, R. M. Joshi, S. L. Knight, R. Lara-Alecio, J. F. McNamara, W. R. Nash, Y. N. Padron, D. J. Palmer, C. R. Reynolds, C. Riccio, C. Ridley, M. C. Sadoski, D. C. Simmons, B. Thompson, V. L. Willson; **Associate Professors** F. A. Bonner, D. F. Brossart, L. G. Castillo, L. D. Cifuentes, D. S. Davenport, J. C. Edwards, G. R. Elkins, Jr., S. Hagan-Burke, R. J. Hall, R. I. Parker, S. J. Pedersen, L. M. Stough, R. D. Zellner, D. Zhang; **Assistant Professors** J. Blake, L. J. Bowman-Perrott, M. D. Burke, A. J. Doss, J. E. Gonzalez, O.-M. Kwok, J. Liew, S. Pollard-Durodola, F. Tong, K. J. Vannest, M. Yoon; **Clinical Professors** C. J. Fournier, P. S. Lynch, W. A. Rae; **Clinical Assistant Professor** G. E. Byrns, A. L. McCormick, M. Walichowski; **Lecturers** J. E. Juntune, R. S. Woodward; **Assistant Lecturer** D. Palmer, K. Schmid

Educational Psychology (EPSY)

102. **Career Development.** (1-2). **Credit 2. I, II, S** Assists students in becoming more aware of their abilities, interests and values, with requirements of tentatively chosen careers and preparation programs, and with career decision processes; group and individual counseling, testing and independent study; designed for freshmen, sophomores and undeclared majors.
291. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in educational psychology. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.

320. **Child Development.** (3-0). **Credit 3. I, II, S** Growth and development of the normal child from infancy to adolescence; implications of children's cognitive, language and psychosocial development for success in academic and social interactions. Prerequisite: Junior or senior classification.
321. **Adolescent Development.** (3-0). **Credit 3. I, II, S** Characteristics of adolescent growth and development emphasizing behavior within secondary school setting; influences of prior development; home, family and community; peer group, as these affect school adjustment and success. Prerequisite: Junior or senior classification.
430. **Creativity Theories and Research.** (3-0). **Credit 3.** Theoretical base of creativity and the research methodologies used to study creativity. Prerequisite: Junior or senior classification.
431. **Personal Creativity and Giftedness.** (3-0). **Credit 3.** Personal giftedness and creativity and its inter-relativity with development, relationships, and learning. Prerequisite: Junior or senior classification.
432. **Creativity and Creative Problem Solving.** (3-0). **Credit 3.** Creativity research; historical background and application of the framework and tools of the Parnes/Osborn Creative Problem Solving Process. Prerequisite: Junior or senior classification.
433. **Lateral Thinking.** (3-0). **Credit 3.** Edward deBono's theories and approach to creativity known as lateral thinking which is used throughout the world to increase creative thinking in individuals. Prerequisite: Junior or senior classification.
435. **Educational Statistics.** (3-0). **Credit 3. I, II, S** Statistical concepts and techniques and their application in behavioral sciences. Prerequisite: Junior or senior classification.
459. **Practicum in Educating the Gifted and Talented.** (1-6). **Credit 3.** Theory and strategies for instruction and guidance of the gifted and talented through a supervised experience in a laboratory setting with gifted and talented children and/or adolescents. May be taken two times for credit. Prerequisites: Approval of department head and instructor; junior or senior classification.
484. **Field Experiences.** **Credit 1 to 6.** University-supervised experience in a professional employment setting related to specializations in guidance and special education. May be repeated to 6 hours total. Prerequisite: Approval of student's advisor and department head.
485. **Directed Studies.** **Credit 1 to 4. I, II, S** Research problems and readings in areas selected to supplement existing offerings; individual reports, oral and written, required. Prerequisites: Junior or senior classification; approval of instructor.
489. **Special Topics in...** **Credit 1 to 4. I, II, S** Selected topics in an identified area of educational psychology. May be repeated for credit. Prerequisite: Approval of instructor.
491. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in educational psychology. May be repeated 2 times for credit. Prerequisites: Junior or senior classification and approval of instructor.

Educational Psychology Field Based

(faculty, see page 675)

(EPFB)

210. **Family Involvement and Empowerment.** (2-3). **Credit 3.** Field-based course that provides information and skills necessary to work with diverse families; addresses need for positive school-family collaboration and characteristics of families throughout the life cycle, the collaboration of educators with families through the special education process, and the provision of family services through community agencies.
428. **Collaboration in School Settings.** (3-0). **Credit 3.** Strategies and skills for providing collaborative services in school settings with emphasis on problem solving; coordinated team functioning and delivery of services at the individual classroom and school building levels. Prerequisites: SPED 302; admission to program; junior or senior classification.
484. **Field Experiences.** **Credit 1 to 6.** University-supervised experience in a professional employment setting related to specializations in guidance and special education. May be repeated for credit up to 6 hours. Prerequisites: Admission to program; junior or senior classification.

Educational Technology

(faculty, see page 675)

(EDTC)

305. **Instructional Technology: Theory and Practice.** (1-2). **Credit 2. I, II, S** Theoretical and practical study of communication with emphasis on technology; laboratory experiences in the selection, preparation, use and evaluation of instructional materials. For undergraduate students with a minimum of prior educational training. Recommended for all Bachelor of Science degree candidates in the College of Education and Human Development. Prerequisite: Junior classification.
311. **Adaptive/Assistive Technology.** (3-0). **Credit 3.** Comprehensive overview of Adaptive/Assistive Technology (AT) solutions for persons with special needs. Prerequisites: Admission to Special Education program; junior or senior classification.
345. **Microcomputer Awareness for Educators.** (2-2). **Credit 3. I, II, S** Focus on both teacher and student utilization; overview of computer operations and instructional integration of word processor, database, spread sheet, and graphics utilities; telecommunications and Internet functions and resources accessed and developed; includes the design, development, and evaluation of instructional materials and integration of MultiMedia and HyperText resources and techniques. Prerequisite: Junior classification.
489. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of educational technology. May be repeated for credit. Prerequisite: Approval of instructor.

Department of Electrical and Computer Engineering

Professors S. P. Bhattacharyya, K. L. Butler-Purry, A. K. Chan, K. Chang, A. Datta, E. R. Dougherty, M. Ehsani, O. Eknayan, P. Enjeti, C. N. Georghiadis (Head), P. R. Hemmer, J. W. Howze, G. M. Huang, M. Kezunovic, L. B. Kish, M. Lu, C. K. Madsen, T. A. Maldonado, S. L. Miller, K. R. Narayanan, R. D. Nevels, C. Nguyen, A. L. N. Reddy, B. D. Russell, E. Sanchez-Sinencio, J. M. Seminario, W. Shi, C. Singh, C. B. Su, H. A. Toliyat, K. L. Watson, M. H. Weichold, S. M. Wright, Z. Xiong; **Associate Professors** P. E. Cantrell, S. G. Choi, D. R. Halverson, J. Hu, A. I. Karsilayan, D. Kundur, K. A. Michalski, S. A. Savari, E. Serpedin, J. Silva Martinez, X. Zhang; **Assistant Professors** U. Braga-Neto, J-F Chamberland, M. Cheng, X. Cheng, S. Cui, K. Entesari, A. Han, S. Hoyos, G. H. Huff, J. X. Ji, J. Kameoka, S. Khatri, P. Li, T. Liu, M. P. McDougall, H. D. Pfister, R. Righetti, S. Shakkottai, A. Sprintson, H. Wang, B. J. Yoon, J. Zou, T. Zourntos; **Senior Lecturers** W. C. Daugherty, B. Styblinski, J. Tyler

Electrical Engineering

(ECEN)

119. **Practice of Electrical and Computer Engineering.** (1-0). **Credit 1.** Discussion of some well-known and major contributions that electrical and computer engineers have made to society; development of the integrated circuit, advanced vehicle research, magnetic resonance imaging, communication and others.
214. **Electrical Circuit Theory.** (3-3). **Credit 4. I, II, S** Resistive circuits: circuit laws, network reduction, nodal analysis, mesh analysis; energy storage elements; sinusoidal steady state; AC energy systems; magnetically coupled circuits; the ideal transformer; resonance; introduction to computer applications in circuit analysis. Prerequisites: PHYS 208; MATH 308 or registration therein; admission to upper level in an engineering major.
215. **Principles of Electrical Engineering.** (2-2). **Credit 3. I, II** Fundamentals of electric circuit analysis and introduction to electronics for engineering majors other than electrical and computer engineering. Prerequisites: PHYS 208; Corequisite MATH 308; admission to upper level in an engineering major.
220. **Introduction to Digital Design.** (3-3). **Credit 4. I, II** Combinational and sequential digital system design techniques; design of practical digital systems. Prerequisite: CPSC 110 or equivalent. For students other than electrical engineering majors.
248. **Introduction to Digital Systems Design.** (3-3). **Credit 4. I, II, S** Combinational and sequential digital system design techniques; design of practical digital systems. Prerequisite: Admission to upper level in an engineering major.
285. **Directed Studies.** **Credit 1 to 4. I, II, S** Problems of limited scope approved on an individual basis intended to promote independent study. Prerequisite: Approval of department head.

289. **Special Topics in...** Credit 1 to 4. Selected topics in an identified area of electrical engineering. May be repeated for credit. Prerequisite: Approval of instructor.
291. **Research.** Credit 1 to 4. Research conducted under the direction of faculty member in electrical engineering. May be repeated 3 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
303. **Random Signals and Systems.** (3-0). Credit 3. Concepts of probability and random variables necessary for study of signals and systems involving uncertainty; applications to elementary problems in detection, signal processing and communication. Prerequisites: ECEN 214, MATH 308 or registration therein.
314. **Signals and Systems.** (3-1). Credit 3. I, II, S Introduction to the continuous-time and discrete-time signals and systems; time domain characterization of linear time-invariant systems; Fourier analysis; filtering; sampling; modulation techniques for communication systems. Prerequisites: ECEN 214; MATH 308.
322. **Electric and Magnetic Fields.** (3-0). Credit 3. I, II, S Vector analysis, Maxwell's equations, wave propagation in unbounded regions, reflection and refraction of waves, transmission line theory; introduction to waveguides and antennas. Prerequisites: ECEN 214; MATH 311 or registration therein; PHYS 208.
325. **Electronics.** (3-3). Credit 4. I, II, S Introduction to electronic systems; linear circuits; operational amplifiers and applications; diodes, field effect transistors, bipolar transistors; amplifiers and nonlinear circuits. Prerequisite: ECEN 314 or registration therein.
326. **Electronic Circuits.** (3-3). Credit 4. Basic circuits used in electronic systems; differential and multistage amplifiers; output stages and power amplifiers; frequency response, feedback circuits, stability and oscillators, analog integrated circuits, active filters. Prerequisites: ECEN 314 and 325.
338. **Electromechanical Energy Conversion.** (3-3). Credit 4. Introduction to magnetic circuits, transformers, electromechanical energy conversion devices such as dc, induction and synchronous motors; equivalent circuits, performance characteristics and power electronic control. Prerequisite: ECEN 214.
350. **Computer Architecture and Design.** (3-3). Credit 4. Computer architecture and design; use of register transfer languages and simulation tools to describe and simulate computer operation; central processing unit organization, microprogramming, input/output and memory system architectures. Prerequisite: ECEN 248. Cross-listed with CPSC 350.
351. **Applied Electromagnetic Theory.** (3-0). Credit 3. Guided waves; applications of Maxwell's equations and electromagnetic wave phenomena to radiation, antenna design and optics; numerical techniques in electromagnetics. Prerequisite: ECEN 322.
370. **Electronic Properties of Materials.** (3-0). Credit 3. I, II Introduction to basic physical properties of solid materials; some solid state physics employed, but major emphasis is on engineering applications based on semiconducting, magnetic, dielectric and superconducting phenomena. Prerequisite: PHYS 222.
405. **Electrical Design Laboratory.** (1-6). Credit 3. I, II, S Introduction to the design process and project engineering as practiced in industry; student teams apply the design process by developing a project from proposal through test and evaluation. Prerequisites: ENGL 210 or 301, completion of selected major field courses, senior classification and project approval.
410. **Introduction to Medical Imaging.** (3-0). Credit 3. Introduction to the physics and the engineering principles of medical imaging systems; focus on magnetic resonance imaging, x-ray computer tomography, ultrasonography, optical imaging and nuclear medicine; includes system structure, source generation, energy tissue interaction, image formation and clinical examples. Prerequisites: MATH 222 or 251 or 253; junior or senior classification.
411. **Introduction to Magnetic Resonance Imaging and Magnetic Resonance Spectroscopy.** (2-3). Credit 3. Introduction to the basic physics of magnetic resonance, the principles of MR imaging and spectroscopy, the major contrast mechanisms in MRI and MR imaging system hardware; development of pulse sequences for different imaging methods, including flow and spectroscopic imaging; will build RF coils. Prerequisites: Junior or senior classification; MATH 251, PHYS 208.
420. **Linear Control Systems.** (3-0). Credit 3. I, II Application of state variable and frequency domain techniques to modeling, analysis and synthesis of single input, single output linear control systems. Prerequisites: ECEN 314; MATH 308.
421. **Digital Control Systems.** (3-0). Credit 3. Feedback systems in which a digital computer is used to implement the control law; Z-transform and time domain methods serve as a basis for control systems design. Effects of computer word length and sampling rate. Prerequisite: ECEN 420 or equivalent.

422. **Control Engineering and Design Methodology.** (2-3). **Credit 3.** Modeling, specifications, rating and operating principles of sensors, actuators and other control system components; experiments on conceptual design, simulation and physical implementation of control systems. Prerequisite: ECEN 420 or equivalent.
438. **Power Electronics.** (3-3). **Credit 4.** I Electric power conditioning and control; characteristics of solid state power switches; analysis and experiments with AC power controllers, controlled rectifiers, DC choppers and DC-AC converters; applications to power supplies, airborne and spaceborne power systems. Prerequisite: Junior or senior classification in electrical engineering or approval of instructor.
440. **Introduction to Thin Film Science and Technology.** (3-0). **Credit 3.** The course focuses on the thin film technology in semiconductor industry; topics include the basic growth mechanisms for thin films (growth models, lattice matching epitaxy and domain matching epitaxy), the instrumental aspects of different growth techniques and advanced topics related to various applications. Prerequisites: Junior or senior classification; admission to upper level in College of Engineering.
441. **Electronic Motor Drives.** (3-3). **Credit 4.** Application of semiconductor switching power converters to adjustable speed DC and AC motor drives; steady state theory and analysis of electric motion control in industrial, robotic and traction systems; laboratory experiments in power electronic motor drives and their control. Prerequisite: Junior or senior classification in electrical engineering.
442. **DSP Based Electromechanical Motion Control.** (2-3). **Credit 3.** Overview of energy conversion and basic concepts on electromechanical motion devices; different control strategies including the solid-state drive topologies; for every electromechanical motion device, its DSP control implementation discussed and implemented in the lab. Prerequisites: ECEN 314 or approval of instructor; junior or senior classification.
444. **Digital Signal Processing.** (3-0). **Credit 3.** Digital signal processing; discrete-time signals and systems, linear shift-invariant systems, the discrete Fourier transform and fast Fourier transform algorithm, and design of finite impulse response and infinite impulse response digital filters. Prerequisite: ECEN 314.
447. **Digital Image Processing.** (3-3). **Credit 4.** Improvement of pictorial information using spatial and frequency domain techniques; two-dimensional discrete Fourier transform; image filtering, enhancement, restoration, compression; image processing project. Prerequisites: ECEN 444; familiarity with C programming.
448. **Real-Time Digital Signal Processing.** (2-3). **Credit 3.** Features and architectures of digital signal processing chips; assembly language programming; software development tools; real-time implementation of FIR filters, IIR filters, and the FFT algorithms; signal processing project. Prerequisites: ECEN 444; familiarity with C programming.
449. **Microprocessor Systems Design.** (2-2). **Credit 3.** Introduction to microprocessors; 16/32 bit single board computer hardware and software designs; chip select equations for memory board design, serial and parallel I/O interfacing; ROM, static and dynamic RAM circuits for no wait-state design; assembly language programming, stack models, subroutines and I/O processing. Prerequisite: ECEN 248.
450. **Computer Interfacing and Communications.** (3-3). **Credit 4.** Hardware and software aspects of interfacing microcomputers and minicomputers to memory; peripheral and communication devices. Prerequisites: ECEN 248 and 449.
451. **Antenna Engineering.** (3-0). **Credit 3.** Introduction to antenna theory and design; includes antenna performance parameters, analysis of radiation from sources using Maxwell's equations, theory and design of wire antennas, arrays and frequency independent antennas; computer methods for antenna design. Prerequisite: ECEN 322.
452. **Ultra High Frequency Techniques.** (2-3). **Credit 3.** Introduction to theory and practice of ultra high frequency radio wave generation, transmission and radiation; application of Maxwell's equations to transmission of electrical energy in wave guides. Prerequisites: ECEN 322; ECEN 351 or registration therein.
453. **Microwave Solid-State Circuits and Systems.** (3-0). **Credit 3.** Microwave solid-state devices and circuits; theory and design of various types of active circuits; applications of these devices and circuits in radar, communication and surveillance systems. Prerequisite: ECEN 322.
454. **Digital Integrated Circuit Design.** (2-2). **Credit 3.** Analysis and design of digital devices and integrated circuits using MOS and bipolar technologies and computer aided simulation. Prerequisites: ECEN 214 and 248.

455. **Digital Communications.** (3-3). **Credit 4.** Digital transmission of information through stochastic channels; analog-to-dialog conversion, entropy and information, Huffman coding; signal detection, the matched-filter receiver, probability of error; baseband and passband modulation, signal space representation of signals, PAM, QAM, PSK, FSK; block coding, convolutional coding; synchronization; communication through fading channels; spread-spectrum signaling; simulation of digital communication systems. Prerequisite: ECEN 314.
456. **Communication Theory.** (3-0). **Credit 3.** Frequency domain and time domain response of linear systems; analog modulation methods including amplitude modulation, frequency modulation and phase modulation; signal and noise modeling using probabilistic descriptions; narrowband random processes and the performance of analog modulation techniques in the presence of noise; design of communication links. Prerequisite: ECEN 314.
457. **Operational Amplifiers.** (3-3). **Credit 4.** Analysis of basic operational amplifier and operational transconductance amplifier (OTA) circuits; noise analysis in Op amp and OTA circuits; nonlinear OTA and Op amp circuits; instrumentation amplifiers; transducer circuits; function generators; oscillators and D/A converters and basics of switched-capacitor circuits. Prerequisite: ECEN 326.
458. **Active Filter Analysis and Design.** (3-3). **Credit 4.** Systematic analysis and design for active RC filters; continuous-time; switched-capacitor circuits; filter approximations; synthesis techniques; sensitivity; practical considerations for monolithic integrated filters; experimental and computer-simulation verification. Prerequisite: ECEN 325.
459. **Power System Fault Analysis and Protection.** (3-2). **Credit 4.** General considerations in transmission and distribution of electrical energy as related to power systems; calculation of electric transmission line constants; general theory of symmetrical components and application to analysis of power systems during fault conditions. Prerequisite: ECEN 215 or 314.
460. **Power System Operation and Control.** (3-2). **Credit 4.** Load flow studies; power system transient stability studies; economic system loading and automatic load flow control. Prerequisite: ECEN 215 or 314.
462. **Optical Communication Systems.** (3-0). **Credit 3.** Principles of optical communication systems; characteristics of optical fibers, lasers and photodetectors for use in communication systems; design of fiber-optic digital systems and other optical communication systems. Prerequisites: ECEN 322 and 370.
464. **Optical Engineering.** (3-0). **Credit 3.** Ray optics; wave optics; propagation, reflection, refraction and diffraction of light; passive optical components, polarization, optical modulators, interferometers and lasers. Prerequisites: ECEN 322 and 370.
468. **Advanced Logic Design.** (3-3). **Credit 4.** Introduction to the design, modeling and verification of complex digital systems; modern design methodologies for logic design; development of tools for the design and testing of digital systems. Prerequisite: ECEN 248.
469. **Advanced Computer Architecture.** (3-0). **Credit 3.** Introduction to advanced computer architectures including memory designs, pipeline techniques, and parallel structures such as vector computers and multiprocessors. Prerequisite: ECEN 350 or CPSC 321. Cross-listed with CPSC 469.
472. **Microelectronic Circuit Fabrication.** (3-3). **Credit 4.** Fundamentals of MOS and bipolar microelectronic circuit fabrication; theory and practice of diffusion, oxidation, ion implantation, photolithography, etch; yield and reliability considerations; statistical process control; integrated process design, simulation and characterization. Prerequisites: ECEN 325 and 370.
473. **Microelectronic Device Design.** (3-0). **Credit 3.** General processes for the fabrication of microelectronic devices and integrated circuits; a review of the electronic properties of semiconductors and carrier transport and recombination; analysis and characterization of p-n junctions, bipolar transistors, and MOS capacitors and transistors; design considerations for achieving optimum performance and practical structures are discussed. Prerequisites: ECEN 325, 370.
474. **VLSI Circuit Design.** (3-3). **Credit 4.** Analysis and design of monolithic analog and digital integrated circuits using NMOS, CMOS and bipolar technologies; device modeling; CAD tools and computer-aided design; design methodologies for LSI and VLSI scale circuits; yield and economics; test and evaluation of integrated circuits. Prerequisite: ECEN 326.
475. **Introduction to VLSI Systems Design.** (3-3). **Credit 4.** Introduction to design and fabrication of microelectronic circuits; emphasis on very large scale integration (VLSI) digital systems; use of state-of-the-art design methodologies and tools; design of small to medium scale integrated circuits for fabrication. Prerequisites: ECEN 248 and 325.

476. **Neural Networks and Implementations.** (3-3). **Credit 4.** Analysis of neural network architectures; underlying principles, circuit implementations, and the application of neural networks to practical problems. Prerequisite: Senior classification.
478. **Wireless Communications.** (3-0). **Credit 3.** Overview of wireless applications, models for wireless communication channels, modulation formats for wireless communications, multiple access techniques, wireless standards. Prerequisites: ECEN 455; junior or senior classification.
480. **RF and Microwave Wireless Systems.** (3-0). **Credit 3.** Introduction to various RF and microwave system parameters, architectures and applications; theory, implementation, and design of RF and microwave systems for communications, radar, sensor, surveillance, navigation, medical and optical applications. Prerequisite: ECEN 322.
485. **Directed Studies.** **Credit 1 to 6 each semester. I, II, S** Problems of limited scope approved on an individual basis intended to promote independent study. Prerequisites: Senior classification; approval of department head.
489. **Special Topics in...** **Credit 1 to 4. I, II, S** Selected topics in an identified area of electrical engineering. May be repeated for credit. Prerequisite: Approval of instructor.
491. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in electrical engineering. May be repeated 3 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor.

Dwight Look College of Engineering (ENGR)

101. **Energy: Resources, Utilization and Importance to Society.** (3-1). **Credit 4.** Introductory course about current and potential energy sources, the link between energy and wealth, and the consequences of action or inaction concerning energy and the environment.
111. **Foundations of Engineering I.** (1-3). **Credit 2. I, II, S** Introduction to the engineering profession, ethics, and disciplines; development of skills in teamwork, problem solving and design; other topics included, depending on the major, are: emphasis on computer applications and programming; visualization and CAD tools; introduction to electrical circuits, semiconductor devices, digital logic, communications and their application in systems; Newton's laws, unit conversions, statistics, computers, Excel; basic graphics skills; visualization and orthographic drawings. Corequisites: MATH 151; admission to the Dwight Look College of Engineering.
112. **Foundations of Engineering II.** (1-3). **Credit 2. I, II, S** Continuation of ENGR 111. Topics include, depending on the major: emphasis on computer applications and programming and solids modeling using CAD tools or other software; fundamentals of engineering science; advanced graphic skills. Prerequisites: ENGR 111; MATH 151; approval of instructor may also be required.
281. **Engineering Scholars Program Seminar I.** (1-0). **Credit 1. II** Survey of interdisciplinary topics related to the professional practice of engineering; seminars with practicing professionals in industry and government. To be taken on a satisfactory/unsatisfactory basis. Prerequisites: Engineering Scholars Program membership; sophomore classification.
289. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of engineering. May be repeated for credit. Prerequisite: Approval of instructor.
301. **College of Engineering Study Abroad.** **Credit 1 to 18.** For students in approved programs abroad. May be repeated for credit. Prerequisites: Admission to approved program; approval of study abroad coordinator.
381. **Engineering Scholars Program Seminar II.** (1-0). **Credit 1. I** Exploration of research and development opportunities; university and industry research; research commercialization. To be taken on a satisfactory/unsatisfactory basis. Prerequisite: ENGR 281.
385. **Problems for Co-Op Students.** **Credit 1 to 3 each semester. I, II, S** Special problems in engineering for cooperative education students. Problems related to student's work assignment culminating in a research paper. Three hours may be used as technical elective, and one additional hour may be used as free elective. A total of 4 hours may be used toward graduation. Prerequisite: Approval of department head.

400. **Public Leadership Development.** (3-0). **Credit 3. I, II** Major issues in the study of public leadership, development of leadership skills, and a field investigation done in conjunction with local public leaders. Prerequisites: Junior or senior classification and approval of instructor. Cross-listed with AGED 400 and CARC 400.
401. **Interdisciplinary Design.** (2-3). **Credit 3.** Instruction and practice in the following design process applied to an interdisciplinary design project: establish the customer need; determine requirements in terms of function (what) and performance (how well); develop alternative design concepts; perform trade-off studies among performance, cost and schedule; embodiment and detail design; iterate the above steps; major interdisciplinary design project. Prerequisites: Senior classification and approval of instructor.
402. **Interdisciplinary Design II.** (2-3). **Credit 3.** Product detail and design development process including case studies; may include project management, marketing considerations, manufacturing detailed design specifications; failure modes, applications of codes and standards, selection of design margins; product (component) development guidelines; intellectual property, product liability and ethical responsibility. Prerequisites: ENGR 401; junior or senior classification.
410. **Global Engineering.** (3-0). **Credit 3.** A framework for the systematic study of important facets of an international engineering project; decision making methods that allow the integration of quantitative and qualitative information; applications of the framework and decision methods using real case studies. Prerequisite: Junior or senior classification or approval of instructor.
442. **Mechanics of European Structures.** (3-0). **Credit 3.** Design and construction of major structures in Europe from 1st century BC to 16th century; masonry design and construction techniques; mechanics of columns, arches, vaults, walls, buttresses and other components; modern analysis techniques applied to historic structures. Prerequisites: CVEN 305 or equivalent; approval of instructor; junior or senior classification.
482. **Ethics and Engineering.** (2-2). **Credit 3. I, II** Development of techniques of moral analysis and their application to ethical problems encountered by engineers, such as professional employee rights and whistle blowing; environmental issues; ethical aspects of safety, risk and liability and conflicts of interest; emphasis on developing the capacity for independent ethical analysis of real and hypothetical cases. Prerequisite: Junior classification. Cross-listed with PHIL 482.
483. **Energy and the Environment.** (3-0). **Credit 3.** Introduction to methods to generate electricity including actual overall costs, efficient use and conservation; political and ethical issues associated with energy use in the world. Prerequisite: Junior or senior level in engineering.
484. **International Engineering Internship.** (6-0). **Credit 6.** International Engineering Internship. Prerequisite: Junior or senior classification.
489. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified field of engineering. May be repeated for credit.
491. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in the College of Engineering. May be repeated 3 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor.

Engineering Design Graphics

(faculty, see page 683)

(ENDG)

105. **Engineering Graphics.** (0-6). **Credit 2. I, II, S** Graphical approach to the engineering design process as applied to products; methods of graphical communications, three-dimensional geometry, working drawings, data analysis and computer graphics; introduction to team dynamics and creative problem solving.
407. **Computer Design Graphics.** (3-0). **Credit 3. I, II, S** Use of microcomputers with currently available CAD software as an aid in the design process and as a means of increasing engineering productivity. Review of ANSI standards and an introduction to a variety of computer graphics applications encountered in industry; user-oriented. Prerequisite: ENDG 105 or ENGR 112 or equivalent.
408. **Computer Graphics.** (3-0). **Credit 3. I, II** Current applications of computer graphics to produce orthographic views and rendered pictorials; introduction to several computer graphics software packages including applications in 3-D, parametric solid modeling, animation and rapid prototyping. Prerequisite: ENDG 105 or 407 or ENGR 112.

409. **Professional Computer Animation.** (3-0). **Credit 3. II** Advanced studies in computer graphics with an emphasis on the intricacies of graphical design and how it applies to a cohesive project design. Prerequisites: ENDG 407 and 408; junior or senior classification.
485. **Directed Studies.** **Credit 1 to 3. I, II, S** Special problems in engineering design graphics to fit needs of individual students. Prerequisite: Approval of instructor.
489. **Special Topics in...** **Credit 1 to 4. I, II, S** Selected topics in an identified field of engineering design graphics. Prerequisite: Approval of instructor.

Department of Engineering Technology and Industrial Distribution

Professors W. W. Buchanan (Head), D. F. Jennings, V. J. Leon, J. A. Morgan, B. Zoghi; **Associate Professors** R. W. Bolton, J. L. Fike, R. J. Fink, S. Hsieh, N. P. Hung, F. B. Lawrence, J. R. Porter, A. H. Price, J. Wang; **Assistant Professors** J. A. Alvarado, R. A. Beasley, I. Capar, A. Fang, A. E. Goulart, R. E. Groom, M. D. Johnson, A. Narayanan, M. Natarajarthinam, W. Zhan; **Senior Lecturers** M. M. Harper, M. M. Whiteacre, G. B. Wright; **Lecturers** N. Clark, J. Dorribo-Camba, M. R. Golla, R. Hutchinson, R. Lorenzo, L. McDaniels, L. W. Muehe, J. Otey, T. E. Raborn, L. P. Till

Engineering Technology (ENTC)

120. **Introduction to Quality Assurance.** (1-0). **Credit 1. II** Importance of quality to the competitiveness of service and manufacturing businesses; Deming's management philosophies; teamworking; basic techniques for problem solving; process diagnosing and improvement; process variability.
181. **Manufacturing and Assembly Processes I.** (2-3). **Credit 3. I, II, S** A survey of metal manufacturing processes; traditional machining, non-traditional machining, welding, fabrication, casting and assembly. Prerequisite: ENDG 105 or ENGR 111 or registration therein.
200. **Introduction to Manufacturing Processes.** (2-3). **Credit 3. I, II** Overview of basic metallic manufacturing processes: machining, welding, fabricating and computer-aided manufacturing; current technology and economic comparisons. Prerequisite: ENDG 105 or ENGR 111 or registration therein.
206. **Nonmetallic Materials.** (2-3). **Credit 3. I, II** Introduction to structure, properties, processing and application of forest products, plastics, ceramics and composites; laboratory includes processing, physical and mechanical testing, applications, surface treatment and material identification. Prerequisite: CHEM 102 or 107.
207. **Metallic Materials.** (2-3). **Credit 3. I, II** Introduction to structure, properties and engineering application of ferrous and nonferrous materials; beneficiation, production of ferrous and nonferrous metals, destructive and nondestructive testing, protective coatings, strengthening and heat treatment; laboratory includes metallographic procedures, mechanical testing, heat treatment, surface treatment, corrosion testing, recrystallization and failure analysis. Prerequisite: CHEM 102 or 107.
210. **Circuit Analysis I.** (3-2). **Credit 4. I, II, S** Electric and magnetic principles of components used in DC circuits; transient analysis; Ohm's and Kirchhoff's laws, Thevenin's and Norton's theorems, mesh and nodal equations; measurement of current, voltage and waveforms with meters and oscilloscopes. Prerequisite: MATH 151.
211. **Circuit Analysis II.** (3-2). **Credit 4. I, II, S** Continuation of ENTC 210. Multiloop and multinode circuit networks; phasor analysis of networks, resonance, bridge circuits, Fourier components of waveforms, passive filter networks, frequency response, Laplace transformation, practice in measurements. Prerequisites: ENTC 210; MATH 152.
215. **Introduction to Telecommunications.** (3-2). **Credit 4. I, II** Survey of the telephone industry; analysis of modulations and multiplexing (FDM, TDM); introduction to transmission media (cable pairs, radio, satellites and fiber optics) and to switching (multistage, space and time division). Overview of the major services offered by several common carriers. Prerequisite: PHYS 208 for ENTC majors or PHYS 202 for non-majors.

216. **Semiconductor Process Technology.** (3-0). **Credit 3.** Basic principles and techniques involved in semiconductor manufacturing; process descriptions; terminology; equipment requirements; process controls; basic semiconductor physics and process chemistry combined with control schemes to arrive at overall systems descriptions. Field trips may be required for which departmental fees may be assessed. Prerequisites: CHEM 107; PHYS 201 or 218.
219. **Digital Electronics.** (2-2). **Credit 3. I, II, S** Survey of digital applications, number systems, digital logic devices and circuits, sequential logic.
249. **Advanced Digital Electronics.** (3-2). **Credit 4. I, II** Sequential logic analysis and basic design; computer-based design and simulation of discrete implementation of digital logic using MSI, programmable logic and field programmable gate array devices. Prerequisite: ENTC 219.
250. **Introduction to Electronics Technology.** (2-2). **Credit 3. I, II** Hardware and software tools used in the electronics industry; software tools include LabVIEW and PSPICE; designed for anyone who needs knowledge, awareness and working familiarity of the software tools used in industry.
275. **Mechanics for Technologists.** (4-0). **Credit 4. I, II** Forces, moments and couples in 2-D and 3-D systems; equilibrium of rigid bodies; friction and applications; centroids and moments of inertia; review of particle dynamic principles; kinematics and kinetics of rigid bodies; principles of impulse-momentum and work-energy; computer use in selected areas. Prerequisites: MATH 152; PHYS 218.
281. **Manufacturing and Assembly Processes II.** (2-3). **Credit 3. I, II** Continuation of ENTC 181. Economics and manufacturability in polymer molding processes; assembly (fits and tolerances); compatibility of metallic and non-metallic discrete parts. Prerequisites: ENTC 181 and 206.
289. **Special Topics in...** **Credit 1 to 4. I, II, S** Selected topics in an identified area of engineering technology. May be repeated for credit. Prerequisite: Approval of instructor.
303. **Fluid Mechanics and Power.** (3-2). **Credit 4. I, II** Fluid mechanics and fluid power applications for technologists; fluid properties; conservation of energy and momentum; incompressible flow in pipes; standard symbols: components and control of hydraulic systems and pneumatic systems. Prerequisites: ENTC 275; admitted to major degree sequence (upper-level) in engineering technology.
313. **Industrial Welding Processes.** (2-3). **Credit 3. II** Theory and practical applications of industrial welding and cutting processes; experience in operation of various machines and processes. Prerequisites: ENTC 181 and 207; admitted to major degree sequence (upper-level) in engineering technology.
315. **Local-and-Metropolitan-Area Networks.** (3-2). **Credit 4. I, II** Design, operation, application and management of LANs and MANs; topologies, cabling systems, protocols, bridges, routers, hubs, switches, security; media and transport systems; Internet and TCP/CP topics including the protocol stack, router operation and addressing issues. Prerequisites: ENTC 215; admitted to major degree sequence (upper-level) in engineering technology.
320. **Quality Assurance.** (2-3). **Credit 3. I, II, S** Applied statistical process control and design-of-experiment techniques for quality improvement and process characterization; emphasis on organizations operating in a continuous-improvement, customer-driven environment; statistical thinking; control charts; capability analysis of product, process and measurement system; experimental process characterization, prediction models and input variable control. Prerequisites: STAT 211; admitted to major degree sequence (upper-level) in engineering technology.
325. **Telecommunications Services Analysis.** (3-0). **Credit 3. I** Survey of topics dealing with: the telephone network from a regulatory point of view; reduction of telecommunication costs; WATS, FX and PL lines; common carriers; PABX evaluations, operation and management; interconnect and by-pass; telex and related networks; introduction to traffic theory. Prerequisites: ENTC 215; STAT 211; admitted to major degree sequence (upper-level) in engineering technology.
345. **Telecommunications Testing Techniques.** (3-2). **Credit 4. I** Testing techniques used in public and private telephone networks: attenuation and level measurements; linear distortions; bit error rates and related topics; fiber optic principles, link design and testing; testing copper cables. Prerequisites: ENTC 315; CPSC 206; admitted to major degree sequence (upper-level) in engineering technology.
349. **Microprocessors.** (3-2). **Credit 4. I, II** Microprocessors including types of circuits and how they function; architecture of microprocessors; instruction sets and how they are programmed. Prerequisites: ENTC 249; CPSC 206; admitted to major degree sequence (upper-level) in engineering technology.

350. **Electronic Devices and Circuits. (3-2). Credit 4. I, II** Semiconductor diodes, bipolar junction transistors, junction field effect transistors, operational amplifiers; diode applications, transistor biasing, transistor DC and AC models, operational amplifier theory; various transistor amplifiers in cascade and cascode configurations and operational amplifier applications. Prerequisites: ENTC 211; admitted to major degree sequence (upper-level) in engineering technology.
351. **Electronic Devices and Circuits II. (3-2). Credit 4. I, II** Analysis and design using integrated circuits; typical industrial applications of operational amplifiers, Norton amplifiers, 3-terminal regulators, waveform generators and active filters. Prerequisite: ENTC 350.
352. **Introduction to Mixed-Signal Test and Measurement. (3-2). Credit 4. I, II** Testing of mixed-signal circuits for signal processing and interfacing between the circuit under test and state-of-the-art test equipment; concepts include test specifications, parametric testing, measurement accuracy, test hardware, DSP-based testing, analog and sampled channel testing, and focused calibrations. Prerequisites: ENTC 350; admitted to major degree sequence (upper-level) in engineering technology.
355. **Electromagnetics and High Frequency Systems. (3-2). Credit 4. I, II** High frequency concepts including topics in basic electromagnetics, transmission lines, antennas, and RF circuit design; applications including wireless communication systems, fiber optic systems, and high frequency PCB layout. Prerequisites: ENTC 211; PHYS 208; admitted to major degree sequence (upper-level) in engineering technology.
359. **Electronic Systems Interfacing. (3-2). Credit 4. I, II** Computer-based data acquisition and process control using graphical development environment; interfacing techniques include digital input/output, analog input/output, counter/timer applications, common transducers/signal conditioning and data communication methods. Prerequisites: ENTC 349 and 350; admitted to major degree sequence (upper-level) in engineering technology.
361. **Solids Modeling and Analysis. (2-2). Credit 3. I, II** Fundamentals of part geometry development and mechanical assembly; simple finite element analysis used to evaluate and optimize design; rapid prototyping of simple product models. Prerequisite: ENTC 376; admitted to major degree sequence (upper-level) in engineering technology.
363. **Mechanical Design Applications I. (3-0). Credit 3. I, II** Principles of design of mechanical components; theories of failure; Soderberg and Goodman diagrams; fatigue and fracture design criteria; materials and their selection to engineering applications; component assembly aspects; design of fasteners and springs as examples. Prerequisites: ENTC 376; admitted to major degree sequence (upper-level) in engineering technology.
369. **Software Systems Technology. (3-2). Credit 4. I, II** Technical aspects of digital computer software systems, with emphasis on embedded real-time systems, programming techniques and development methodologies. Prerequisites: ENTC 349; admitted to major degree sequence (upper-level) in engineering technology.
370. **Thermodynamics for Technologists. (3-2). Credit 4. I, II, S** Thermal and mechanical energy transformations; relationships applied to flow and non-flow processes in power and refrigeration cycles; devices include compressors, turbines, heat exchangers, nozzles, diffusers, pumps and piston-cylinder models; computer modeling. Prerequisites: PHYS 218; admitted to major degree sequence (upper-level) in engineering technology.
373. **Power Technology. (2-2). Credit 3. I, II, S** Primary power sources and mechanical power transmission methods; experimental application of the related theory. Prerequisites: IDIS 300; admitted to major degree sequence (upper-level) in engineering technology.
376. **Strength of Materials. (3-2). Credit 4. I, II** Stress and strain; elastic moduli Poisson's ratio; torsion, bending, unsymmetrical bending; design of beams and shafts; deflection of beams; buckling of columns; material and strength characterization laboratory tests. Prerequisites: ENTC 207 and 275; admitted to major degree sequence (upper-level) in engineering technology.
377. **Applied Vibration for Technologists. (2-2). Credit 3. I, II** Elements of mechanical vibrations for engineering technologists; undamped, damped, free and forced vibration of single degree freedom systems, multi-degree of freedom systems; vibration absorbers; vibration testing methods and measurement; transient motion and computer analysis of vibrations. Prerequisites: ENTC 376 and 395; admitted to major degree sequence (upper-level) in engineering technology.

380. **Computer-Aided Manufacturing.** (2-3). **Credit 3. I, II, S** Basic concepts in computer-aided manufacturing with emphasis on a system approach to manufacturing activities; use of numerical control machine tools and other computer based software as applied to different industries. Prerequisites: ENTC 181; MATH 151; admitted to major degree sequence (upper-level) in engineering technology.
383. **Manufacturing Information Systems.** (3-3). **Credit 4. I, II** Use of information technology for manufacturing enterprise applications, including computer-integrated manufacturing, database, computer networking, web-technology and enterprise resource planning. Prerequisites: ENTC 380; admitted to major degree sequence (upper-level) in engineering technology.
395. **Electro-Mechanical Systems for Technologists.** (3-2). **Credit 4. I, II** Model development and analysis; simulation and experimentation of physical open and closed loop systems; integration of graphical user interface and math-analysis software to study dynamic characteristics of simple industry-type systems. Prerequisites: PHYS 208; admitted to major degree sequence (upper-level) in engineering technology.
402. **Inspection Methods and Procedures.** (2-2). **Credit 3. I, II** Methods and procedures in nondestructive inspection of materials and industrial products; ultrasonics, dye penetrants, magnetic particle, radiography and supportive evaluation methods such as weld sectioning, polishing, etching and macroscopic analysis. Prerequisites: ENTC 281 and 376; admitted to major degree sequence (upper-level) in engineering technology.
403. **Fluid Power Technology.** (2-2). **Credit 3. I, II, S** Design and characteristics of fluid power systems and their adaptation to specific industrial problems of manufacture and consumer equipment. Prerequisites: ENTC 373 or approval of instructor; admitted to major degree sequence (upper-level) in engineering technology.
405. **Weldability of Ferrous Metals.** (3-0). **Credit 3. I** Applied principles of metallurgy with reference to weldability of ferrous metals. Prerequisites: ENTC 207 or MEEN 340; ENTC 313 or approval of instructor; admitted to major degree sequence (upper-level) in engineering technology.
407. **Instrumentation and Controls.** (2-2). **Credit 3. I, II** Study of measurements; collection and use of real-time data; use of instrumentation, sensors, data acquisition equipment, programmable controllers; errors in measurements; signal processing and process control. Prerequisites: ENTC 219; admitted to major degree sequence (upper-level) in engineering technology.
410. **Manufacturing Automation and Robotics.** (2-3). **Credit 3. I, II** Hardware for automated work handling, conveyors, loaders, robots, storage devices; power sources and methods of control, electric motors, controllers, program logic controllers, robot programming; interfacing of equipment controls; and manufacturing work cells. Prerequisites: ENTC 361 and 380; IDIS 300; admitted to major degree sequence (upper-level) in engineering technology.
411. **Fixtures and Tooling Systems.** (2-2). **Credit 3.** Principles of fixturing of workpieces in manufacturing processes; various types of fixturing systems employed in industry and their applications; machining tooling systems employed in industry and their application principles. Prerequisites: ENTC 181; ENTC 380 or ENDG 407; admitted to major degree sequence (upper-level) in engineering technology.
412. **Production and Inventory Planning.** (2-2). **Credit 3. I, II** An introductory treatment of models and techniques for the planning of production and inventory systems. Prerequisites: ISEN 302; completion of junior-level courses; admitted to major degree sequence (upper-level) in engineering technology.
414. **Micro/Nano Manufacturing.** (2-3). **Credit 3. I** Product miniaturization and impact; review of atomic structure, electrical and physical properties of materials; ultraprecision machining; microlithography; dry and wet etching/sputtering techniques; isotropic and anisotropic processes; pattern transfer with additive processes; surface micromachining; microreplication processes; introduction to packaging technology and nanometrology; manufacturing of selected microsystems (MEMS) and their applications. Prerequisites: CHEM 107; PHYS 208; senior or graduate in engineering or science; admitted to major degree sequence (upper-level) in engineering technology for ENTC majors.
415. **Digital Transmission and Switching.** (3-2). **Credit 4. I** Digital transmission and switching techniques used in telephone networks: A/D conversion; PAM, PCM, ADPCM, CVSD, LPC, vocoders; pulse transmission; line codes; TDM; DSI; and DS3 signals; digital switching; T, S, TSST; network synchronization; SONET; frame relay; ISDN; VoIP; ATM. Prerequisites: ENTC 215; admitted to major degree sequence (upper-level) in engineering technology.

419. **Technical Project Management.** (3-0). **Credit 3. I, II** Fundamentals of technical project management and associated topics; planning and approval activities necessary to prepare a formal technical proposal including scope, time, cost, quality, and risk for following semester's technical design project. Prerequisites: Senior classification; approval of instructor; must be taken semester immediately preceding ENTC 420; admitted to major degree sequence (upper-level) in engineering technology.
420. **Engineering Technology Projects.** (2-4). **Credit 3. I, II** Team approach to analysis and design of basic industrial-level projects; use of standard components and proven design techniques. Prerequisites: ENTC 419; must be taken semester of graduation or by approval of instructor; admitted to major degree sequence (upper-level) in engineering technology.
421. **Mechanical Technology Projects.** (1-3). **Credit 2. I, II** Team approach to analysis and design of basic industrial-level projects; integration of concepts learned in previous required courses; capstone learning experience. Prerequisites: ENTC 429; completion of junior-level courses; must be taken semester of graduation; and approval of instructor; admitted to major degree sequence (upper-level) in engineering technology.
422. **Manufacturing Technology Projects.** (1-3). **Credit 2. I, II** A capstone projects course utilizing a team approach to an analysis and solutions of manufacturing problems. Prerequisites: ENTC 429; completion of junior-level courses; must be taken semester of graduation; approval of instructor; admitted to major degree sequence (upper-level) in engineering technology.
429. **Managing People and Projects in a Technological Society.** (3-0). **Credit 3. I, II** Supervisory and project management duties and responsibilities in technology based organizations and the methods required to fulfill these functions. Prerequisites: ISEN 302 or approval of instructor; admitted to major degree sequence (upper-level) in engineering technology.
435. **Data Communications.** (3-2). **Credit 4. I, II** Data communications concepts, theory and techniques including: transmission, encoding, decoding, error detection and correction, link control, networking and standards. Prerequisites: ENTC 315 and 369; admitted to major degree sequence (upper-level) in engineering technology.
452. **Advanced Semiconductor Test and Measurement.** (3-2). **Credit 4. I, II** Advanced test methodologies; emphasis on DAC testing, ADC testing, Device Interface Board Design, Data Analysis and Test Economics; provides hands on experience in Mixed-Signal testing using industry funded state-of-the-art test equipment. Prerequisites: ENTC 349 and 352; admitted to major degree sequence (upper-level) in engineering technology.
455. **Wireless Transmission Systems.** (3-2). **Credit 4. II** System engineering aspects of microwave, satellite and cellular communication systems; power budget calculations, propagation analysis, systems descriptions; CNR, CIR; review of modulations practical engineering considerations. Prerequisite: ENTC 355; admitted to major degree sequence (upper-level) in engineering technology.
462. **Control Systems.** (3-2). **Credit 4. I, II** Fundamentals of real-time closed-loop analog and digital control (the proportional, integral and derivative controller); distributed control systems, sensors, electronics, stepper and servo motors on a 16-bit microcontroller platform; design an autonomous vehicle; open industrial networks, such as Control Area Network (CAN) and DeviceNet technologies, will be discussed. Prerequisites: ENTC 359 and 369; admitted to major degree sequence (upper-level) in engineering technology.
463. **Mechanical Design Applications II.** (3-0). **Credit 3. I, II** Application of principles of design to mechanical power transmission elements, such as transmission shafts, gears, belts, chains, bearings, brakes and clutches; use of AUTOCAD/PRO-E and analysis (MECHANICA) packages. Prerequisites: ENTC 361 and 363; admitted to major degree sequence (upper-level) in engineering technology.
465. **Private Network Design.** (3-0). **Credit 3. II** Architectures of data and voice networks; network modeling and optimization; centralized and distributed network design; local area to wide area networks interfacing; private and virtual networks; network management; VoIP networks. Prerequisites: ENTC 325, 345 and 415; admitted to major degree sequence (upper-level) in engineering technology.
485. **Directed Studies.** **Credit 1 to 6. I, II, S** Permits work in a special problem area on an individual basis with the intent of promoting independent reading, research and study; to supplement existing course offerings or subjects not presently covered. Prerequisites: Senior classification and approval of instructor.
489. **Special Topics in...** **Credit 1 to 4. I, II, S** Selected topics in an identified area of engineering technology. Prerequisite: Approval of instructor.

Department of English

Professors H. Andreadis, A. Bendixen, D. A. Berthold, R. E. Boenig, P. N. Christensen, W. B. Clark, D. R. Dickson, M. J. M. Ezell, C. L. Gibson, J. R. Hannah, J. L. Harner, T. A. Hoagwood, C. W. Kallendorf, M. J. Killingsworth (Head), J. M. Loving, J. P. McCann, C. J. Machann, P. R. Matthews, J. L. Mitchell, C. B. Nelson, L. J. Oliver, P. A. Parrish, P. A. Phillippy, M. Portales, L. J. Reynolds, C. H. Rowell, C. J. Swearingen, E. D. Tebeaux, L. M. Vallone, J. G. Wollock; **Associate Professors** V. M. Balester, N. Bhattacharya, D. A. Brooks, K. N. Brown, M. Collins, G. P. Del Negro, S. B. Egenolf, M. Eide, R. J. Griffin, M. C. Ives, K. E. Kelly, D. McWhirter, H. J. Marchitello, A. M. Morey, D. G. Myers, M. A. O'Farrell, S. A. Robinson, V. Rosner, S. M. Stabile; **Assistant Professors** J. J. Alonzo, A. Cruz, E. Dominguez Barajas, E. H. Ho, S. N. Jackson, S. Kendall, S. L. Kerschbaum, B. A. Mize, P. K. Muana, N. L. Perry; **Senior Lecturers** A. E. Earhart, J. B. Gibson, C. E. Hawkins, J. S. Palmer, E. K. Robinson, C. B. Taylor, Jr.

English (ENGL)

Some of the following course descriptions contain representative lists of authors and/or works; the student should consult the professor teaching a course for a semester's exact list.

104. **(ENGL 1301) Composition and Rhetoric. (3-0). Credit 3.** Focus on referential and persuasive researched essays through the development of analytical reading ability, critical thinking and library research skills; for U1 and U2 students only. (ENGL 104I offered for students whose native language is not English.)
201. **Approaches to Literacy. (3-0). Credit 3.** Origins, functions, and philosophies of literacy; theories of text analysis; development of a broader concept of literacy; enhancement of instruction of communication skills. Prerequisite: ENGL 104.
203. **(ENGL 1302) Introduction to Literature. (3-0). Credit 3.** Exploration of literature by genre and/or theme; literary analysis and interpretation; intensive writing about literature. Prerequisite: ENGL 104.
204. **Introduction to African-American Literature. (3-0). Credit 3.** Introduction to the writings of African Americans from the 18th century to the present, emphasizing the major themes and traditions. Prerequisite: ENGL 104.
205. **Introduction to Africana Literature. (3-0). Credit 3.** Works, literary movements and genres of authors of African descent in the Americas, Europe and Africa. Prerequisite: ENGL 104.
209. **Introduction to Linguistics. (3-0). Credit 3.** Nature of human language and of linguistics; includes an introduction to phonology, syntax, semantics and morphology and the role of spoken and written discourse in sustaining societal arrangements. Cross-listed with LING 209. Credit cannot be given for both ENGL 209 and LING 209.
210. **(ENGL 2311) Scientific and Technical Writing. (3-0). Credit 3.** Principles of composition, rhetoric, and document design applied to the basic genres of research-based scientific and technical writing, including the report, proposal, manual, resume and professional correspondence. Appropriate for all majors. Computer sections available. Prerequisite: ENGL 104.
212. **Shakespeare. (3-0). Credit 3.** Exploration of selected works of Shakespeare. Prerequisite: ENGL 104.
219. **Literature and the Other Arts. (3-0). Credit 3.** Aesthetic principles linking imaginative literature to such other arts as painting, sculpture, architecture, and music, with attention devoted to cultural periods and to interpretation of individual works. Prerequisite: ENGL 104 or approval of instructor.
221. **(ENGL 2332) World Literature. (3-0). Credit 3.** Representative works in translation of major authors and texts from various cultures to A. D. 1500, including such authors as Homer, biblical writers, Greek dramatists, Sappho, Virgil, Marie de France, Dante, Lao Tzu, and works like Gilgamesh, and The Bhagavad Gita. Prerequisite: ENGL 104. Cross-listed with MODL 221.
222. **(ENGL 2333) World Literature. (3-0). Credit 3.** Representative works in translation of major authors from A.D. 1500 to the present from various cultures, including such authors as Cervantes, Moliere, Goethe, Tolstoy, Mahfouz, Munif, Achebe, Tolstaya, Vargas Llosa and Duras. Prerequisite: ENGL 104. Cross-listed with MODL 222.
224. **Structure of Present-Day English. (3-0). Credit 3.** Descriptive survey of the major elements of grammar of modern English, including word and clause types and their combinatory potential for creating sentences and longer text types; of special interest to both native and nonnative speakers and teachers of English. Cross-listed with LING 224. Credit cannot be given for both ENGL 224 and LING 224.

227. (ENGL 2327) **American Literature: Colonial to American Renaissance. (3-0). Credit 3.** Literature of the Puritans, revolutionaries, literary nationalists and romanticists; the artist in a frontier society and the development of a native literature; includes such writers as Bradstreet, Edwards, Poe, Hawthorne, Melville, Thoreau, Emerson and Whitman. Prerequisite: ENGL 104.
228. (ENGL 2328) **American Literature: Civil War to Present. (3-0). Credit 3.** Expressions of the American experience in realism, regionalism and naturalism; varieties of modernist and contemporary writing; the rise of ethnic literatures and experimental literary forms; includes such writers as Dickinson, Twain, James, Crane, Frost, Eliot, Fitzgerald, Hemingway, Faulkner, O'Neill, Baldwin and Rich. Prerequisite: ENGL 104.
231. (ENGL 2322) **Survey of English Literature I. (3-0). Credit 3.** Literature of England from Anglo-Saxon times to the late 18th century, including such works as Beowulf, and such authors as Chaucer, Kempe, Spenser, Shakespeare, Donne, Philips, Behn, Dryden, Pope, Swift and Johnson. Prerequisite: ENGL 104.
232. (ENGL 2323) **Survey of English Literature II. (3-0). Credit 3.** Literature of England from the late 18th century to the 20th century, including such authors as the Romantics, Austen, the Brownings, the Brontes, Dickens, Seacole, Tennyson, Wilde, Conrad, Joyce, Woolf and Lawrence. Prerequisite: ENGL 104.
235. (ENGL 2307) **Elements of Creative Writing. (3-0). Credit 3.** Initiation into the craft of creative writing in prose and poetry; extensive reading in the genres; peer workshops. Prerequisite: ENGL 104.
241. **Advanced Composition. (3-0). Credit 3.** Focuses on the writing of advanced academic and professional prose by integrating computer technology in the analysis and production of that prose. Prerequisite: ENGL 104.
251. **The Language of Film. (2-2). Credit 3.** Development of the language of film: major movements, representative works, theory and techniques; lecture/discussion following film screenings. Prerequisite: ENGL 104.
260. **Introduction to Children's Literature. (3-0). Credit 3.** Introduction to critical thinking about genres and styles of textual production important to contemporary children's literature, including picture books, poetry, nonfiction, prose, film and fiction. Prerequisite: ENGL 104.
285. **Directed Studies. Credit 1 to 4.** Readings for specific needs of major or minor in English.
289. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of English. May be repeated for credit.
291. **Research. Credit 1 to 3.** Research conducted under the direction of faculty member in English. Prerequisites: 3 hours of 200-level literature; freshman or sophomore classification and approval of instructor.
301. **Technical Writing. (3-0). Credit 3.** Processes of developing field-specific technical information related to the major, including researching, drafting, editing, revising, and designing technical reports, proposals, manuals, resumes and professional correspondence for specific audiences. Special topics, computer and distance sections available. Prerequisites: ENGL 104; junior classification.
308. **History of Literary Criticism. (3-0). Credit 3.** History of literary thought from antiquity to the present, including writers such as Plato, Aristotle, "Longinus," Sidney, Shelley, and Dryden; analysis of genres such as tragedy, lyric, and film; critical approaches such as new criticism, structuralism, deconstruction, Marxism, feminism, new historicism, and film studies. Prerequisite: 3 credits of literature at 200-level or above.
310. **History of the English Language. (3-0). Credit 3.** Phonological, grammatical and lexical history of the English language; brief discussion of some other Indo-European languages; principles of linguistic change, as reflected in English. Prerequisite: LING 209. Cross-listed with LING 310. Credit cannot be given for both ENGL 310 and LING 310.
311. **Sound Structure of Language. (3-0). Credit 3.** Introduction to the sounds and writing systems of language, focusing on human articulation and the systematic nature of speech sounds and their written representation; intensive practice in phonetic transcription of English and other languages. Prerequisite: LING 209. Cross-listed with LING 311. Credit cannot be given for both LING 311 and ENGL 311.
312. **Shakespeare. (3-0). Credit 3.** Advanced analysis of selected works of Shakespeare, emphasizing language, dramatic theory, criticism and scholarship. Prerequisite: 3 credits of literature at 200-level or above.
313. **Medieval English Literature. (3-0). Credit 3.** Old and Middle English literature exclusive of Chaucer, including such authors and works as Beowulf, The Dream of the Rood, Sir Gawain and the Green Knight, Piers Plowman, Malory, Julian of Norwich, Kempe, the mystery plays and the lyrics. Prerequisite: 3 credits of literature at 200-level or above.

314. **The English Renaissance. (3-0). Credit 3.** Period course in poetry and prose of England in the 16th century, including such authors as Wyatt, Surrey, More, Queen Elizabeth, Spenser, Mary Sidney, Philip Sidney, Wroth and Campion. Prerequisite: 3 credits of literature at 200-level or above.
315. **Seventeenth-Century Literature. (3-0). Credit 3.** Period course in English poetry and prose of the 17th century, excluding Shakespeare; includes such authors as Donne, Herbert, Jonson, Cavendish, Browne, Bunyan, Hobbes, Philips, Vaughan and Marvell. Prerequisite: 3 credits of literature at 200-level or above.
316. **Eighteenth-Century Literature. (3-0). Credit 3.** Period course in English poetry and prose of the eighteenth century, and including such authors as Dryden, Astell, Pope, Swift, Johnson, Finch, Montague, Addison and Steele, Wollstonecraft and Blake. Prerequisite: 3 credits of literature at 200-level or above.
317. **English Renaissance Drama. (3-0). Credit 3.** Non-Shakespearean drama in England from the building of the first public theater in 1576 to the closing of the theaters in 1642, including such authors as Marlowe, Jonson, Webster, Mary Sidney, Beaumont and Fletcher and Carey. Prerequisite: 3 credits of literature at the 200-level or above.
320. **Technical Editing and Writing. (3-0). Credit 3.** Clarifying, reducing, expanding and synthesizing such technical materials created by others as manuals, annual reports, and technical articles and reports; audience adaptation, invention, organization, style and mechanics explored. Prerequisite: Completion of ENGL 301 or approval of instructor.
321. **Nineteenth-Century Literature (Romantic). (3-0). Credit 3.** Period course in English poetry and prose of the Romantic Movement, including such writers as Blake, Wordsworth, Coleridge, Byron, Percy Bysshe Shelley, Keats, Mary Shelley, Charlotte Smith, Hunt, Lamb, Hazlitt and Austen. Prerequisite: 3 credits of literature at 200-level or above.
322. **Nineteenth-Century Literature (Victorian). (3-0). Credit 3.** Period course in English poetry and prose of major Victorian authors, including such authors as Carlyle, Mill, Arnold, Elizabeth Barrett Browning, Tennyson, Robert Browning, Dante Gabriel Rossetti, Christina Rossetti, Meredith, Morris and Hopkins. Prerequisite: 3 credits of literature at 200-level or above.
323. **The American Renaissance. (3-0). Credit 3.** Period course in the American Renaissance, covering such writers as Emerson, Hawthorne, Thoreau, Alcott, Fuller, Fern, Melville, Poe, Stowe and Whitman. Prerequisite: 3 credits of literature at 200-level or above.
329. **African-American Literature Pre-1930. (3-0). Credit 3.** Major works of the African-American literary tradition from the 18th century to 1930 studied within cultural and historical context. Prerequisites: 3 credits of literature at 200-level or above; junior or senior classification or approval of instructor.
330. **Arthurian Literature. (3-0). Credit 3.** Legend of King Arthur in English and American literature from its Medieval origins to the present. Prerequisite: ENGL 104.
333. **Gay and Lesbian Literature. (3-0). Credit 3.** Gay and lesbian literature from classical times to present, studied in its historical and cultural context, including works by Sappho, Catullus, Shakespeare, Marlowe, Philips, Wilde, Forster, Brown, and Orton. Prerequisite: ENGL 104. Cross-listed with WMST 333.
334. **Science Fiction Present and Past. (3-0). Credit 3.** Origins and development of the science fiction genre, including such authors as Wells, Lewis, Clarke, Miller and Le Guin. Prerequisite: ENGL 104.
335. **Literature of the Sea. (3-0). Credit 3.** Significance of the sea in fictional and factual accounts, such as novels, short stories, poems, and narratives of sailors and seafaring life. Prerequisite: 3 credits of literature at 200-level or above.
336. **Life and Literature of the Southwest. (3-0). Credit 3.** Exploration of Southwestern literature, including such authors as Abbey, Anaya, Cabeza de Vaca, Cather, Krutch, McCarty, Momaday, Paz, Paredes and Porter. Prerequisite: 3 credits of literature at 200-level or above.
337. **Life and Literature of the American South. (3-0). Credit 3.** Exploration of Southern literature, including such authors as Faulkner, O'Connor, Warren, Percy, Welty and Walker. Prerequisite: 3 credits of literature at 200-level or above.
338. **American Ethnic Literature. (3-0). Credit 3.** Multi-ethnic study of American literature; the writings of Black Americans, American Indians, Mexican-Americans, Jewish Americans, as well as Euro-American ethnic groups; representative authors include Douglass, Toomer, Wright, Hurston, Morrison, Anaya, Cisneros, Momaday and Kingston. Prerequisite: 3 credits of literature at 200-level or above.
339. **African-American Literature Post-1930. (3-0). Credit 3.** Major works of the African-American literary tradition from the 1930s to the present studied in their cultural and historical context. Prerequisites: 3 credits of literature at 200-level or above; junior or senior classification or approval of instructor.

340. **Twentieth-Century Drama.** (3-0). **Credit 3.** Representative plays and performances from the late nineteenth through the twentieth century, including such authors as Isben, Strindberg, Chekhov, Brecht, Hansberry and Shange. Prerequisite: 3 credits of literature at 200-level or above.
345. **Writers' Studies: Prose.** (3-0). **Credit 3.** A different topic for fiction writers each term; may include historical development of genres; connection between biography and artistic production; study of writers' theories of the art of fiction. Prerequisite: ENGL 235; junior or senior classification or approval of instructor.
346. **Writers' Studies: Poetry.** (3-0). **Credit 3.** A different topic for poets each term; may include historical development of the genre; connection between biography and artistic production; study of writers' theories of the art of poetry. Prerequisite: ENGL 235; junior or senior classification or approval of instructor.
347. **Writers' Workshop: Prose.** (3-0). **Credit 3.** Production of advanced, complete stories; peer workshops; extensive reading. May be repeated 1 time for credit. Prerequisite: ENGL 235; junior or senior classification or approval of instructor.
348. **Writers' Workshop: Poetry.** (3-0). **Credit 3.** Production of advanced, complete poems; peer workshops; extensive reading. May be repeated 1 time for credit. Prerequisite: ENGL 235; junior or senior classification or approval of instructor.
350. **Twentieth-Century Literature Pre-World War II.** (3-0). **Credit 3.** British and American novelists, poets and dramatists from late nineteenth to mid-twentieth century, including such authors as Conrad, Hardy, Joyce, Woolf, Faulkner, Eliot, Beckett, H. D., Lawrence, O'Neill, Miller and Hemingway. Prerequisite: 3 credits of literature at 200-level or above.
351. **Advanced Film.** (3-0). **Credit 3.** A different film topic each term; sample topics: major directors, historical periods, fiction into film, film genres. May be repeated for credit. Prerequisite: FILM 201 or 301 or approval of instructor; junior or senior classification. Cross-listed with FILM 351.
352. **Twentieth-Century Literature Post-World War II.** (3-0). **Credit 3.** Novelists, poets and dramatists of the post-World War II era, including such authors as Morrison, Pynchon, Stoppard, Rushdie, Garcia Marquez, Kundera, Carter, Barth and O'Brien. Prerequisite: 3 credits of literature at 200-level or above.
353. **History of Rhetoric.** (3-0). **Credit 3.** Introduction to the major approaches to written communication from ancient Greece to the end of the 19th century; focus on such authors as Plato, Aristotle, Cicero, St. Augustine, Erasmus, Campbell and Whately. Prerequisite: ENGL 104.
354. **Modern Rhetorical Theory.** (3-0). **Credit 3.** Introduction to 20th-century rhetorical theorists, focusing on such figures as Kenneth Burke, Walter Ong, Chaim Perelman, Michel Foucault and Jacques Derrida; application to text interpretation and criticism. Prerequisite: ENGL 104.
355. **The Rhetoric of Style.** (3-0). **Credit 3.** Fosters an appreciation for and better understanding of English prose style; the history of English prose; representative prose models for analysis and imitation; the impact of computer analysis. Prerequisite: ENGL 104.
356. **Literature and Film.** (2-2). **Credit 3.** Novels and films based on them; writers and filmmakers such as Virginia Woolf, John Steinbeck, John Ford, Sally Potter, John Huston, Charlotte Bronte and Peter Bogdanovich. Prerequisite: 3 credits of literature at the 200-level.
360. **Literature for Children.** (3-0). **Credit 3.** Survey of literature for children, including such authors as the Brothers Grimm, Sarah Fielding, Carroll, Burnett, Potter, Barrie, Nesbit, Dr. Seuss and Sendak. Prerequisite: ENGL 104.
361. **Literature for Adolescents.** (3-0). **Credit 3.** Survey of literature for adolescents, including such authors as Twain, Sutcliff, Alcott, Cormier and Blume. Prerequisite: ENGL 104.
362. **Hispanic Literature in the United States.** (3-0). **Credit 3.** Contemporary literature by Hispanic authors of the United States writing in English; representative works from the major Hispanic communities of the U.S. Prerequisite: ENGL 104. Cross-listed with MODL 362.
365. **The Bible as Literature.** (3-0). **Credit 3.** Narrative, structural, and thematic study of the Hebrew and Christian Scriptures in English translation. Prerequisite: 3 credits of literature at 200-level or above. Cross-listed with RELS 360.
374. **Women Writers.** (3-0). **Credit 3.** History of literature by women in English primarily from the 16th century to the present; emphasis on continuity of ideas and on literary contributions; study of poetry, essays, novels, short stories, with particular attention to characteristic themes and to racial, social, cultural diversity of women writing in English. Prerequisite: ENGL 104. Cross-listed with WMST 374.

375. **Nineteenth-Century American Novel. (3-0). Credit 3.** Representative novels of the nineteenth century, such authors as Cooper, Child, Hawthorne, Melville, Twain, Stowe, Wharton, James, Jewett and Chopin. Prerequisite: 3 credits of literature at 200-level or above.
376. **Twentieth-Century American Novel. (3-0). Credit 3.** Representative novels of the twentieth century, including such authors as Wharton, Stein, Faulkner, Hemingway, Dos Passos, Cather, Wright, Steinbeck, Baldwin, Salinger, Oates and Morrison. Prerequisite: 3 credits of literature at 200-level or above.
377. **The English Novel to 1870. (3-0). Credit 3.** Representative novels of the eighteenth and nineteenth centuries, including such authors as Defoe, Fielding, Burney, Austen, Shelly, Dickens, the Brontes, Gaskell, Eliot and Braddon. Prerequisite: 3 credits of literature at 200-level or above.
378. **The English Novel, 1870 to Present. (3-0). Credit 3.** Representative novels of the late nineteenth and twentieth centuries, such authors as Hardy, Conrad, Lawrence, Joyce, Woolf, Forster and Lessing. Prerequisite: 3 credits of literature at 200-level or above.
379. **Postcolonial Studies. (3-0). Credit 3.** Cultural expression of formerly colonized or occupied peoples; including authors such as Achebe, Appadurai, Du Bois, Cesaire, Fanon, Freire, C.L.R. James, Ngugi, Roy, Rushdie, Said, Soyinka, and Spivak. Prerequisites: 3 credits of literature at the 200-level or above; junior or senior classification or approval of instructor.
385. **Playwriting. (3-0). Credit 3.** The craft of writing plays and practical experience in writing plays of various lengths; structure, building of ideas into dramatic situations, use of dialogue and movement. Prerequisite: ENGL 235; junior or senior classification or approval of instructor..
390. **Studies in British Literature. (3-0). Credit 3.** Exploration of a significant topic or period in British literature. Prerequisite: 3 credits of literature at 200-level or above.
392. **Studies in Literature, Religion and Culture. (3-0). Credit 3.** Exploration of literature treating significant religious topics in the context of cultural setting. Prerequisites: 3 credits of literature at 200-level or above; junior or senior classification. Cross-listed with RELS 392.
393. **Studies in Africana Literature and Culture. (3-0). Credit 3.** Literary movements, genres, groups of authors, topics or issues in the literature and culture of people of African descent. Prerequisites: 3 credits of literature at 200-level or above; junior or senior classification or approval of instructor.
394. **Studies in Genre. (3-0). Credit 3.** Theory and practice of a single genre including analysis of its history and development. May be repeated for credit. Prerequisite: 3 credits of literature at 200-level or above.
396. **Studies in American Literature. (3-0). Credit 3.** Exploration of a significant topic or period in American literature. Prerequisite: 3 credits of literature at 200-level or above.
401. **Critical Theory and Practice. (3-0). Credit 3.** Contemporary literary theory and critical practice including editing, interpretation, criticism, and historical research through the study of major theories and their application. Prerequisite: 3 credits of literature at the 300-level.
412. **Studies in Shakespeare. (3-0). Credit 3.** Exploration of a significant topic or genre in Shakespeare, emphasizing scholarship and literary criticism. Prerequisite: ENGL 212 or 312.
414. **Milton. (3-0). Credit 3.** In-depth study of poetry and selected prose works of Milton, emphasizing scholarship and literary criticism. Prerequisite: 3 credits of literature at 300-level.
415. **Studies in a Major Author. (3-0). Credit 3.** Exploration of a major author as a vehicle for emphasizing intensive analysis, scholarship and literary criticism. Prerequisite: 3 credits of literature at 300-level.
431. **Chaucer. (3-0). Credit 3.** Intensive analysis of Chaucer's major works, emphasizing language, criticism and scholarship. Prerequisite: 3 credits of literature at 300-level.
461. **Advanced Syntax and Rhetoric. (3-0). Credit 3.** Points of view toward language study; traditional syntax; points of view toward rhetoric; Christensen's rhetoric of the paragraph; analysis of written discourse. Prerequisite: Senior classification or approval of instructor.
474. **Studies in Women Writers. (3-0). Credit 3.** A different specific topic each term examining women's writing through historical period, genre, cross-cultural study, or feminist literary theory, including minority and third world writers. May be repeated for credit. Prerequisite: 3 credits of literature at 200-level or above or approval of instructor. Cross-listed with WMST 474.
481. **Senior Seminar. (3-0). Credit 3.** Seminar on a significant figure, movement, or issue in literature or rhetoric or creative writing with special attention to the methods and materials of scholarship. Prerequisite: 12 credits in English, including 3 at 300-level.

484. **Internship. Credit (3-0). Credit 3.** Directed internship in a public or private organization to provide students with on-the-job training and applied research experience appropriate to career objectives. Must be taken satisfactory/unsatisfactory. Prerequisites: Approval of department head; junior or senior classification.
485. **Directed Studies. Credit 1 to 3.** Readings for specific needs of major or minor in English.
489. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of English language and literature. May be repeated for credit.
491. **Research. Credit 1 to 3.** Research conducted under the direction of faculty member in English. May be repeated 2 times for credit. Prerequisites: 12 credits of English, including 3 at 300-level; junior or senior classification and approval of instructor.
497. **Independent Honors Studies. Credit 1 to 3.** Directed independent studies in the English language and English or American literature. Prerequisites: Junior or senior classification either as Honors student or with overall GPR of 3.5 and letter of approval from head of student's major department. May be repeated for credit.

Department of Entomology

Professors D. E. Bay, R. N. Coulson, F. E. Gilstrap, R. E. Gold, M. K. Harris, K. M. Heinz (Head), J. S. Johnston, M. D. Summers, P. D. Teel, S. B. Vinson, R. A. Wharton, L. T. Wilson II, J. B. Woolley; Associate Professors J. S. Bernal, C. J. Coates, J. D. Oswald, T. Pankiw, P. V. Pietrantonio, K. Zhu-Salzman; Assistant Professors S. T. Behmer, R. F. Medina, A. Mulenga

Entomology (ENTO)

201. **General Entomology. (2-2). Credit 3. I, II** Survey of the major classes of arthropods with special emphasis on species of economic or biological importance; general insect anatomy, physiology, metamorphosis and classification; survey of the biologies of insect orders and major families using common injurious and beneficial species to relate material to production agriculture and the urban environment.
208. **Veterinary Entomology. (2-2). Credit 3. I, II, S** Classification, biology and control of insects and other arthropods associated with livestock and poultry production; identification emphasized in laboratory.
285. **Directed Studies. Credit 1 to 4.** Directed individual study in entomology. Prerequisites: Freshman or sophomore classification; approval of instructor and department head.
289. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of entomology. May be repeated for credit. Prerequisite: Approval of instructor.
291. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in entomology. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
300. **Field Studies. (3-0). Credit 3. S** Integration of principles of animal and plant ecology with environmental factors to characterize wildlife populations. Intensive analysis of specific areas will emphasize either the development of a wildlife management plan or a general vertebrate natural history survey. Prerequisite: Junior or senior classification. Cross-listed with WFSC 300.
301. **Biodiversity and Biology of Insects. (3-3). Credit 4. II** Introduction to orders and most important families of insects; order-level morphology and family-level natural history; collection of insects identified to family level provides introduction to collection methods and specimen preparation. Prerequisites: 6 hours of biological sciences; junior or senior classification or approval of instructor.
305. **Evolution of Insect Structure. (2-3). Credit 3. I** External morphology of insects; evolution of form and function. Prerequisite: 6 hours of biological sciences.
306. **Insect Physiology. (2-3). Credit 3. I** Physiology of insects; structure and function of internal organ systems and their role in insect success. Prerequisite: ENTO 201 or equivalent.
313. **Biology of Insects. (2-3). Credit 3. I, II** Study of the orders and important families of insects and related arthropods, including general biology, relationships with plants and other animals, and characteristics used in identification. Prerequisite: 3 hours of biological science.
315. **Biotechnology and Society. (3-0). Credit 3. I, II** Understanding the technology and principles of biotechnology; interpreting and communicating biotechnology reports of both popular press and peer-reviewed scientific articles. Prerequisite: Junior or senior classification or approval of instructor.

320. **Honey Bee Biology.** (3-0). **Credit 3. I, II, S** Introduction of honey bee biology and beekeeping practices to science and non-science majors; honey bees as the model insect to introduce general principles of biology and entomology. Prerequisite: Junior or senior classification or approval of instructor.
322. **Insects and Human Society.** (3-0). **Credit 3. I, II, S** Emphasis on the role insects have played in the development of human cultures; aspects include health, food production and storage, art, music and architecture; overview of historic, present day, and future roles insects will have on environmental movements (green societies), and in underdeveloped, developing and developed societies. Prerequisite: Junior or senior classification.
330. **Aquatic Entomology for Anglers.** (1-4). **Credit 3. I** Integration of insect behavior and anatomy and fish behavior with design principles, materials selection and artistic creation focusing on insect lures for anglers; knowledge and expertise needed to create and select insect imitations; aquatic insects and lure design principles; hands-on technique development. Prerequisite: Junior or senior classification or approval of instructor.
401. **Principles of Insect Pest Management** (2-3). **Credit 3. I** Basic tenets of integrated pest management emphasizing ecological principles; integration of chemical, biological, cultural and physical tactics into an overall strategy for the agroecosystem; chemical pesticides, cultural practices, host resistance, biological control, sterility principle, economics of pest control and pest/host relationships. Prerequisite: ENTO 201 or equivalent.
402. **Field-Crop Insects.** (2-3). **Credit 3. II** Application of management strategies for insect/mite pests of small grains, corn, cotton, rice, sorghum, stored products and sunflower; nature and symptoms of damage, life history and habits of common pests. Laboratory consists of pest and pest damage identification supported by field trips. Prerequisite: ENTO 201 or equivalent.
403. **Urban Entomology.** (2-3). **Credit 3. II** Biology, economic importance and control strategies for arthropod pests commonly invading households and commercial structures in urban environments; laboratory consists of urban pest identification and special presentations and demonstrations covering topics related to urban pest problems and their control. Offered in 2007-2008 academic year and alternating years thereafter. Prerequisite: ENTO 201 or equivalent or approval of instructor.
405. **Horticultural and Floricultural Entomology.** (2-3). **Credit 3. II** Nature of injury, life history and control of common insects attacking ornamentals, fruits and vegetables in the field and greenhouse; pest identification and development of management strategies demonstrated in laboratory. Prerequisite: ENTO 201 or equivalent.
412. **Aquatic Bioassessment.** (3-2). **Credit 4. II** Basic ecological knowledge and theories concerning the structure and functional integrity of freshwater environments, and the practical skills and experience with methods used to assess biological components relevant to water quality and ecosystem health. Offered in 2008-2009 academic year and alternating years thereafter. Prerequisites: BIOL 112 or BIOL 101 and BIOL 107; junior or senior classification or approval of instructor. Cross-listed with WFSC 412.
423. **Medical Entomology.** (2-3). **Credit 3. I, S** Biologies, disease relationships, and control of insects and other arthropods parasitic on or in humans; aspect of the fields of clinical and preventative medicine; survey, collection and taxonomy of medically-important arthropods in laboratory sessions. Prerequisite: Junior or senior classification or approval of instructor.
424. **Insect Ecology.** (2-3). **Credit 3. II** Provides basic ecological background with an applied interpretation, emphasizing influences of insect populations and communities on ecosystem processes that influence landscape structure, function and change. Prerequisites: ENTO 201 or equivalent; 3 hours of biological sciences; junior or senior classification or approval of instructor.
428. **Insect Biotechnology.** (3-0). **Credit 3. I** Applications of genetic engineering and biotechnology; specific problems dealing with insects and control of insect pests. Prerequisites: GENE 301 or 315 or 320; junior or senior classification or approval of instructor.

429. **Insect Biotechnology Laboratory.** (0-3). **Credit 1. I** Basic technical experience in insect molecular biology and biotechnology, including genomic DNA isolation, PCR, cloning, sequencing and gene manipulation techniques; focus on insect applications for improvement of human health and agriculture. Prerequisites: ENTO 428; concurrent enrollment in ENTO 428; junior or senior classification or approval of instructor.
431. **The Science of Forensic Entomology.** (3-0). **Credit 3. II** Explores the science, methodology and technology employed to gather, preserve and present information about insects and other arthropods in such a manner that this information can be used in courts of law as evidence and testimony to help resolve issues of a criminal or civil nature. Prerequisite: Junior or senior classification or approval of instructor. Cross-listed with FIVS 431.
432. **Applied Forensic Entomology.** (0-3). **Credit 1. II** Laboratory-based course offering students practical experience using scientific information, methodology, technology, and legal procedures inherent to the field of forensic entomology; emphasis on collecting, preserving, and identifying information as evidence and expert witness testimony in courts of law. Prerequisites: Concurrent enrollment in ENTO 431; junior or senior classification or approval of instructor. Cross-listed with FIVS 432.
435. **Case Studies in Problem Solving.** (3-0). **Credit 3. II** Development of reasoning strategies by examining a variety of case studies, science and scientific methods; solving real-world problems as part of an investigative team. Prerequisite: Senior classification or approval of instructor. Cross-listed with FIVS 435.
440. **Insects in the Classroom.** (3-0). **Credit 3. I** Exploration of insects as teaching tools in K-12 education; focus on the teaching of science concepts and development of critical thinking skills; concepts extend to using insects as tools to teach across the curricula of science, mathematics, language arts, social studies and art. Prerequisite: Junior or senior classification or approval of instructor.
450. **Caribbean Conservation.** (0-6). **Credit 2. S** Provide students with experience in and appreciation for diverse tropical habitats and the problems associated with conserving these habitats; design and conduct individual research projects on topics of their choice with approval from the instructors on project design and feasibility. Prerequisites: Concurrent enrollment in ENTO 300 and 451; junior or senior classification. Cross-listed with WFSC 450.
451. **Caribbean Research Seminar.** (1-0). **Credit 1. S** Document research activities; keep a journal of activities and research methods during study abroad trips. Prerequisites: Concurrent enrollment in ENTO 300 and 450; junior or senior classification. Cross-listed with WFSC 451.
481. **Seminar.** (1-0). **Credit 1. I, II** Report of original investigations, current literature and special features of entomology. Prerequisites: ENTO 201 or equivalent; junior or senior classification.
482. **Occupational and Professional Development.** (2-0). **Credit 2. I** Organized instruction in written and oral communication; acquaint students with private and public-sector companies and agencies as well as leading professionals from these firms to reinforce academic instruction and prepare students for the transition to employment, graduate and professional schools. Prerequisite: Junior or senior classification or approval of instructor. Cross-listed with FIVS 482.
484. **Professional Internship.** **Credit 1 to 4. I, II, S** Independent study and supervised field experience related to a professional area of interest in entomology. May be taken two times for credit. Prerequisite: Junior or senior classification or approval of instructor.
485. **Directed Studies.** **Credit 1 to 4. I, II, S** Individual problems. Prerequisites: ENTO 201 or equivalent; junior or senior classification; approval of instructor and department head.
489. **Special Topics in...** **Credit 1 to 4. I, II, S** Selected topics in an identified area of entomology. May be repeated for credit. Prerequisite: Approval of instructor.
491. **Research.** **Credit 1 to 4. I, II, S** Faculty supervised research in entomology. May be taken two times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification or approval of instructor

Environmental Design

(faculty, see page 622)

(ENDS)

101. (ARCH 1311) **Design Process.** (3-0). **Credit 3.** Fundamental design processes, issues and theories relevant to design resolution and the creation of new ideas; creative thought processes from the formation of ideas through incubation to final product and future impact on the physical environment and society.
102. **Design Foundations I—Lecture.** (1-0). **Credit 1.** Fundamental design processes, issues and theories relevant to design resolution by disciplines in the environmental design professions; the act of designing, its purpose, method and impact on the physical environment and society; creative thought processes from the formation of ideas through incubation to final product; intuition, systems theory and creation of hybrids. Prerequisite: Classification in environmental design, construction science or landscape architecture.
103. **Design Foundations II—Lecture.** (1-0). **Credit 1.** Fundamental design processes, issues and theories relevant to design disciplines in the environmental design professions; critical thinking through systematic processes; physical, human and cultural factors as influences for the arts and environment. Prerequisite: Classification in environmental design, construction science or landscape architecture; ENDS 102.
105. (ARCH 1403) **Design Foundations I.** (2-4). **Credit 4. I, S** Visual and functional design principles; development of skills in perception, thought and craft as they apply to the formation of two- and three-dimensional relationships; design attitudes and environmental awareness. Prerequisite: Classification in environmental design, construction science or landscape architecture.*
106. **Design Foundations II.** (1-6). **Credit 4. II, S** Approaches to problem identification and problem solving emphasizing an awareness of human, physical and cultural factors influencing design; reinforcement of visual and verbal communication as applied to the design process. Prerequisite: ENDS 105.*
115. (ARCH 1407) **Design Communication Foundations.** (1-4). **Credit 3.** Introduction to and practice of tools, methods, techniques available for graphic communication; graphic communication and the design process; observation and other forms of free-hand drawing and drawing systems that develop the student's representational and descriptive capabilities.
116. **Design Communication Foundations II.** (1-4). **Credit 3.** Introduction to design drawing using a wide variety of tools ranging from conventional drafting and drawing equipment to the latest digital graphic applications; a focused investigation of analytical drawing as it contributes to the design process; experience of a wide variety of drawing conventions intended to equip students to navigate a design process. Integrally related to ENDS 106. Prerequisites: ENDS 115 and concurrent enrollment in ENDS 106.
170. **Computer Techniques for Design and Visualization.** (2-3). **Credit 3.** Introduction to the history of computing; fundamentals of computer applications for design visualization; review of applications for web publishing, image editing, vector editing, modeling, rendering, animation, multimedia/hypermedia presentations and the development of virtual environments. Prerequisite: Basic computer literacy.
260. **Comparative Theory in the Built and Virtual Environments.** (3-0). **Credit 3. II** Introduction of cultural theory and the environment; theories, special concepts and ideas relevant to the built and virtual environments with primary focus on the last fifty years; theory, theory building, and application to buildings and urban design; formation of ideas and critical ways of assessing the environment. Prerequisites: ENDS 102, 103, 250.
291. **Research in Architecture Innovation.** **Credit 1 to 4.** Research conducted under the direction of faculty member in the College of Architecture. May be repeated 2 times for credit. Prerequisites: Approval of instructor.
311. **Photography I.** (2-4). **Credit 3.** Exploration of vision through the photographic image as a medium of visual expression; basic theory and practice of black and white and/or still photography and/or digital imaging; historic development and aesthetic concern for photographic imagery. Prerequisite: ENDS 106 or 115 or approval of instructor or department head.
312. **Photography II.** (2-4). **Credit 3.** Advanced photographic image-making; development of control and presentation of individual photographic expression and comments. Prerequisite: ENDS 311.
353. **Color Theory.** (2-4). **Credit 3. I** Introduction to various aspects of color, including optical phenomena, color psychology and perception; application and principles with respect to art and design. Prerequisite: Upper-level classification in environmental design.

370. **Virtual Architecture. (3-0). Credit 3.** Introduction to VRML and X3D used in the creation of realtime 3D environments; definition of formal scene description structures; modeling and transformation techniques; behaviors and message passing; user interaction and animation; inclusion of diverse media; scripting; relationship to HTML. Prerequisites: ENDS 170 or approval of instructor or department head.
372. **Creating Digital Environments. (2-2). Credit 3.** Introduction to the terminology, principles and practices used in the creation of 3D models; mathematical principles of geometric modeling; theory and application of modeling techniques, including Boolean operations, parametric modeling, particle systems, nurbs and grammar based techniques; lighting setup and control. Prerequisite: Junior classification or approval of instructor or department head.
374. **Multimedia Design and Development. (2-4). Credit 3.** Design and development of large scale multimedia projects; principles of user interactivity and navigation; integration of 2D and 3D display technologies; audio capture and editing; computer based presentations; kiosk design. Prerequisite: Junior or senior classification.
470. **Digital Rendering. (3-0). Credit 3.** Creation of photorealistic images; perceptual and physical principles that form the foundation for creating realistic images; outdoor and indoor lighting, environmental effects, properties of materials, rendering models and techniques for adding visual detail. Prerequisites: Senior classification.
474. **Designing for the Web. (2-4). Credit 3.** Visual presentations on the web using web standards design; foundations of web technologies; web page and site creation; design typography for the web; controlling the page real estate through cascading style sheets (CSS); imaging for the web; the creation and use of color and graphics. Prerequisite: Junior or senior classification.
481. **Seminar. (1-0). Credit 1.** Presentations by and discussions with professionals representing specialty areas related to environmental design; career and academic objectives. May be repeated for up to 4 credit hours. Prerequisite: Junior or senior classification.
484. **Summer Internship. (3-0). Credit 3.** S Practical experience in an office of design allied professionals; 12-week internship with a minimum of 480 hours; continuous employment; departmental pre-approval through the department internship coordinator required; post-approval evaluation conducted following the internship. May not be repeated for credit. Prerequisites: Upper-level classification in environmental design; approval of environmental design internship coordinator.
485. **Directed Studies. Credit 1 to 6 each semester.** Special problems in environmental design. May be repeated for up to 12 credit hours. Prerequisite: Approval of instructor or department head.
489. **Special Topics in... Credit 1 to 4.** Selected topics in an identified field of environmental design. May be repeated for up to 9 credit hours. Prerequisite: Approval of instructor or department head.
491. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in environmental design. May be repeated 2 times for credit. Prerequisites: Junior or senior classification and approval of instructor.
494. **Internship. (6-0). Credit 6. I, II** Practical experience in an office of design allied professionals; 18-week internship with a minimum of 720 hours; continuous employment; departmental pre-approval through the departmental internship coordinator required; post-approval evaluation conducted following the internship. May not be repeated for credit. Prerequisites: Upper-level classification in environmental design; approval of environmental design internship coordinator.

*Field trips may be required for which departmental fees may be assessed to cover costs.

Environmental Studies (ENST)

291. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in environmental studies. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
491. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in environmental studies. May be repeated 3 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Freshman or sophomore classification and approval of instructor.

Department of European and Classical Languages and Cultures

Professors N. J. Bracher, L. B. Cooke, R. J. Golsan (Head), M. C. Hawthorne, C. W. Kallendorf, S. M. Oberhelman; **Associate Professors** F. Ciccolella, O. M. Cooke, C. F. Konrad, T. V. Laane, R. Larson, E. T. Rich, R. Schoolcraft, R. R. Shandley, C. J. Steppich; **Assistant Professors** S. Arnaud, M. Marchesini; **Senior Lecturers** I. K. Bakelmann, C. D. Schaile, F. Vionnet-Bracher; **Lecturers** I. D. Golsan, S. B. Ragucci; **Assistant Lecturer** C. Hauf

Incoming students who intend to enroll for the first time in a French, Italian, German, Russian, or Latin course at Texas A&M University, who have previous knowledge, however acquired, of the language in which they plan to enroll, and who have no college credit in the language, must take a placement test to determine the appropriate course for their level of ability. The foreign language placement test also serves as a basis for credit by examination.

Students will be expected to complete the 201 and 202 language courses in sequence before taking upper-division courses. Those who already have a high level of proficiency may request an examination for credit in the courses. Once, however, students register for a higher-level language course, they are no longer eligible to receive credit for prerequisite courses.

International students whose native language is not English are exempted from satisfying the University foreign language requirement. These students are not allowed to register for courses in their native language (101, 102) which are used to fulfill that requirement.

European Studies

(faculty, see above)

(EURO)

220. **Contemporary French Culture. (1-0). Credit 1.** Cultural and practical orientation for students participating in the summer study abroad programs in France; brief introduction to contemporary social and cultural institutions; discussions of French university system; oral reports and final paper; readings and discussion in English and French. Prerequisite: FREN 101 or equivalent.
223. **French Culture and Society in French Literary Masterpieces in Translation. (3-0). Credit 3.** Analysis and understanding of French culture and contemporary society through the study of masterpieces of French literature including novels, plays, short stories and films. Cross-listed with FREN 223.
230. **Contemporary German Culture. (1-0). Credit 1.** Cultural and practical orientation for students participating in the summer study abroad programs in Germany; brief introduction to contemporary social and cultural institutions; discussions of German university system; oral reports and final paper; readings and discussion in English and German. Prerequisite: GERM 101 or equivalent.
232. **Exploratory German Language and Culture. (3-0). Credit 3.** Introduction to the fundamentals of German language and culture; immersion in a European culture; acquisition of skills and insights necessary to experience life in Germany; study of comparisons and contrasts between German and North American culture.
240. **Contemporary Russian Culture. (1-0). Credit 1.** Cultural and practical orientation for students participating in the summer study abroad programs in Russia; brief introduction to contemporary social and cultural institutions; discussions of Russian university system; oral reports and final paper; readings and discussion in English and Russian. Prerequisite: RUSS 101 or equivalent.
285. **Directed Studies. Credit 1 to 4.** Individual supervision of readings or assigned projects in European studies selected for each student individually. Prerequisite: Approval of instructor and department head.
289. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of European studies. May be repeated for credit. Prerequisite: Approval of instructor.
311. **Diversity Issues in Classical Studies. (3-0). Credit 3.** Study of diversity, 'otherness,' and tolerance in Greco-Roman antiquity; and the effects of intolerance on modern classical studies. Prerequisite: ENGL 104 and junior or senior classification.
323. **Immigration and Ethnicity in Contemporary France. (3-0). Credit 3.** Immigration and ethnic groups in contemporary France, their effects on national identity and politics, and their cultural representations. Prerequisite: ENGL 104 and junior or senior classification. Cross-listed with FREN 323.

405. **European Cinema.** (3-0). **Credit 3.** Exploration of key movements in European cinema from 1895 to the present, including both national cinematic traditions, such as Italian Neorealism or French New Wave, and international trends such as Formalism, Expressionism, or Auteursism. Prerequisite: FILM 201 or approval of instructor. Cross-listed with FILM 405.
406. **Propaganda and Dissidence.** (3-0). **Credit 3.** Use of film as a medium to promote political ideology, government propaganda, political dissidence, and subversion, with focus on Europe. Prerequisite: Junior or senior classification or approval of instructor. Cross-listed with FILM 406.
425. **French Film.** (3-0). **Credit 3.** Overview of French cinema from its origins to the present; interpretation of French cultural history and politics through film; taught in English. Prerequisites: Junior or senior classification, or approval of instructor. Cross-listed with FREN 425 and FILM 425.
430. **Seminar in German Literature and Culture.** (3-0). **Credit 3.** Survey of major literary and intellectual landmarks of a period in German history (Enlightenment, Romanticism, High Modernism, post-1945); study of literary works in context of social and cultural history, with attention to Germany's particular place in Europe and the world; taught in English. May be taken two times. Prerequisite: Junior or senior classification, or approval of instructor. Cross-listed with GERM 430.
431. **German Author and Genre Studies.** (3-0). **Credit 3.** Examines the work of a specific author, such as Goethe, Schiller, Kafka, Brecht, Frisch, Grass or the diachronic study of a specific genre, e.g., poetry, drama, prose; taught in English. May be taken two times. Prerequisite: Junior or senior classification, or approval of instructor. Cross-listed with GERM 431.
432. **Music in German Culture.** (3-0). **Credit 3.** Examination of the role of music in German cultural and national self-definition from the 18th century to the present; the political and ideological role of music; study of genres and media including opera, art song, Singspiel, protest songs and film; taught in English. Prerequisite: Junior or senior classification, or approval of instructor. Cross-listed with GERM 432.
434. **Martin Luther and the Reformation in Germany.** (3-0). **Credit 3.** Introduction to the life and thought of Martin Luther; study of the Protestant Reformation in Germany from theological, political, and social perspectives; taught in English. Prerequisite: Junior or senior classification, or approval or instructor. Cross-listed with GERM 434 and RELS 434.
435. **German Film.** (3-0). **Credit 3.** Consideration and analysis of major works and directors of German film; interpretation of culture through film; relationship of film to history, literature, and other arts; taught in English. Prerequisite: Junior or senior classification, or approval of instructor. Cross-listed with GERM 435 and FILM 435.
436. **German Fairy Tales.** (3-0). **Credit 3.** Introduction to and study of fairy tales and children's literature through German tradition in these forms; reception of fairy tales through adaptation and modernization; taught in English. Prerequisite: Junior or senior classification, or approval of instructor. Cross-listed with GERM 436.
441. **The Russian Novel I: Tolstoy and Dostoevsky.** (3-0). **Credit 3.** Study of the major works of Tolstoy and Dostoevsky; discussion of the literary nature and purpose of novels, especially in the context of Russian culture; taught in English. Prerequisite: 3 hours of English literature at 200 level or above, or approval of instructor. Cross-listed with RUSS 441.
442. **The Russian Novel II: The Twentieth Century.** (3-0). **Credit 3.** Study of major Russian novels from ca. 1900 to the end of Stalinism; exploration of topics relevant to Russia's experience in the 20th century; taught in English. Prerequisite: 3 hours of English literature at 200 level or above, or approval of instructor. Cross-listed with RUSS 442.
443. **Contemporary Russian Prose.** (3-0). **Credit 3.** Study of Russian and Soviet 20th-century prose literature, with emphasis on post-Stalinist and post-glasnost writers. Prerequisites: Junior or senior classification, or approval of instructor. Cross-listed with RUSS 443.
444. **Russian Drama.** (3-0). **Credit 3.** Introduction to the masterpieces of Russian drama from the 19th century to the present; includes such authors as Pushkin, Chekhov, Gorky, Arbuzov, Rozov and Petrushevskaya; taught in English. Prerequisites: Junior or senior classification or approval of instructor. Cross-listed with RUSS 444
446. **Russian Artistic Culture I: Beginnings to 1900.** (3-0). **Credit 3.** Masterpieces of Russian art, including architecture, dance, theater, music, and literature, from its beginnings until ca. 1900; taught in English. Prerequisite: Junior or senior classification, or approval of instructor. Cross-listed with RUSS 446.

447. **Russian Artistic Culture II: 1890 to Present.** (3-0). **Credit 3.** Masterpieces of Russian art, including architecture, dance, theater, music, film, and literature, from ca. 1890 to the present; taught in English. Prerequisite: Junior or senior classification, or approval of instructor. Cross-listed with RUSS 447.
451. **Introduction to Italian Culture.** (3-0). **Credit 3.** Introduction to the culture of the Italian Peninsula, from Middle Ages to present; study of major works of literature, political science, visual arts, music and cinema, to set Italy's culture in its social and historical context; taught in English. Prerequisite: Junior or senior classification or approval of instructor. Cross-listed with ITAL 451.
453. **Italian Literature.** (3-0). **Credit 3.** Survey of Italian literature from Middle Ages to the present; focus on the Italian Renaissance's relevance for contemporary Europe, the birth of a secular view of culture, and the dialogue with the classical tradition. Prerequisite: Junior or senior classification or approval of instructor. Cross-listed with ITAL 453.
455. **Italian Cinema.** (3-0). **Credit 3.** Survey of Italian cinema from Neorealism to the present; taught in English. Prerequisite: Junior or senior classification or approval of instructor. Cross-listed with FILM 455 and ITAL 455.
485. **Directed Studies.** **Credit 1 to 4.** Individual supervision of readings or assigned projects in European studies, selected for each student individually. Prerequisite: Approval of instructor and department head.
489. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of European studies. May be repeated for credit. Prerequisite: Approval of instructor.
491. **Research.** **Credit 1 to 3.** Research conducted under the direction of faculty member in European languages and cultures. Prerequisites: 24 hours in courses taught in EURO department with at least 9 at 300-level or above; approval of department head.

Film Studies (FILM)

201. **Introduction to Film Analysis.** (3-0). **Credit 3.** Fundamental aspects of film analysis and criticism.
285. **Directed Studies.** **Credit 1 to 3.** Selected fields of film studies not covered in depth by other courses. Reports and extensive reading required. May be repeated for credit. Prerequisite: Approval of director of film.
289. **Special Topics in...** **Credit 1 to 4.** Special topics in an identified area of film studies.
291. **Research.** **Credit 1 to 3.** Research conducted under the direction of faculty member in film. Prerequisite: FILM 201 or FILM 301 and freshman or sophomore classification and approval of instructor.
301. **History of Film.** (3-0). **Credit 3.** Historical development of major periods, movements and styles, including several different national cinemas. Prerequisites: FILM 201; ENGL 104.
351. **Advanced Film.** (3-0). **Credit 3.** A different film topic each term; sample topics; major directors; historical periods, fiction into film, film genres. May be repeated for credit. Prerequisite: FILM 201 or 301 or approval of instructor; junior or senior classification. Cross-listed with ENGL 351.
394. **Studies in Film Genre.** (3-0). **Credit 3.** Study of a specific film genre, such as Western, Gangster, Mystery, Science Fiction; genre varies each time course is taught; movies are screened and analyzed along with assigned readings that explore characteristics of the genre and its cultural importance. May be repeated for credit. Prerequisite: FILM 201 or ENGL 251.
401. **National Cinema History.** (3-0). **Credit 3.** Cinema History of a given film-producing nation, such as Japanese Film, Swedish Film, South African Film. May be taken three times for credit. Prerequisites: FILM 301; junior or senior classification.
405. **European Cinema.** (3-0). **Credit 3.** Exploration of key movements in European cinema from 1895 to the present, including both national cinematic traditions, such as Italian Neorealism or French New Wave, and international trends such as Formalism, Expressionism, or Auteurism. Prerequisite: FILM 201 or approval of instructor. Cross-listed with EURO 405.
406. **Propaganda and Dissidence.** (3-0). **Credit 3.** Use of film as a medium to promote political ideology, government propaganda, political dissidence, and subversion, with focus on Europe. Prerequisite: Junior or senior classification or approval of instructor. Cross-listed with EURO 406.
425. **French Film.** (3-0). **Credit 3.** Overview of French cinema from its origins to the present; interpretation of French cultural history and politics through film; taught in English. Prerequisites: Junior or senior classification, or approval of instructor. Cross-listed with EURO 425 and FREN 425.

435. **German Film.** (3-0). **Credit 3.** Consideration and analysis of major works and directors of German film; interpretation of culture through film; relationship of film to history, literature, and other arts; taught in English. Prerequisite: Junior or senior classification, or approval of instructor. Cross-listed with GERM 435 and EURO 435.
455. **Italian Cinema.** (3-0). **Credit 3.** Survey of Italian cinema from Neorealism to the present; taught in English. Prerequisites: Junior or senior classification, or approval of instructor. Cross-listed with EURO 455 and ITAL 455.
481. **Seminar in Film Studies.** (3-0). **Credit 3.** Seminar on a figure, theme, style, movement or theory in film studies, with practice in the methods of research in film studies, culminating in a substantial research paper. Open to seniors enrolled in the interdisciplinary minor in film studies and to others with approval of the Coordinator of Film Studies. May be taken two times for credit. Prerequisite: 9 hours in film studies courses including FILM 301.
485. **Directed Studies.** **Credit 1 to 3.** Selected fields of film studies not covered in depth by other courses. Reports and extensive reading required. May be repeated for credit. Prerequisite: Approval of director of film.
489. **Special Topics in...** **Credit 1 to 4.** Special topics in an identified area of film studies. Prerequisite: Junior or senior classification or approval of instructor.
491. **Research.** **Credit 1 to 3.** Research conducted under the direction of faculty member in film. Prerequisite: FILM 201 or FILM 301 and junior or senior classification and approval of instructor.

Department of Finance

Professors K. E. Back, D. W. Blackwell, S. K. Cooper, D. R. Fraser, J. C. Groth, R. L. Haney, Jr., S. A. Johnson, J. W. Kolari, D. S. Lee, A. Mahajan; Associate Professors E. Boehmer (Interim Head), L. P. Fields, S. M. Sorescu; Assistant Professors S. Chava, M. F. Gallmeyer, N. E. Galpin, R. G. Petkova; Clinical Professors J. E. Gaspar, L. C. Wolken; Clinical Associate Professors J. A. Adkisson, R. T. Dye, T. O. Jackson; Clinical Assistant Professor D. R. Hallermann Executive Professors C. C. Donnell; Senior Lecturers O. E. Elmore, S. C. Guyton, L. R. Martindale; Lecturer P. K. Drysdale

Finance (FINC)

201. (BUSI 1307) **Personal Finance.** (3-0). **Credit 3. I, II, S** Financial management problems of the individual consumer; budgeting, insurance, saving and investing, and home financing. May not be used as a finance elective.
267. **Introduction to Securities and Commodities Trading.** (1-0). **Credit 1.** Introduction to financial markets and the instruments that trade in them; describes how financial markets operate; compare and contrast a wide variety of common financial instruments, including debt, equity, derivatives and commodities; basic functions of real-world data sources (especially Bloomberg and the Wall Street Journal); and career paths in the field of finance. Prerequisite: Freshman or sophomore classification in business.
341. **Business Finance.** (3-0). **Credit 3. I, II, S** Financial practices and financial management of modern business corporations; cash flow, planning, procurement of funds, management of long-term funds and working capital. Prerequisites: Admission to upper division in Mays Business School.
371. **Real Estate Decision-Making.** (3-0). **Credit 3. I, II, S** Legal, physical and economic characteristics of real estate; overview of real estate market analysis, real estate valuation procedures and real estate production, marketing and financing methods. Prerequisites: Admission to upper division in Mays Business School.
409. **Survey of Finance Principles.** (3-0). **Credit 3. I, II, S** Finance survey for non-business majors; financial markets, the investment banking process, interest rates, financial intermediaries and the banking system, financial instruments, time value of money concepts, and security valuation and selection. May not be used to satisfy degree requirements for majors in business. Prerequisites: ACCT 209 or 229; junior classification; for students other than business and agribusiness.
421. **Investment Analysis.** (3-0). **Credit 3. I, II, S** Operation and functions of the organized security exchanges, fundamental security analysis and technical market analysis. Prerequisite: FINC 341 with a grade of C or better.

422. **Applied Investment Analysis. (3-0). Credit 3. I, II** Theoretical and analytical developments in security selection and portfolio management; includes macroeconomic analysis, portfolio theory, and portfolio performance evaluation; concepts applied to the allocation of investments in a student-managed equity portfolio. Prerequisite: Approval of instructor; FINC 421.
423. **Options and Financial Futures. (3-0). Credit 3. I, II** Valuation of options and financial futures; risk management and hedging applications using options and financial futures; primary focus on stock options, index options, stock index futures, interest rate futures, foreign exchange futures and futures options. Prerequisite: FINC 421.
424. **Trading Risk Management. (3-0). Credit 3.** Mid-office risk management strategies using the energy markets as a focus; develops understanding of commodity market behavior, use of forwards and options for risk management, risk management reporting, Greeks and simulation-based VaR analysis. Prerequisite: FINC 421.
425. **Portfolio Management. (3-0). Credit 3.** Overview of the investment industry and the portfolio management process; includes indices and benchmarks, portfolio structuring, stock vs. sector selection, performance measurement, and attribution analysis, investment products and distribution, and current issues affecting the investment industry. Prerequisites: FINC 421.
426. **Trading Markets. (3-0). Credit 3.** Issues related to securities trading and securities markets; why and how people trade; the operation, structure and regulation of securities markets; focus on equity markets; comparisons to the markets for derivatives and other securities. Prerequisites: FINC 421.
427. **Titans of Investing. (3-0). Credit 3.** Readings from the most influential theorists and practitioners of 20th and 21st century investing; case studies and portfolio sector exercises in an institutional context, based on detailed assessment of global investment risks. Prerequisites: Junior or senior classification; approval of instructor; FINC 421.
434. **Managerial Finance I. (3-0). Credit 3. I, II, S** Managerial problems of financial managers; financial analysis, current asset management, capital budgeting and capital structure. Prerequisite: FINC 341 with a grade of C or better.
435. **Managerial Finance II. (3-0). Credit 3. II, S** Case studies in the administration of the financial affairs of business enterprises; working capital management, capital budgeting, capital structure, and mergers and acquisitions. Prerequisite: FINC 434.
445. **Funding International Business. (3-0). Credit 3. I, II** International business transactions, balance of payments and exchange rate systems, exchange rate risk and hedging techniques, sources of funding, relation to international financial institutions and capital instruments; relates international business funding to national and commercial development. Prerequisite: FINC 341 with a grade of C or better. Cross-listed with IBUS 446.
447. **Financial Statement Analysis. (3-0). Credit 3. I, II** Development of an analytical approach to financial statements, integrating relevant finance and accounting concepts and principles; current topics in financial analysis. Prerequisites: FINC 341 with a grade of C or better; ACCT 315 or 327. Cross-listed with ACCT 447.
460. **Money and Capital Markets. (3-0). Credit 3. I, II, S** Role of finance and financial institutions in the money and capital markets in the U.S. including supply of and demand for funds, interest rates and flow of funds analysis. Prerequisite: FINC 341 with a grade of C or better.
462. **Commercial Bank Management. (3-0). Credit 3. I, II** Problems confronting commercial banks: development and application of credit standards, decisions on loan applications, liquidity management and profit sensitivity to varying levels of interest rates. Prerequisite: FINC 460.
466. **Wall Street, Investment Banking and the Financial Markets. (3-0). Credit 3. S** Enables students to experience, first-hand, the major financial markets of the United States; visits to major Wall Street firms, security and commodity exchanges, and other financial institutions. Prerequisites: Admission to upper division in Mays Business School and approval of instructor.
467. **Commodity Trade Strategy. (3-0). Credit 3.** Front office trading strategies using the energy market as a focus; comprehending and evaluating price behavior in energy markets; derivation of price and risk strategies. Prerequisites: FINC 423.
472. **Real Estate Finance. (3-0). Credit 3. II** Real estate financing instruments, institutions and techniques; trust deed financing, mortgage underwriting and risk analysis, primary and secondary mortgage markets and institutions. Prerequisite: FINC 371.

473. **Real Estate Appraisal. (3-0). Credit 3. I** Impact of socio-economic forces on urban real estate values; cost, sales comparison and capitalized income approaches to market value; demonstration appraisal. Prerequisite: FINC 371.
475. **Real Estate Investment Analysis. (3-0). Credit 3. I** Real estate market analysis, equity investor decision criteria, institutional investment constraints and investment valuation; case analysis of specific real estate investment decisions. Prerequisite: FINC 341 with a grade of C or better.
478. **Real Estate Law. (3-0). Credit 3. I, II** Laws and regulations affecting real estate ownership and use; estates and interests in land, legal descriptions, deeds, security devices for real estate creditors, earnest money contracts, leases, public and private land use controls and mineral and water rights. May not be used as a finance elective. Prerequisite: FINC 371 or approval of instructor.
484. **Professional Internship. Credit 1 to 6. I, II, S** Professional internship with practicing professionals under the direction of a faculty member. Available for free elective only and must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Finance major and approval of instructor and department head.
485. **Directed Studies. Credit 1 to 3 each semester. I, II, S** Directed study on selected problems in the area of finance not covered in other courses. Prerequisites: Finance major and senior classification; approval of department head.
489. **Special Topics in... Credit 1 to 4. I, II, S** Selected area in finance. May include attention to aspects of real estate finance, corporate financial management, investments, or financial institutions and markets. Prerequisite: Admission to upper division in Mays Business School and approval of instructor.

Department of Nutrition and Food Science

Professors M. C. Bielamowicz, R. S. Chapkin, E. D. Harris, J. T. Keeton (Interim Head), K. S. Kubena, J. R. Lupton, M. McBurney, S. Pillai; Associate Professors J. D. Anding, P. S. Murano, S. Robinson, S. Talcott, N. D. Turner, R. L. Walzem; Assistant Professors C. D. Allred, C. Morgan, J. Sturino, A. R. Villalobos, C. Wu; Senior Lecturer M. N. Riaz Lecturers K. M. Beathard, S. Lorenz, L. J. Talley

Food Science and Technology (FSTC)

201. **(AGRI 1329) Food Science. (3-0). Credit 3. I, II S** The fundamental biological, chemical and physical scientific principles associated with the study of foods; topics include food composition and nutrition, food additives and regulations, food safety and toxicology, food processing, food engineering, food biotechnology, product development and sensory evaluation.
291. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in food science and technology. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of department head.
305. **Fundamental Baking. (2-3). Credit 3. II** Fundamentals of baking; chemical and physical properties of ingredients, methods of baking all products, fundamental reactions of dough, fermentation and oven baking. Prerequisite: CHEM 222 or 227 or approval of department head.
307. **Meats. (2-3). Credit 3. I, II, S** Integrated studies of the meat animal processing sequence regarding the production of meat-type animals and the science and technology of their conversion to human food. Prerequisites: ANSC 107 and 108 or approval of department head. Cross-listed with ANSC 307.
311. **Principles of Food Processing. (2-3). Credit 3. I** Principles and practices of canning, freezing, dehydration, pickling and specialty food manufacture; fundamental concepts of various techniques of preparation, processing, packaging and use of additives; processing plants visited. Prerequisite: Junior or senior classification. Cross-listed with HORT 311.
312. **Food Chemistry. (3-0). Credit 3. II** The fundamental and relevant chemistry and functionality of the major food constituents (water, carbohydrates, lipids, proteins, phytochemical nutraceuticals) and study of food emulsion systems, acids, enzymes, gels, colors, flavors and toxins. Prerequisite: CHEM 222 or 228 or approval of department head. Cross-listed with DASC 312.
313. **Food Chemistry Laboratory. (0-3). Credit 1. II** Laboratory exercises investigating specific molecules, such as food acids, enzymes, pigments and flavors, and chemical interactions in foods, such as oxidation reactions, emulsion systems, and functional properties from a fundamental chemistry rather than an analytical perspective. Prerequisite: CHEM 238 or 242.

314. **Food Analysis.** (1-4). **Credit 3. I** Selected standard methods for assay of food components; principles and methodology of both classical and instrumental techniques in food analysis. Prerequisite: CHEM 238 or 242 or approval of department head. Cross-listed with DASC 314.
315. **Food Process Engineering Technology.** (2-2). **Credit 3. II** Elementary mechanics, power transmission, steam and steam boilers, pipes and pipe fitting, refrigeration and insulation, temperature measurement and control, electric motors, disposal of waste products, and mechanical problems as applied to foods and food processing. Prerequisite: Junior or senior classification or approval of instructor. Cross-listed with AGSM 315.
326. **Food Bacteriology.** (3-0). **Credit 3. I, II** Microbiology of human foods and accessory substances. Raw and processed foods; physical, chemical and biological phases of spoilage. Standard industry techniques of inspection and control. Prerequisite: BIOL 206 or approval of department head. Cross-listed with DASC 326.
327. **Food Bacteriology Lab.** (0-3). **Credit 1. I, II** Laboratory to accompany FSTC 326. Cross-listed with DASC 327.
330. **Dairy and Food Technology.** (3-3). **Credit 4. I** Principles and practices involved in processing of milk into market milk, butter, cheese and cheese foods; fundamental principles of these processes as related to their design and control. Cross-listed with DASC 330.
331. **Dairy and Food Technology.** (3-3). **Credit 4. II** Manufacture of frozen, freeze-dehydrated, concentrated and dehydrated dairy foods; fundamental aspects of freezing, concentration and dehydration of foods. Prerequisite: FSTC 330 or approval of department head. Cross-listed with DASC 331.
401. **Food Product Development.** (2-3). **Credit 3. II** Design and develop food products using principles of food chemistry, food processing, nutrition, sensory analysis and statistics; team collaborate to improve food product characteristics to meet the needs of a changing society. Prerequisites: FSTC 311, 312, 313, 314, 315, 326 or registration therein.
406. **Poultry Processing and Products.** (3-2). **Credit 4. I** The science and practice of processing and products of poultry and eggs; physical, chemical, microbiological and functional characteristics of value-added poultry products as they affect consumer acceptance, efficiency of production, and regulatory approval. Prerequisites: FSTC 326; CHEM 222; POSC 309. Cross-listed with POSC 406.
446. **Commercial Fruit and Vegetable Processing.** (2-3). **Credit 3. II** Pilot plant and laboratory operations pertaining to processed fruits, vegetables and beverages; new product development emphasized via individual laboratory projects. Prerequisite: FSTC 311. Cross-listed with HORT 446. (Offered in even numbered years.)
457. **Hazard Analysis and Critical Control Point System.** (3-0). **Credit 3. I** Hazard Analysis and Critical Control Point (HACCP) principles specifically related to meat and poultry; microbiological and process overviews; good manufacturing practices and standard operating procedures development. Prerequisite: FSTC 326 or approval of instructor. Cross-listed with ANSC 457.
481. **Seminar.** (1-0). **Credit 1. I** Guidelines and practice in journal article review and making effective technical presentations; strategies for conducting a job search; development of résumés and letters and interviewing targeted for careers in the food industry or graduate school. Prerequisite: Senior classification in food science and technology.
485. **Directed Studies.** **Credit 1 to 4 each semester. I, II, S** Directed study on selected problems in the area of food technology not covered in other courses. Prerequisites: Junior or senior classification; approval of department head; 2.0 GPR in major and overall.
489. **Special Topics in...** **Credit 1 to 4. I, II, S** Selected topics in an identified area of food science and technology. May be repeated for credit.
491. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in food science and technology. May be repeated 3 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded.

Forensic and Investigative Sciences

(faculty, see page 693)

(FIVS)

205. **Introduction to Forensic and Investigative Sciences. (3-0). Credit 3. I** Overview of principles, procedures, and concepts of forensic and investigative sciences; instruction in the definitions, scope, and use of tools, techniques and protocols in forensic applications used to resolve social, regulatory, and legal disputes. Prerequisites: Freshman or sophomore classification or approval of instructor.
291. **Research. (0-12). Credit 1 to 4.** Research conducted under the direction of a faculty member in the department of entomology. May be repeated 3 times for credit. Prerequisite: Freshman or sophomore classification.
316. **Biotechnology and Forensics. (3-0). Credit 3. II** Introduction of applications of biotechnology for agriculture and human health purposes; description of experimental protocols used to create genetically modified organisms (GMOs); discussion of the risks, benefits, and regulations controlling the use of biotechnology in society. Prerequisites: GENE 301, or equivalent or approval of instructor.
415. **Practice and Principles of Science and Law. (3-0). Credit 3. II** Introduction to series of practitioners of forensic science and the justice system; receive instruction on principles, procedures, and practices used in solving legal and societal issues; examine scientific method and scientific knowledge as applied through expert testimony; enhance critical thinking and reasoning skills in studying and debating different positions of current issues of science and law. Prerequisites: FIVS 205, 431 and 432; senior classification or approval of instructor.
431. **The Science of Forensic Entomology. (3-0). Credit 3. II** Explores the science, methodology and technology employed to gather, preserve, and present information about insects and other arthropods in such a manner that this information can be used in courts of law as evidence and testimony to help resolve issues of a criminal or civil nature. Prerequisites: Junior classification or approval of instructor. Cross-listed with ENTO 431.
432. **Applied Forensic Entomology. (0-3). Credit 1. II** Laboratory-based course affording students practical experience using scientific information, methodology, technology, and legal procedures inherent to the field of forensic entomology; emphasis on collecting, preserving, and identifying information as evidence and expert witness testimony in courts of law. Prerequisites: Concurrent enrollment with FIVS 431; junior classification or approval of instructor. Cross-listed with ENTO 432.
435. **Case Studies in Problem Solving. (3-0). Credit 3. II** Development of reasoning strategies by examining a variety of case studies; science and scientific method solving real-world problems as part of an investigative team. Prerequisite: Senior classification or approval of instructor. Cross-listed with ENTO 435.
481. **Seminar. (1-0). Credit 1.** Analysis of research topics related to the fields of forensic science and law. May be taken 4 times for credit. Prerequisite: Junior or senior classification or approval of instructor.
482. **Occupational and Professional Development. (2-0). Credit 2. I** Organized instruction in written and oral communication; acquaint students with private and public-sector companies and agencies as well as leading professionals from these firms to reinforce academic instruction and prepare students for the transition to employment, graduate and professional schools. Prerequisite: Junior or senior classification or approval of instructor. Cross-listed with ENTO 482.
484. **Professional Internship. (0-12). Credit 1 to 4.** Independent study and supervised field experience related to a professional area or interest in forensic science. May be taken 3 times for credit. Prerequisite: Junior or senior classification or approval of instructor.
491. **Research. (0-12). Credit 1 to 4.** Research conducted under the direction of a faculty member in the department of entomology. May be repeated 3 times for credit. Prerequisite: Junior or senior classification.

Department of Ecosystem Science and Management

Professors D. N. Appel, T. W. Boutton, D. D. Briske, J. R. Conner, R. N. Coulson, J. Gan, S. L. Hatch, M. M. Kothmann, M. G. Messina, B. P. Mohanty, F. E. Smeins, Jr., R. Srinivasan, S. G. Whisenant (Head), B. P. Wilcox, X. Wu; **Associate Professors** D. M. Burton, M. Eriksson, C. D. Foster, J. H. Gould, R. W. Knight, U. P. Kreuter, V. Krutovsky, D. K. Loh, C. Loopstra, W. E. Rogers, M. G. Tjoelker; **Assistant Professors** G. W. Moore, S. C. Popescu, R. A. Washington-Allen; **Senior Lecturers** W. T. Hamilton, W. T. Watson; **Assistant Lecturer** O. Popescu

Forest Science (FRSC)

101. **Introduction to Forestry.** (1-3). **Credit 2.** I Survey of the field of forestry in the U.S.; history, resources, policies, organization, industries, employment, education and research. Laboratory periods to provide exposure to forestry and wood processing operations.*
102. **Introduction to Spatial Science.** (1-0). **Credit 1.** Provides students with an understanding of the spatial sciences, how they are applied for problem solving in a wide variety of fields, and what opportunities are available to professionals in the spatial sciences.
203. **Dendrology.** (2-2). **Credit 3.** I Taxonomy, identification and silvical features of the important timber and understory species of North America. Prerequisite: BIOL 111 or equivalent.
291. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in forest science. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
300. **Forest Practices.** **Credit 5.** S A field study of problems in mensuration, silviculture, ecology, soils, harvesting and their role in developing forest management systems. Prerequisites: FRSC 305 and 306.*
302. **Fundamentals of Environmental Decision-Making.** (3-0). **Credit 3.** I, II Introduction to environmental issues in natural resources management; fundamental principles and methods for understanding bio-social interdependencies in complex environmental issues; use of computer-aided group decision-making techniques to develop cooperative strategies for resolving local or global environmental issues. Prerequisite: Junior classification or approval of instructor.*
304. **Forest Ecology.** (3-0). **Credit 3.** I Life history and general characteristics of trees; structure and function of forest ecosystems; fundamental principles of forest tree physiology and ecology applied to an analysis of tree growth in relation to environmental factors and present day forest management; global changes and forests. Prerequisite: Junior or senior classification or approval of instructor.*
305. **Silviculture.** (3-3). **Credit 4.** II The theory and practice of controlling forest establishment, composition, structure and growth; principles of natural and artificial regeneration; intermediate cultural operations; silvicultural systems; use and control of fire in forests.
306. **Forest Measurements.** (3-3). **Credit 4.** II Land measurement and mapping; measuring resources; types of volume; the creation and use of volume equations; principles of forest sampling. Prerequisites: AGLS 201; MATH 141 and 142; STAT 302 or equivalent.*
307. **Forest Protection.** (3-3). **Credit 4.** II Destructive agents in forestry as related to importance, identification, cause, extent of losses and protective measures. Prerequisite: Junior classification or approval of instructor.*
308. **Tree Structure and Function.** (0-3). **Credit 1.** II A laboratory study of tree biology with emphasis on integrated tree responses to the environment and forestry practices. Prerequisites: BIOL 111 and 112.
311. **Wood Properties and Utilization.** (2-2). **Credit 3.** I Structure and identification of wood; anatomical, chemical, physical and mechanical properties of wood; wood deterioration and preservation; technology of forest products (solid wood and wood composites). Prerequisite: Junior or senior classification.*
314. **Forest Economics and Valuation.** (4-0). **Credit 4.** II Economic concepts affecting decisions of production, consumption, and prices of the multiple goods and services obtainable from forests, methods for valuing, and outputs of forest land; concepts and practice of forest and forest products business. Prerequisites: AGE 105 or ECON 202; MATH 142.

398. **Interpretation of Aerial Photographs.** (2-3). **Credit 3.** I Identification and evaluation of natural and cultural features on aerial photographs; methods for extracting information concerning land use, vegetative cover, surface and structural features, urban/industrial patterns and archaeological sites. Prerequisites: Any mathematics course and one of the following: AGRO 301, BIOL 111, FRSC 101, GEOG 203, GEOL 101, RENR 205, WFSC 101. Cross-listed with GEOG 398.
404. **Forest Management.** (3-0). **Credit 3.** I Elements, criteria and methods of forest management; survey of current forest management issues; diagnosis and development of forest management plans under different ownership objectives; integration of the business and social aspects with the biophysical and technological aspects of forestry. Prerequisites: FRSC 300 and 314 or approval of instructor.*
405. **Integrated Forest Resource Analysis and Planning.** (3-3). **Credit 4.** Integration of biophysical, economic and social factors in forest resource analysis, management planning and decision making; applications of interdisciplinary knowledge and multiple-use principles to practical forest management problems. Prerequisite: Senior classification or approval of instructor.
406. **Forest Policy.** (3-0). **Credit 3.** I Forest policy development in the United States and review of current issues in forest and related natural resource policy. Prerequisite: Senior classification or approval of instructor.
409. **Manufacturing and Applications of Wood Products.** (3-0). **Credit 3.** I Manufacturing process and operation, grading and specification, process control and improvement, and marketing and application of major wood products such as lumber, structural and nonstructural panel, and engineering products. Prerequisite: FRSC 311 or approval of instructor.*
414. **Modeling Forest Resources.** (3-0). **Credit 3.** I Types of models; model fitting; assumptions, assessment, prediction and simulation; applications in natural resources and forest management. Prerequisites: AGLS 201; FRSC 306; MATH 141, 142; STAT 302.
420. **Arboriculture.** (2-2). **Credit 3.** I Tree selection and planting to fit climatic, space and edaphic conditions; diagnosing tree abnormalities and practicing intensive tree care. Frequent field work and demonstrations. Prerequisite: Senior classification or approval of instructor.*
421. **Urban Forestry.** (3-0). **Credit 3.** II Conceptual role of trees in improving the urban environment; optimum use of existing forested areas and the establishment of trees in appropriate open spaces; tree ordinances, species evaluation, street tree planning and tree inventory systems. Prerequisite: Approval of instructor.*
430. **Introduction to Tree Improvement.** (3-0). **Credit 3.** Study of genetic variation in forest trees and its use in tree breeding programs; includes introductory genetics, breeding schemes, progeny testing, seed orchards and seedling production. Prerequisites: Undergraduate course in biology, forestry or closely related field; junior or senior classification.
461. **Geographic Information Systems for Resource Management.** (2-2). **Credit 3.** I Geographic Information System (GIS) approach to the integration of spatial and attribute data to study the capture, analysis, manipulation and portrayal of natural resource data; examination of data types/formats, as well as the integration of GIS with remote sensing and Global Positioning System; laboratory includes extensive use of GIS applications to conduct analyses of topics in natural resources. Prerequisite: Approval of instructor. Cross-listed with AGSM 461 and SPSC 461.
462. **Advanced GIS Analysis for Natural Resource Management.** (2-2). **Credit 3.** Advanced topics in Geographic Information Systems (GIS) to solve natural resource problems; manipulation of raster data types; three-dimensional modeling; emphasis on geoprocessing as it relates to applied projects, particularly with habitat suitability models; field and lab use of Global Positioning Systems (GPS); internet-based GIS modeling. Prerequisites: FRSC 461 or AGSM 461 or equivalent or approval of instructor; junior or senior classification. Cross-listed with AGSM 462, GEOG 462 and SPSC 462.
484. **Internship.** **Credit 1 to 4.** I, II, S On-the-job supervised experience program conducted in the area of the student's specialization. Prerequisite: Approval of instructor.
485. **Directed Studies.** **Credit 1 to 4 each semester.** I, II, S Individual study and research on a selected problem in forest science approved by instructor.*
489. **Special Topics in...** **Credit 1 to 4.** I, II, S Selected topics in an identified area of forestry. May be repeated for credit.*
491. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in forest science. May be repeated 3 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor.

*Field trips required for which departmental fees may be assessed to cover costs.

French

(faculty, see page 698)

(FREN)

101. **(FREN 1411) Beginning French I. (3-2). Credit 4. I, II, S** Elementary language study with oral, written, and reading practice. Preparation for conversation. Part of class preparation will be done in language laboratory.
102. **(FREN 1412) Beginning French II. (3-2). Credit 4. I, II, S** Continuation of FREN 101. Part of class preparation will be done in language laboratory. Prerequisite: FREN 101.
201. **(FREN 2311) Intermediate French I. (3-0). Credit 3. I, II, S** Readings of average difficulty. Review of grammar; practice in conversation and composition. Prerequisite: FREN 102.
202. **(FREN 2312) Intermediate French II. (3-0). Credit 3. I, II, S** Continuation of FREN 201 with more advanced material. Prerequisite: FREN 201.
221. **Field Studies I. Credit 3.** French language and culture taught in France; supervised travel of cultural interest; living with local families; participation in the activities and courses of a French university or institute; written and oral reports, exams; to be taken concurrently with FREN 222. Prerequisite: FREN 102 with a grade of B or higher or approval of instructor.
222. **Field Studies II. Credit 3.** French language and literature taught in France in cooperation with a French university or institute; exams, written reports; to be taken concurrently with FREN 221. Prerequisite: FREN 102 with a grade of B or higher or approval of instructor.
223. **French Culture and Society in French Literary Masterpieces in Translation. (3-0). Credit 3.** Analysis and understanding of French culture and contemporary society through the study of masterpieces of French literature including novels, plays, short stories and films. Cross-listed with EURO 223.
250. **Phonetics. (3-0). Credit 3.** Problems of articulation and intonation; special attention given to corrective phonetics; readings of poetic and dramatic texts; emphasis on diction; transcription based on International Phonetic Alphabet; conducted in French. Prerequisite: FREN 202 or 222.
285. **Directed Studies. Credit 1 to 4.** Individual supervision of readings or assigned projects in French, selected for each student individually. Prerequisite: Approval of instructor and department head.
289. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of French. May be repeated for credit. Prerequisite: Approval of instructor.
300. **Composition. (3-0). Credit 3.** Development of writing skills in French; emphasis on grammatical constructions; structural analysis of representative texts and their imitation; expression of hypotheses; descriptive and explanatory writing; required for modern languages majors in French; conducted in French. Prerequisite: FREN 202 or 222.
301. **French Culture and Civilization. (3-0). Credit 3.** Cultural background of French language and literature; salient aspects of the geography and history of France; characteristic elements of French culture; illustration of major stylistic periods in literature and the fine arts; conducted in French. Prerequisite: FREN 202 or 222.
306. **Technical and Business French. (3-0). Credit 3.** Advanced–intermediate course to provide cross-cultural communication skills crucial to succeeding in a francophone business or technical environment, including topics on business and technical jargon, correspondence, résumés, interviewing, the European Union, telecommunications, technology and the French-speaking community. Prerequisite: FREN 202 or 222 or approval of instructor.
311. **Advanced Oral Expression. (3-0). Credit 3.** Strategies for effective communication in spoken French with special attention to language appropriate to various social contexts; analysis of press articles, television and radio programs; oral presentations; conducted in French. Prerequisite: FREN 202 or 222.
321. **Survey of French Literature I. (3-0). Credit 3.** Masterpieces of French poetry, prose and theater from the Middle Ages through the seventeenth century, with special attention to the place of each work's significance to the evolution of French society and culture; conducted in French. Prerequisite: FREN 202 or 222.
322. **Survey of French Literature II. (3-0). Credit 3.** Masterpieces of French poetry, prose and theater from the Enlightenment through the twentieth century, with special attention to the place of each work's significance to the evolution of French society and culture; conducted in French. Prerequisite: FREN 202 or 222.
323. **Immigration and Ethnicity in Contemporary France. (3-0). Credit 3.** Immigration and ethnic groups in contemporary France, their effects on national identity and politics, and their cultural representations. Prerequisite: ENGL 104 and junior or senior classification. Cross-listed with EURO 323.

336. **Contemporary France. (3-0). Credit 3.** Cultural, economic and political aspects of present-day French society, including educational institutions, modern families, gender roles, entertainment and leisure, social classes and lifestyles, French and American cultural differences, and treatment of these issues in French media; conducted in French. Prerequisite: FREN 202 or 222.
410. **Seminar in French Literature. (3-0). Credit 3.** Exploration of a significant topic or period in French literature; conducted in French. Prerequisites: FREN 300 and an additional 3 hours at 300-level.
418. **Seminar in French Civilization. (3-0). Credit 3.** Discussions and observation of particular events and institutions crucial to the development of French society and culture; analysis of literary, artistic and cinematic representations of events and phenomena such as the French revolution, May 1968, and church and state relations; conducted in French. Prerequisites: FREN 300 and an additional 3 hours at 300-level.
425. **French Film. (3-0). Credit 3.** Overview of French cinema from its origins to the present; interpretation of French cultural history and politics through film; taught in English. Prerequisites: FREN 202 or approval of instructor. Cross-listed with EURO 425 and FILM 425.
485. **Directed Studies. Credit 1 to 4.** Individual supervision of readings or assigned projects, selected for each student individually; written and oral reports. Prerequisite: Approval of instructor and department head.
489. **Special Topics in... Credit 1 to 4. I, II, S** Selected topics in an identified area of French. May be repeated for credit. Prerequisite: Approval of instructor.
491. **Research. Credit 1 to 3.** Research conducted under the direction of faculty member in French. Prerequisites: 24 hours of French with at least 9 at 300-level or above; approval of department head.

Genetics

Professors D. Bell-Pedersen, M. J. Benedik, D. L. Busbee, B. P. Chowdhary, N. D. Cohen, E. W. Collisson, J. N. Derr, D. J. Ebbole, A. C. R. Ficht, T. A. Ficht, R. H. Finnell, J. R. Gold, C. F. Gonzalez, I. F. Greenbaum, L. A. Guarino, T. C. Hall, P. E. Hardin, J. S. Johnston, J. L. Leibowitz, T. D. McKnight, C. W. Magill, J. E. Mullet, K. E. Murphy, W. D. Park, D. O. Peterson, B. B. Riley, S. H. Safe, F. Schroeder, D. E. Shippen, L. C. Skow, C. W. Smith, D. M. Stelly, J. W. Templeton, R. D. Wells, C. J. Welsh, J. R. Wild, J. E. Womack, H. Zhang; **Associate Professors** D. L. Adelson, R. Aramayo, L. Bernstein, B. Binas, M. Bryk, C. J. Coates, J. Cruz-Reyes, S. Datta, J. W. Erickson, R. Fan, C. A. Gill, J. Gould, A. D. Herring, J. C. Hu, N. H. Ing, G. M. Kapler, S. R. King, K. V. Krutovsky, G. R. Kunkel, C. Loopstra, W. J. Murphy, V. M. Panin, A. E. Pepper, M. Polymenis, B. B. Riley, E. Rucker, J. E. Samuel, B. W. Shaw, D. A. Siegele, T. E. Spencer, H. H. Wilkinson, H. Zhang, G. Zhu, K. Zhu-Salzman; **Assistant Professors** P. de Figueiredo, L. R. Garcia, R. Lints, C. R. Long, K. A. Maggert, M. Mateos, B. D. Perkins, H. Qin, T. Raudsepp, P. K. Riggs, J. M. Sturino, H. Zhou

Genetics (GENE)

105. **Perspectives in Genetics: Past, Present and Future. (2-0). Credit 2. I** Impact of genetics on science and society: historical and continuing development of genetics and its contributions to agricultural, biological, medical, physical and social studies. Prerequisite: Freshman or sophomore classification or approval of instructor.
285. **Directed Studies. Credit 1 to 4.** Introduction to laboratory research. Prerequisite: Freshman or sophomore classification in genetics or approval of instructor.
289. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of genetics. May be repeated for credit. Prerequisites: Freshman or sophomore classification in genetics; approval of instructor.
291. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in genetics. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
301. **Comprehensive Genetics. (3-3). Credit 4. I, II, S** Survey of the fundamental principles of genetics: Physical basis of Mendelian inheritance, expression and interaction of genes, linkage, sex linkage, biochemical nature of genetic material and mutation. Credit will not be given for more than one of GENE 301, 302, 315 or 320. Not open to biochemistry or genetics majors. Prerequisite: BIOL 112.

302. **Principles of Genetics.** (3-3). **Credit 4. I, II** Mechanisms of inheritance, stressing the conservation of fundamental genetic processes throughout evolution, from bacteria to humans; mutations and phenotypes, Mendelian genetics, population genetics and evolution, and complex inheritance. Course designed for biochemistry, genetics and all majors in biology. Credit will not be given for more than one of GENE 301, 302, 315 and 320. Prerequisites: BIOL 112.
310. **Principles of Heredity.** (3-0). **Credit 3. I, II** Basic principles of classical genetics, molecular genetics, mutation theory and genetic engineering; emphasis on humans and society. Not open to biochemistry and genetics majors. Prerequisite: Junior classification.
315. **Genetics of Plants.** (3-0). **Credit 3.** Fundamental genetic principles as applied to plants: transmission, replication, expression and interaction of genes; linkage, recombination and mapping; chromosomal and gene mutation; behavior of genes in populations; selection, mating systems, cytoplasmic inheritance; molecular analysis and manipulation of genes and gene products; genetically modified plants. Not open to biochemistry or genetics majors. Credit will not be given for more than one of GENE 301, 302, 315 or 320. Prerequisite: BIOL 101 or BIOL 111.
320. **Biomedical Genetics.** (3-0). **Credit 3. I, II** Fundamental genetic principles as applied to biomedical science; Mendelian inheritance, linkage and genetic mapping, mutagenesis and pedigree analysis; molecular basis of gene function and inherited disease; gene therapy and genetic counseling. Credit will not be given for more than one of GENE 301, 302, 315 or 320. Prerequisite: BIMS major with a minimum overall 2.5 TAMU GPA. Cross-listed with BIMS 320.
404. **Plant Breeding.** (2-2). **Credit 3.** Application of genetics and other sciences to the breeding and improvement of horticultural crops; methods and special techniques employed. Prerequisite: GENE 301. Cross-listed with HORT 404. Credit cannot be given for HORT 404 and AGRO 304.
405. **Mammalian Genetics.** (3-0). **Credit 3.** Comparative mammalian genetic systems with emphasis on laboratory animals; organization and expression of mammalian genes; development and use of genetically defined animals in biomedical and genetic research. Prerequisite: GENE 302. Cross-listed with BIMS 405.
406. **Bacterial Genetics.** (3-0). **Credit 3.** A problem oriented course surveying the manipulation and mechanisms of genetic systems in bacteria; recombination, gene structure and regulation of bacterial genes, plasmids and phages. Prerequisites: GENE 302; BIOL 351. Cross-listed with BIOL 406.
411. **Biotechnology for Crop Improvement.** (3-0). **Credit 3.** Use of biotechnology to improve agricultural, horticultural and forest crops; techniques and methods used and case studies where biotechnology has been used to alter traits such as pathogen resistance, protein or oil consumption, ripening, fertility and wood properties. Prerequisite: BIOL 111 or equivalent. Cross-listed with MEPS 411.
412. **Population and Ecological Genetics.** (3-0). **Credit 3. I, II** Concepts of population genetics: dynamics of natural populations with emphasis on ecological interactions. Prerequisite: GENE 302.
420. **Bioethics.** (3-0). **Credit 3. II** The application of ethical theory to the use of modern genetics and biochemistry stressing the social implications of genetic engineering, agricultural manipulation and biotechnology. Prerequisites: GENE 302; BICH 410 or 440.
421. **Advanced Human Genetics.** (3-0). **Credit 3.** A rigorous, analytical approach to genetic analysis of humans including diagnosis and management of genetic disease in humans; transmission of genes in human populations; human cytogenetics; the structure of human genes; human gene mapping; molecular analysis of genetic disease; genetics screening and counseling. Prerequisites: GENE 302; BICH 410 or 440. Cross-listed with BIMS 421.
431. **Molecular Genetics.** (3-0). **Credit 3. I, II** Molecular basis for inheritance: gene structure and function, chromosomal organization, replication and repair of DNA, transcription and translation, the genetic code, regulation of gene expression, genetic differentiation and genetic manipulations. Prerequisites: GENE 302; BICH 410 or MEPS 313 or BIOL 351. Cross-listed with BICH 431.
432. **Laboratory in Molecular Genetics.** (0-6). **Credit 2. II** Laboratory for molecular genetics providing technical experience with tools of molecular biology. Prerequisite: GENE 431 or concurrent registration. Cross-listed with BICH 432.
450. **Recombinant DNA and Biotechnology.** (3-0). **Credit 3. I, II** Basic genetic engineering techniques; cloning with plasmid, lambda, cosmid and M13 vectors; gene libraries; DNA sequencing and mutagenesis; PCR; eucaryotic expression with yeast, baculovirus and mammalian vectors; transgenic animals and plants; gene therapy; monoclonal antibodies; bioremediation. Prerequisites: BICH 431 or GENE 431 or concurrent registration; BICH 411 or 441 or concurrent registration.

452. **Modifying Mammalian Genomes for Biomedical Research.** (3-0). **Credit 3.** Review advances in the production of transgenic animals, the manipulation of embryonic stem cells for transgenics and therapeutics, the modification of specific genes in mammalian species by homologous recombination and RNA interference; special emphasis on genetic manipulation of cells and animals for biomedical research, stem-cell and gene therapy. Prerequisite: GENE 302. Cross-listed with BIMS 452.
481. **Genetics I Seminar.** (1-0). **Credit 1.** I Seminar topics on recent developments in genetics. Prerequisites: GENE 302; GENE 431 or concurrent registration; senior classification or approval of instructor.
482. **Genetics II Seminar.** (1-0). **Credit 1.** II Student preparation and presentation of pertinent genetics topics. Prerequisites: GENE 481; senior classification or approval of instructor.
485. **Directed Studies.** **Credit 1 to 4 each semester.** **I, II, S** Directed study in genetics not included in established courses. Prerequisites: Junior or senior classification; approval of instructor and department head.
489. **Special Topics in...** **Credit 1 to 4.** **I, II, S** Selected topics in an identified area of genetics. May be repeated for credit. Prerequisite: Approval of instructor.
491. **Research.** **Credit 1 to 4 each semester.** Laboratory research supervised by a faculty member. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification in genetics; approval of instructor and department head.

Department of Geography

Professors R. S. Bednarz, S. W. Bednarz, J. R. Giardino, P. J. Hugill, B. Kjerfve, J. B. Kracht, A. C. Millington, D. J. Sherman (Head), J. M. Smith, D. Z. Sui, V. P. Tchakerian, M. R. Waters; **Associate Professors** C. Brannstrom, D. M. Cairns, A. Chin, W. D. Heyman, A. G. Klein, C. W. Lafon, H. Liu; **Assistant Professors** A. Filippi, I. Güneralp, C. Houser, W. Jepson, T. Mangieri, K. O'Reilly, E. B. Roark, R. S. Rose-Redwood, S. M. Quiring; **Lecturer** G. F. Carter, Jr.

Geography (GEOG)

102. **Introduction to Spatial Sciences.** (1-0). **Credit 1.** Provides students with an understanding of spatial sciences; how it is applied for problem solving in a wide variety of fields; and survey of the field and what opportunities are available to professionals in spatial sciences. Cross-listed with FRSC 102 and SPSC 102.
201. **(GEOG 1302) Introduction to Human Geography.** (3-0). **Credit 3.** **I, II** A survey of the major systems of man-land relations of the world and their dissimilar developments; the processes of innovation, diffusion and adaptation stressed with regard to changing relationships between people and their environment.
202. **(GEOG 1303) Geography of the Global Village.** (3-0). **Credit 3.** **I, II** Uses of resources; identification of problems pertaining to poverty, hunger, overpopulation, relations between nations and races, environmental destruction and violence within the major geographic regions of the world.
203. **Planet Earth: Introduction to Earth Systems Science.** (3-2). **Credit 4.** **I, II** Input, storage and output of energy and matter and interaction with air, land, water and plant subsystems of earth; processes, distributions and interactions between subsystems and humans; laboratory activities to illustrate principles of physical geography.
213. **Planet Earth Lab.** (0-3). **Credit 1.** Exercises and maps to illustrate principles of physical geography. Prerequisite: GEOG 203 or registration therein.
291. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in geography. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Freshman or sophomore classification and approval of instructor.
301. **Geography of the United States.** (3-0). **Credit 3.** **I, II** Geographic personality (physical and cultural) of the United States.
304. **Economic Geography.** (3-0). **Credit 3.** **I, II** Location of economic activities over the earth; distribution of agriculture, manufacturing, tertiary activities and transportation; economic growth of areas.
305. **Geography of Texas.** (3-0). **Credit 3.** **I, II** Exploration into the geographic personality of Texas: past and current physical and biotic environments; cultural pluralism, including ethnic origins and distinctive human ecologies; and the social, economic and political sources of environmental problems.

306. **Introduction to Urban Geography.** (3-0). **Credit 3.** Reasons humankind tends to congregate in cities. Overview of patterns in the geographic distribution of cities, and in the geographic distribution of peoples and activities within cities, and the dynamics of these distributions.
309. **Geography of Energy.** (3-0). **Credit 3.** Development of high-energy society; renewable and nonrenewable energy resources; physical and social economies of energy use; geography of energy; energy problems and decisions; dependence of other resources on energy; alternative energy futures. Prerequisite: Junior classification or approval of instructor.
311. **Cultural Geography.** (3-0). **Credit 3.** Human factors which affect man-land relationship; concept of culture, culture areas; population growth and migrations, types of economic activity, urban and transportation geography.
320. **The Middle East.** (3-0). **Credit 3.** Regional geography of the Middle East; physical setting and the historical evolution of Middle Eastern landscapes; current issues. Prerequisites: GEOG 201 or 202 or 203 or equivalent; approval of instructor.
321. **Geography of Africa.** (3-0). **Credit 3.** Systematic approach to the geography of Africa: physical factors; cultural types; economic patterns; current problems.
323. **Geography of Latin America.** (3-0). **Credit 3.** Physical and cultural characteristics of Latin America; physical landscape, cultural succession and the present cultural landscape; details on sub-regions.
324. **Global Climatic Regions.** (3-0). **Credit 3.** Climatological processes and their consequences for spatial distributions of climates; survey of earth's climates; relationships among climate, landforms, vegetation, soils and humans. Prerequisite: GEOG 203 or ATMO 201 or approval of instructor.
325. **Geography of Europe.** (3-0). **Credit 3.** Regional geography of European landmass; global, political and cultural characteristics of European geography in historical and ecological contexts. Prerequisite: Junior or senior classification.
326. **Geography of East Asia.** (3-0). **Credit 3.** Overview of East Asia from physical, social, economic and cultural perspectives; discussions on the roles of East Asia in world affairs and their bilateral ties with the U.S. Prerequisite: Junior or senior classification.
330. **Resources and the Environment.** (3-0). **Credit 3.** Changing demand for land and sea resources; international conditions of population growth, resource depletion and geopolitical control; resource perceptions and decision-making.
331. **Geomorphology.** (2-3). **Credit 3.** Principles and fundamentals of landform analysis. Laboratory work in advanced map interpretation. Prerequisite: GEOL 101 or GEOG 203.
332. **Thematic Cartography.** (2-3). **Credit 3. I, II** Introduction to principles of thematic map compilation and design; history of thematic mapping; projections; data management and symbolization; common types and styles of thematic maps; computer cartography.
335. **Pattern and Process in Biogeography.** (3-0). **Credit 3.** Distribution of organisms across the earth and on environmental and cultural processes that have contributed to these patterns of distribution; dynamic nature of biogeographic patterns; impacts of contemporary and prehistoric humans on plant and animal distributions; methods for exploring biogeographic patterns and detecting change. Prerequisite: Junior or senior classification.
355. **Concepts in Geographic Education.** (3-0). **Credit 3.** Key concepts and generalizations of geography; learning theory applied to geography and environmental education; development of field and computer-based technical/intellectual skills required to teach geography; curriculum and instructional issues related to geography. Prerequisites: GEOG 201 or 202; GEOG 203 or equivalent.
360. **Natural Hazards.** (3-0). **Credit 3.** Introduction to the types and causes of natural events that pose risk to society; an examination of prevailing concepts and theories of human response and vulnerability; characteristics of natural events; natural hazard paradigms; case studies. Prerequisites: GEOG 203 or GEOL 101; junior or senior classification.

361. **Remote Sensing in Geosciences.** (3-2). **Credit 4.** Introduction to the principles, techniques and applications of remote sensing technology in geosciences including the analysis and interpretation of airborne and spaceborne remote sensing data for studying key earth system processes. Prerequisite: GEOG 332 or approval of instructor.
370. **Coastal Processes.** (3-0). **Credit 3.** Introduction to the coastal system, waves and wave dominated coasts, shoreline morphodynamics, tidal and lake coasts, long term coastal development, sea level changes, subtidal and beach ecosystems, coastal dunes and wetlands, structures and organizations, coastal management and coastal hazards. Cross-listed with MARS 370.
380. **Workshop in Environmental Studies.** **Credit 2 to 6. II** The study, understanding and solution of human-environment problems based on principles learned in the classroom; library, laboratory and field work carried out by individuals and in groups; reports on work accomplished. May be repeated for credit as many as three times. Prerequisite: Approval of department head.
390. **Principles of Geographic Information Systems.** (2-2). **Credit 3. I, II** Basic concepts of design, planning and implementation of geographic information systems. Prerequisite: Junior or senior classification.
398. **Interpretation of Aerial Photographs.** (2-3). **Credit 3. I** Identification and evaluation of natural and cultural features on aerial photographs; methods for extracting information concerning land use, vegetative cover, surface and structural features, urban/industrial patterns and archaeological sites. Prerequisites: MATH 102 and one of the following: AGRO 301, BIOL 113, FRSC 101, GEOG 203, GEOL 101, RENR 205, WFSC 101. Cross-listed with FRSC 398.
400. **Arid Lands Geomorphology.** (3-0). **Credit 3.** Introduction to the geomorphology of deserts; processes, origin and evolution of arid lands; urban geomorphology in drylands; desertification.
401. **Political Geography.** (3-0). **Credit 3.** The political process at a variety of geographic scales: international, intranational and urban; origins of territorial organization and conflicts over access to and use of space and its resources.
402. **Interpretation of Cultural Landscapes.** (3-0). **Credit 3.** Cultural context of landscapes in a variety of geographic settings; origins of landscape traditions; folk and popular cultural landscapes; townscape analysis and learning to read landscapes as evidence of cultural conditions.
403. **Historical Geography.** (3-0). **Credit 3.** Historical geography themes: demography, economic structure and social structure; patterns of migration and forms of settlement; use of historical geographic archives and materials; local field trips. Prerequisite: Junior or senior classification.
404. **Spatial Thinking, Perception and Behavior.** (3-0). **Credit 3.** Spatial thinking, spatial perception of the environment and the ways thinking and perception influence spatial behavior; role of geospatial technologies in supporting spatial thinking; models of spatial thinking acquisition; cognitive maps and spatial decision making; developing spatial thinking and individual differences. Meets writing-intensive course requirements for environmental geosciences, environmental studies and geography majors. Prerequisite: Junior or senior classification.
405. **Field Trips.** **Credit 1 to 4.** Supervised field trip to investigate the physical, economic and cultural processes that influence the spatial development and distribution on the landscape. May be repeated for credit. Prerequisites: Geography course at the 200-level or registration therein; approval of instructor.
406. **Geographic Perspectives on Contemporary Urban Issues.** (3-0). **Credit 3.** Contemporary readings on spatial patterns and processes in urban environments; sprawl; human-environment interaction; housing; development and growth; concept of place; scale; power and policy. Prerequisite: GEOG 304 or 306 or equivalent.
420. **Geography of Terrorism.** (3-0). **Credit 3.** Exploration of global terrorism and counter terrorism; regional conflicts and mass violence; construction of places and regions associated with terror; American reactions to global terrorism. Prerequisite: Junior or senior classification.

430. **Environmental Justice.** (3-0). **Credit 3.** Exploration into the spatial variability and human geography of exposure to environmental hazards in U.S. and international contexts; emphasizes environmental equity and environmental racism as it relates to occupational, leisure, and residential geography. Meets writing-intensive course requirements for environmental geosciences, environmental studies and geography majors. Prerequisites: GEOG 201 or 202; junior or senior classification.
433. **Geography of Communication.** (3-0). **Credit 3.** Exploration of the intersection between geography and communication theory; spatial characteristics of communication systems; place representations in the media; social problems of uneven access to information. Prerequisite: GEOG 201.
434. **Hydrology and Environment.** (3-2). **Credit 4.** Examination of hydrologic processes in relation to climate, soils, vegetation, land use practices, and human impacts; natural scientific perspectives emphasized; field and laboratory included. Prerequisite: GEOG 203 or equivalent.
435. **Principles of Plant Geography.** (2-3). **Credit 3.** Plant distributions, their associations and environmental relationships; survey of the principal explanatory systems; field and laboratory study of area patterns at various geographic scales. A weekend field trip is required. Prerequisite: BIOL 101 or 301 or BIOL 107 or approval of instructor.
440. **History and Nature of Geography.** (3-0). **Credit 3.** Summary of classical knowledge of world; development of thought on nature of geography from 1800 to present. Prerequisite: Junior or senior classification.
450. **Field Geography.** (1-6). **Credit 3.** Introduction to field methods; documenting materials, reconnaissance, the field plan; mapping traverse, base maps and aerial photographs; recording techniques; interview procedures. Fields trips required, some on weekends and/or semester breaks, for which departmental fees may be assessed to cover costs. Prerequisite: 15 hours of geography or equivalent.
462. **Advanced GIS Analysis for Natural Resources Management.** (2-2). **Credit 3.** Advanced topics in geographic information systems (GIS) to solve natural resource problems; manipulation of raster data types; three-dimensional modeling; emphasis on geoprocessing as it relates to applied projects particularly with habitat suitability models; field and lab use of global positioning systems (GPS); internet-based GIS modeling. Prerequisites: FRSC 461 or AGSM 461 or equivalent or approval of instructor; junior or senior classification. Cross-listed with AGSM 462, FRSC 462 and SPSC 462.
475. **Advanced Topics in GIS (Geographic Information Systems).** (3-2). **Credit 4.** Topics related to GIS implementation, spatial database design, spatial data analysis, and various advanced GIS applications. Prerequisite: GEOG 390 or equivalent.
476. **GIS Practicum.** (3-0). **Credit 3.** Introduction to current topics in Geographic Information Science including ethical and legal issues surrounding spatial technologies, proper GIS management practices and professional certification; development of professional research, technical and communication skills through participation in a coordinated internship or independent research project. Meets writing-intensive course requirements for environmental geosciences, environmental studies and geography majors. Prerequisites: Senior classification and enrollment in Geographic Information Science Option in geography or approval of instructor.
485. **Directed Studies.** **Credit 1 or more each semester. I, II, S** Individually supervised research or advanced study on restricted areas not covered in regular courses. Prerequisite: Approval of department head.
489. **Special Topics in...** **Credit 1 to 4. I, II, S** Selected topics in an identified area of geography. May be repeated for credit. Prerequisite: Approval of instructor.
491. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in geography. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor.

Department of Geology and Geophysics

Professors W. M. Ahr, T. A. Blasingame, R. L. Carlson, F. M. Chester, M. E. Everett, P. J. Fox, J. R. Giardino, E. L. Grossman, A. Hajash, B. E. Herbert, L. T. Ikelle, A. K. Kronenberg (Head), C. C. Mathewson, R. K. Popp, P. D. Rabinowitz, A. L. Raymond, M. J. Richardson, W. W. Sager, J. H. Spang, V. P. Tchakerian, D. V. Wiltschko, T. E. Yancey, H. Zhan; **Associate Professors** J. S. Chester, R. L. Gibson, Jr., J. R. Hopper, W. M. Lamb, F. Marcantonio, J. T. McGuire, B. V. Miller, T. D. Olszewski, D. W. Sparks, Y. Sun; **Assistant Professors** B. Duan, J. Newman, D. J. Thomas. M. Tice, B. Wade; **Research Associate Professor** R. Guillemette

Geology (GEOL)

101. (GEOL 1103 and 1303, 1403) **Principles of Geology.** (3-3). **Credit 4. I, II, S** Physical and chemical nature of the Earth and dynamic processes that shape it; plate tectonics, Earth's interior, materials it is made of, age and evolution, earthquakes, volcanism, erosion and deposition; introduces physical and chemical principles applied to the Earth. Not open to students who have taken GEOL 103 or 104.
104. **Physical Geology.** (3-3). **Credit 4. I** Earth materials, structures, external and internal characteristics; physical processes at work upon or within the planet; required for students in geology, geophysics and petroleum engineering. A working knowledge of high school chemistry and mathematics is required.*
106. (GEOL 1104 and 1304, 1404) **Historical Geology.** (3-3). **Credit 4. I, II** Hypotheses of Earth's origin; age dating of geologic materials; development and history of life; plate tectonic reconstructions, geologic history, and paleogeography, with emphasis on the North American plate. Prerequisite: GEOL 101 or equivalent.
203. **Mineralogy.** (2-6). **Credit 4. I** Crystallography, crystal chemistry, mineral chemistry, optical crystallography, physical properties, and geologic occurrence of rock-forming and economic minerals. Prerequisites: GEOL 101, 104 or 320; CHEM 101; MATH 131 or 151 or approval of instructor.
285. **Directed Studies.** **Credit 1 to 4.** Directed studies in specific problem areas of geology. Prerequisite: Approval of instructor.
291. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in geology. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Freshman or sophomore classification and approval of instructor.
300. **Field Geology.** **Credit 6. S** Basic concepts of field relationships and field techniques are used to develop geologic maps, stratigraphic columns, cross-sections and geologic interpretations for a variety of geologic provinces. Course conducted off-campus in a field camp for six weeks. Prerequisites: GEOL 302, 306, 309, 312 or approval of instructor.*
301. **Mineral Resources.** (2-3). **Credit 3. II** Origin, geologic relations and geographic distribution of mineral and energy resources; mineral economics, mining and reclamation and global economics in the resource industry; identification and classification of economic minerals including energy resources, base and precious metals, chemical industrial minerals and gemstones. Prerequisites: GEOL 101 or 320; CHEM 106 or higher.*
302. **Introduction to Petrology.** (3-3). **Credit 4. II** Introduction to the origin and evolution of igneous, sedimentary, and metamorphic rocks; classification and petrographic analysis of major rock types; relationships to tectonic settings. Prerequisites: GEOL 104 and 203 or approval of instructor.
304. **Igneous and Metamorphic Petrology.** (3-3). **Credit 4. I** Origin, identification and classification of igneous and metamorphic rocks; genetic processes inferred from laboratory studies and field occurrences. Prerequisites: GEOL 302 and 309 or approval of instructor.*
305. **Paleobiology.** (2-3). **Credit 3. I** Principles of paleobiology; study of organisms important in the marine fossil record; application of paleontology to geologic problems. Prerequisite: GEOL 106 or approval of instructor.
306. **Sedimentology and Stratigraphy.** (3-3). **Credit 4. II** Origin of sediments and sedimentary rocks; climate, weathering, and weathering products; transport, deposition, and depositional environments for sediments; field and laboratory studies in description and interpretation of genesis of sedimentary rocks; principles of stratigraphy and basin analysis; plate tectonics and the formation of sedimentary basins; stratigraphic nomenclature; geologic time and correlation; sequence stratigraphy and basin architecture. Prerequisites: GEOL 101 or 104 or approval of instructor.*

307. **Dinosaur World.** (3-3). **Credit 4.** Evolutionary development of dinosaurs and Mesozoic geography, climate and terrestrial environments including dinosaur morphology; evolutionary relationships; dinosaur metabolism; and constraints imposed by gigantism; their latitudinal distribution; causal mechanism for dinosaur extinction.
308. **Integrated Earth Science.** (3-3). **Credit 4. I,II** Integrated processes shaping Earth's crust, continents, ocean basins, atmosphere and biosphere; place of Earth in the universe; relationship between Earth and human society; related fundamental physical and biological science principles and processes within an integrated Earth science context. Not an elective for students pursuing degrees for careers as professional geologists. Prerequisite: GEOL 101 or GEOG 203.*
309. **Introduction to Geological Field Methods.** (1-6). **Credit 3. II** Geological mapping methods, field observation procedures and data gathering and recording; use of Brunton compass; pace-and-compass mapping; topographic map use and interpretation; measurement of structural elements; interpretation of geologic map patterns; measurement of stratigraphic sections; construction of geologic cross sections; six day geologic mapping project during either spring break or two three-day weekends. Prerequisites: GEOL 101 or 104; GEOL 106.*
310. **Planetary Geology.** (3-0). **Credit 3.** Introduction to planetary science; organization and composition of the solar system, including the planets, satellites and asteroids; surface features and internal structures of the terrestrial planets and moons; the dynamic processes of planetary resurfacing, including volcanism, tectonism, weathering and impacts; the history and future of solar system exploration. Prerequisites: GEOL 101 or 104; junior or senior classification or approval of instructor.
311. **Principles of Geological Writing.** (1-0). **Credit 1.** Principles of writing for geological reports; format and style for abstracts, grant proposals, journal manuscripts and industry reports; evaluating written reports for revision and editing; using proper referencing and citation style; methods of maintaining clarity in documents; using web tools for geological communication.
312. **Structural Geology and Tectonics.** (3-3). **Credit 4. II** Interpretation of rock structures; their relation to stratigraphic, physiographic and economic problems; regional tectonics of several selected areas. Prerequisites: GEOL 101, 104 or 320; approval of instructor.*
320. **Geology for Civil Engineers.** (2-3). **Credit 3. I, II** Principles of physical and engineering geology; properties of minerals, rocks and soils; active surface and subsurface processes; applications to the siting, design, construction, operation and maintenance of engineered works and the protection of the environment. A three-day field trip is required (a field trip fee is charged at registration). Prerequisite: Sophomore classification.*
330. **Geologic Field Trips.** **Credit 1 to 3.** Field trips to observe, analyze and interpret the geology and geophysics of selected localities in Texas and adjacent regions; complements classroom experience. Trip frequencies, duration, dates and study localities vary with semester. Prerequisite: GEOL 101 or 104 or approval of instructor. May be repeated for credit.*
352. **GPS in the Geosciences.** (1-3). **Credit 2.** Introduction to the Global Positioning System (GPS); basic geodesy, figure of the earth; frames of reference, map projection, datums, ellipsoids; GPS accuracy and precision; applications in earth resource mapping and database creation; elementary GPS phase data processing. Prerequisites: Junior or senior classification; approval of instructor.
400. **Reservoir Description.** (2-3). **Credit 3.** An integrated reservoir description experience for senior students in petroleum engineering, geology and geophysics; includes using geophysical, geological, petrophysical and engineering data; emphasis on reservoir description (reservoir and well data analysis and interpretation), reservoir modeling (simulation), reservoir management (production optimization) and economic analysis (property evaluation). Prerequisite: Junior or senior classification or approval of instructor. Cross-listed with PETE 400.
404. **Geology of Petroleum.** (2-3). **Credit 3. I** Origin, migration and accumulation of petroleum; typical U.S. oil and gas fluids; laboratory work in subsurface geology. Prerequisites: GEOL 312; senior classification in geology.
410. **Hydrogeology.** (3-0). **Credit 3. I** Geologic conditions determining the distribution and movement of ground water and their effect on the hydrologic properties of aquifers. Prerequisite: Junior or senior classification or approval of instructor.

420. **Environmental Geology.** (2-2). **Credit 3. II** Geologic concepts of the nature of geologic environments and the dynamics of geologic processes needed to characterize and quantify human interactions with specific geologic systems including aquifers, watershed, coastlines and wetlands; specific techniques, including geophysical and geochemical techniques, field mapping, geographical information systems and remote sensing used to monitor human-geosphere interactions. Prerequisites: GEOL 101 or GEOG 203; junior or senior classification or approval of instructor.
440. **Engineering Geology.** (2-3). **Credit 3. I** Fundamentals of soil, rock and fluid mechanics and basic engineering practices as applied to the analysis of the geologic environment for engineering uses. Designed for geoscience majors who have not had engineering courses. Prerequisites: GEOL 312 or approval of instructor; PHYS 218.*
451. **Introduction to Geochemistry.** (3-0). **Credit 3. II** Chemical principles and processes responsible for the formation and cycling of earth materials, with emphasis on low temperature equilibria and kinetics in rock-water systems. Prerequisite: GEOL 302 or approval of instructor.
454. **Evolution of the Earth's Crust.** (3-0). **Credit 3.** Petrology, stratigraphy and structure of the oceanic and continental lithosphere relative to the unifying hypotheses of sea-floor spreading and plate tectonics; geological data integrated to provide coherent overview of the Earth's crust. Prerequisites: GEOL 302 and 312 or approval of instructor. Offered irregularly as demand merits.
485. **Directed Studies.** **Credit 1 or more each semester. I, II, S** Advanced problems in geology.
489. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of geology. May be repeated for credit. Prerequisite: Approval of instructor.
491. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in geology. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor.

*Field trips may be required for which departmental fees may be assessed to cover costs.

Geophysics

(faculty, see page 715)

(GEOP)

213. **Exploration of the Moon.** (1-0). **Credit 1.** Introduction to geology and geophysics of Earth's Moon, as compared with Earth; origin of terrestrial planets; origin of the moon; physics of meteor impact; tectonics and volcanism; gravity anomalies; paleomagnetism; Moon's geologic history; relatively non-technical course. Prerequisite: GEOL 101 or equivalent or approval of instructor.
291. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in geophysics. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Freshman or sophomore classification and approval of instructor.
341. **Introduction to Global Geophysics.** (3-0). **Credit 3.** Introduction to the structure, composition and evolution of the Earth as inferred by geophysical methods; seismology, gravity and geodesy, magnetics, heat flow and concepts of plate tectonics. Prerequisites: GEOL 101 or 104; MATH 131 or 151; or approval of instructor.
413. **Near-surface Geophysics.** (3-0). **Credit 3. II** Fundamentals of traditional and emergent surface and borehole geophysical methods, as they are applied to shallow (less than 100 meters) subsurface investigations; emphasis on electrical, magnetic and electromagnetic methods; seismic reflection and crosswell tomography. Prerequisites: GEOL 101 or 104; MATH 251; PHYS 219; or approval of instructor.
421. **Petroleum Seismology I.** (3-3). **Credit 4. I** Physical principles behind seismic acquisition; acoustic/elastic, homogeneous/heterogeneous, onshore/offshore/transition zones; description of seismic data, pre- and post-critical reflections, multiples, ground roll; signal processing for seismic data analysis; Fourier transforms, wavelet transform, correlation and smoothness; least squares optimization; forward and inverse problems fitting a Fourier series, deconvolution. Prerequisites: MATH 151 and 152 or approval of instructor.

435. **Methods of Geophysical Exploration.** (3-3). **Credit 4.** Introduction to theory of gravity, magnetic, electrical and seismic exploration methods; physical properties of earth materials and their influence on geophysical measurements; limitations of geophysical data in the interpretation of subsurface structure. Prerequisites: GEOL 309; MATH 251; PHYS 219.*
470. **Computational Methods in Geology and Geophysics.** (3-0). **Credit 3.** Introduction to a variety of computational tools for solving common quantitative problems in geophysics and geology; statistical description and modeling of data sets; techniques for forward modeling geophysical processes, including gravity and magnetics, fluid flow, and heat and chemical transport; elementary inverse modeling of geophysical data sets. Prerequisites: GEOL 101 or 104; MATH 308; or approval of instructor.
475. **Interpretation of Gravity and Magnetic Fields.** (3-0). **Credit 3.** Applications of potential theory in the interpretation of gravity and magnetic fields; analysis of geophysical anomalies produced by geologic structures and by variation in the physical properties of rocks; use of regional gradients, residual anomalies, higher derivatives and surfaces, line integrals and two and three dimensional models. Prerequisites: GEOL 312; MATH 311 or approval of instructor.
485. **Directed Studies.** **Credit 1 or more each semester. I, II, S** Advanced problems in geophysics.
491. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in geophysics. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor.

*Field trips may be required for which departmental fees may be assessed to cover costs.

College of Geosciences (GEOS)

101. **Introduction to the Geosciences.** (1-0). **Credit 1.** Introduction to the geosciences; geography, geology, geophysics, atmospheric sciences and oceanography; areas and opportunities in the various geoscience fields. Open to all freshman and sophomore non-geoscience students interested in geosciences.
105. **Introduction to Environmental Geoscience.** (3-0). **Credit 3.** Key concepts and generalizations of global environmental issues within an Earth systems science framework including climate change, air pollution, land and coastal degradation, water resources and pollution, and habitat loss; environmental ethics, economics and politics; environmental issues in Texas. Enrollment preference will be given to environmental geoscience and environmental studies majors.
289. **Special Topics in ...** **Credit 1 to 4.** Selected topics in an identified area of geosciences. May be repeated for credit. Prerequisite: Approval of instructor.
291. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in the College of Geosciences. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Freshman or sophomore classification and approval of instructor.
301. **College of Geosciences Study Abroad.** **Credit 1 to 18.** For students in approved programs abroad. May be repeated for credit. Prerequisites: Admission to approved program and approval of academic dean.
405. **Environmental Geosciences.** (2-2). **Credit 3.** Dynamics and human interactions with near-surface environments including land, atmosphere and oceans through problem-based learning; interdisciplinary environmental problem topic, for example, water quality, urbanization, coastal development, or environmental pollution; geoscience techniques used for monitoring human-geosphere interaction. Prerequisites: GEOS 105; junior or senior classification.
410. **Global Change.** (3-0). **Credit 3.** The interaction of the earth, atmosphere, oceans, cryosphere and life, including the impact of human society on the environment and climate; global change modeling; politics, policy and decision making; and personal awareness. Prerequisite: Junior or senior classification.
411. **Vegetation Response to Climate Change.** (3-0). **Credit 3.** Changes of vegetation with historical and predicted climate change; Holocene changes and methods of predicting future change. Prerequisite: Junior or senior classification.

444. **The Science and Politics of Global Climate Change.** (3-0). **Credit 3.** Examination of the policy and scientific debate over climate change; how scientific debates produce “knowledge”; how political debates produce policies; how policy debates use science; scientific evidence for climate change; impacts of climate change; possible responses to climate change; the political debate over climate change. Prerequisite: One semester of physics or one science core course.
481. **Seminar.** (1-0). **Credit 1.** Acquaint students with current research themes in the environmental field. May be repeated 4 times for credit. Prerequisite: Junior or senior classification.
485. **Directed Studies.** **Credit 1 to 4.** Advanced problems in geosciences.
489. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of geosciences. May be repeated for credit.
491. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in the College of Geosciences. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor.

German

(faculty, see page 698)

(GERM)

101. **(GERM 1411) Beginning German I.** (3-2). **Credit 4. I, II, S** Elementary language study with oral, written and reading practice. Preparation for conversation. Part of class preparation will be done in language laboratory.
102. **(GERM 1412) Beginning German II.** (3-2). **Credit 4. I, II, S** Continuation of GERM 101. Part of class preparation will be done in language laboratory. Prerequisite: GERM 101.
201. **(GERM 2311) Intermediate German I.** (3-0). **Credit 3. I, II, S** Readings of average difficulty. Review of grammar; practice in conversation composition. Prerequisite: GERM 102.
202. **(GERM 2312) Intermediate German II.** (3-0). **Credit 3. I, II, S** Continuation of GERM 201 with more advanced material. Some literary selections included in class readings. Prerequisite: GERM 201.
221. **Field Studies I.** **Credit 3.** German language and culture taught in Germany; supervised travel of cultural interest; living with local families; participation in the activities and courses of a German university or institute; written and oral reports, exams; to be taken concurrently with GERM 222. Prerequisite: GERM 102 with a grade of B or higher.
222. **Field Studies II.** **Credit 3.** German language and literature taught in Germany in cooperation with a German university or institute; exams, written reports; to be taken concurrently with GERM 221. Prerequisite: GERM 102 with a grade of B or higher.
285. **Directed Studies.** **Credit 1 to 4.** Individual supervision of readings or assigned projects in German, selected for each student individually. Prerequisite: Approval of instructor and department head.
289. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of German. May be repeated for credit. Prerequisite: Approval of instructor.
305. **German Literary Expression.** (3-0). **Credit 3.** Readings of selected drama, poetry, and prose works to introduce the student to important works of German literature; problems involved in defining dramatic, lyric, and epic genres considered, and attention given to the structural and aesthetic elements of literary works; required of German majors; conducted in German. Prerequisite: GERM 202 or 222.
310. **Composition.** (3-0). **Credit 3.** Development of writing skills in German; emphasis on grammatical construction; taught in German. Prerequisite: GERM 202 or 222.
311. **Conversation.** (3-0). **Credit 3.** Development of effective communication skills in spoken German, with emphasis on language appropriate to various social context; taught in German. Prerequisite: GERM 202 or 222.
316. **Advanced Business German.** (3-0). **Credit 3.** Continuation of GERM 203; reading and oral practice of German pertinent to business, trade and international commerce. Prerequisite: GERM 202 or 222.
321. **German Culture and Civilization I.** (3-0). **Credit 3.** German culture and civilization from classical antiquity to 1830; major stylistic periods in literature and the fine arts; conducted in German. Prerequisite: GERM 202 or 222.

322. **German Culture and Civilization II. (3-0). Credit 3.** German culture and civilization from 1830 to the present; conducted in German. Prerequisite: GERM 202 or 222.
334. **German Drama. (3-0). Credit 3.** Study, analysis and public presentation in German of a major German dramatic work; literary theory and intensive conversational practice combined with skills of language acquisition within a performance setting. Prerequisite: GERM 202 or 222.
362. **The German Roaring '20s. (3-0). Credit 3.** Film, theater and poetry in the turbulent era prior to the Nazi terror; conducted in German. Prerequisite: GERM 202 or 222.
417. **The Weimar Republic as Paradigm for European Modernity. (3-0). Credit 3.** Study of the culture of Weimar Germany and its importance for Germany, Europe and the world; examination of political and technological modernization through analysis of artistic forms and philosophical and social ideas. Prerequisites: GERM 202 or registration therein or approval of instructor.
430. **Seminar in German Literature and Culture. (3-0). Credit 3.** Survey of major literary and intellectual landmarks of a period in German history (Enlightenment, Romanticism, High Modernism, post-1945); study of literary works in context of social and cultural history, with attention to Germany's particular place in Europe and the world; taught in English. May be taken two times. Prerequisite: GERM 202 or registration therein, or approval of instructor. Cross-listed with EURO 430.
431. **German Author and Genre Studies. (3-0). Credit 3.** Examines the work of a specific author, such as Goethe, Schiller, Kafka, Brecht, Frisch, Grass, or the diachronic study of a specific genre, e.g., poetry, drama, prose; taught in English. May be taken two times. Prerequisite: GERM 202 or registration therein, or approval of instructor. Cross-listed with EURO 431.
432. **Music in German Culture. (3-0). Credit 3.** Examination of the role of music in German cultural and national self-definition from the 18th century to the present; the political and ideological role of music; study of genres and media including opera, art song, Singspiel, protest songs and film.; taught in English. Prerequisites: GERM 202 or registration therein or approval of instructor. Cross-listed with EURO 432.
434. **Martin Luther and the Reformation in Germany. (3-0). Credit 3.** Introduction to the life and thought of Martin Luther; study of the Protestant Reformation in Germany from theological, political, and social perspectives; taught in English. Prerequisites: GERM 202 or registration therein or approval of instructor. Cross-listed with EURO 434 and RELS 434.
435. **German Film. (3-0). Credit 3.** Consideration and analysis of major works and directors of German film; interpretation of culture through film; relationship of film to history, literature, and other arts; taught in English. Prerequisites: GERM 202 or registration therein, or approval of instructor. Cross-listed with EURO 435 and FILM 435.
436. **German Fairy Tales. (3-0). Credit 3.** Introduction to and study of fairy tales and children's literature through German tradition in these forms; reception of fairy tales through adaptation and modernization; taught in English. Prerequisites: GERM 202 or registration therein or approval of instructor. Cross-listed with EURO 436.
485. **Directed Studies. Credit 1 to 4.** Individual supervision of readings or assigned projects, selected for each student individually; written and oral reports. Prerequisite: Approval of instructor and department head.
489. **Special Topics in... Credit 1 to 4. I, II, S** Selected topics in an identified area of German. May be repeated for credit. Prerequisite: Approval of instructor.
491. **Research. Credit 1 to 3.** Research conducted under the direction of faculty member in German. Prerequisites: 24 hours of German with at least 9 at 300-level or above; approval of department head.

Department of Health and Kinesiology

Professors D. J. Ballard, W. S. Barnes, S. A. Bloomfield, S. F. Crouse, J. M. Eddy (Interim Head), C. P. Gabbard, P. Goodson, J. M. Lawler, R. E. McBride, B. E. Pruitt, C. H. Shea, D. L. Wright; **Associate Professors** P. J. Batista, G. R. Bennett, J. J. Buchanan, G. B. Cunningham, J. R. Elledge, J. J. Guidry, R. Misra, M. Sagas, M. D. Shaw, W. E. Wylie, P. Xiang; **Assistant Professors** D. Christou, E. Christou, J. D. Fluckey, M. P. Massett, E. L. McKyer, S. E. Riechman, J. Singer, C. Woodman; **Clinical Professors** J. S. Green, P. J. Miller; **Clinical Associate Professors** M. E. Sandlin, M. M. Snell; **Clinical Assistant Professors** C. S. Bergeron, P. D. Doughty; **Senior Lecturers** K. Brekken, M. L. Grant, E. P. Kirkham, D. Kniffin, A. B. McGowan, V. J. Markowsky, M. Muckleroy, B. M. Netherland, R. A. Schmitz, F. E. Thomas, S. W. Wagner, J. R. Woosley; **Lecturers** R. F. Aaron, D. Agnor, C. L. Armstrong, P. A. Berthot, F. Boucher, J. Campbell, T. Canterbury, D. D. Chapman, W. J. Coady, L. Cohen, J. Dannenbaum, G. S. Darnell, C. A. Dean, L. Dubuisson, M. G. Hanik, J. M. Hardcastle, S. Hudson, D. M. Kennedy, L. Lintz, A. Locklear, E. E. McNeill, S. E. Martin, A. L. Pool, D. J. Schakel, L. Sherman, K. N. Slagel, E. S. Sparvero, M. A. Thornton, T. M. Wenzel, M. White, M. S. Wright

Health (HLTH)

210. **Introduction to the Discipline.** (3-0). **Credit 3.** Concepts essential to understanding the discipline: competencies and career opportunities for professional health educators in school and community settings. Prerequisites: Current health major; HLTH 231 or concurrent enrollment.
214. **Health and Physical Activity for Children.** (3-0). **Credit 3.** Coordinated school health and physical activity programs appropriate for elementary aged children; focus on the content of the curriculum and the philosophical underpinnings of programming related to health and physical activity. Prerequisite: KINE 198. Cross-listed with KINE 214.
216. **(PHED 1206, PHED 1306) First Aid.** (1-2). **Credit 2.** Basic first aid instruction leading to National Safety Council, University Level, first aid course completion recognition.
221. **Safety.** (3-0). **Credit 3.** The magnitude of the accident problem as it relates to individual and community well-being; promotion of safe behavior. Credit will not be given for both HLTH 221 and SAED 301.
231. **(PHED 1304) Healthy Lifestyles.** (3-0). **Credit 3.** Health issues relevant to students; included are mental health, use and abuse of drugs, human sexuality, communicable diseases, environmental and consumer health.
236. **Race, Ethnicity and Health.** (3-0). **Credit 3.** Explore in-depth the racial, ethnic, and cultural dimensions that underlie health and health disparities; emphasis on culture, social economic status and governmental policies as they influence the adaptation of health practices.
240. **Computer Technology in Health and Kinesiology.** (2-2). **Credit 3.** Application of current technology in the areas of health and kinesiology; fundamentals of computers and their use; application of commercial software to health and kinesiology settings; use of computer networks for communications and research. Prerequisite: Freshman or sophomore classification in health or kinesiology. Cross-listed with KINE 240.
285. **Directed Studies.** **Credit 1 to 4.** Work on a specified topic with the intent of promoting independent reading, research and study; supplement existing course offerings or subjects not presently covered. Prerequisites: Freshman or sophomore classification; approval of instructor.
291. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in health. May be repeated 4 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
317. **Emergency Care and Transportation.** (2-2). **Credit 3.** First responder course in basic emergency medical care; emphasis on requirements of national and state accrediting agencies; in-depth study and practice dealing with assessment, mechanical aids to breathing, CPR, hemorrhage control, soft tissue injury, shock management, orthopedic injuries, emergency childbirth and light rescue. Prerequisites: HLTH 216; junior or senior classification.
319. **Emergency Medical Techniques.** (3-2). **Credit 4.** Emergency medical techniques designed to meet the standards established by Texas Department of Health to achieve an Emergency Medical Technician Certification. Hospital observation, ambulance experience and field trips are certification requirements. Prerequisites: HLTH 317; approval of instructor.

331. **Community Health. (3-0). Credit 3.** Aspects of the community that relate to health; identification and analysis of community health programs; organizational pattern and functions of voluntary and governmental health agencies; organizing the community for health action; and coordination of school and community health programs. Prerequisite: HLTH 231 or concurrent enrollment.
332. **School Health Program. (3-0). Credit 3.** Background, development, administration and framework of the school health program; role of the school health team; nature and function of school health services and healthful school living. Prerequisite: HLTH 231 or concurrent enrollment.
334. **Women's Health. (3-0). Credit 3.** A broad range of health issues that are either unique to women or of special importance to women; information for the health consumer; preparation as an advocate of healthy lifestyles; awareness of the role health plays in the life of all women. Prerequisite: Junior or senior classification.
335. **Human Diseases. (3-0). Credit 3.** Causes of disease, course of communicable disease, body's defense against disease and classification and description of diseases. Prerequisite: Admission to the professional phase of program.
342. **Human Sexuality. (3-0). Credit 3.** Many aspects of human sexuality; physiology and function of human reproductive system, factors involved in learning sex roles, biological and emotional motivations associated with the sexual aspects of life and their relationship to marriage and family planning. Prerequisite: Admission to the professional phase of program.
353. **Drugs and Society. (3-0). Credit 3.** Use and abuse of drugs in today's society; physiological, sociological and psychological factors involved. Prerequisite: Admission to the professional phase of program.
354. **Medical Terminology for the Health Professions. (3-0). Credit 3.** Designed for students interested in pursuing a career in a health, medical, scientific or other helping profession; develop medical word power skills combined with related health and disease knowledge. Prerequisite: Junior or senior classification.
403. **Consumer Health. (3-0). Credit 3.** Selection, evaluation and understanding of health information, medical services, advertising of products and sociocultural factors in consumer health protection. Prerequisite: Junior or senior classification.
405. **Rural Health. (3-0). Credit 3.** Issues facing rural health care; emphasis on understanding the geographical characteristics of rural communities and their affect on health care delivery. Prerequisites: HLTH 331; junior or senior classification.
410. **Exercise and Health Programs in the Workplace. (3-0). Credit 3.** Careful examination of strategies to design, implement and evaluate exercise and health programs in worksites; including health risk assessment, marketing protocol, needs assessment, corporate culture issues, policy development and cost-benefit analysis. Prerequisite: Junior or senior classification.
415. **Health Education Methodology. (3-0). Credit 3.** Theory and practice in the development and use of creative and traditional health education strategies in secondary schools and community settings; emphasis is given to cognitive, affective and behavioral teaching strategies. Prerequisites: Senior classification and approved acceptance to field experience.
421. **Elementary School Health Instruction. (3-0). Credit 3.** Modern issues, trends, content and material in elementary school health programs; research and instructional strategies essential for reading in content areas with an emphasis on developing the coordinated school health education for health and kinesiology teacher certification majors. Junior or senior classification in health or kinesiology.
425. **Health Program Evaluation. (3-0). Credit 3.** Theory and practice in evaluation of health programs in school and community; analysis of test results; evaluation of standardized health tests. Prerequisites: Senior classification and approved acceptance to field experience.
429. **Environmental Health. (3-0). Credit 3.** Health aspects of environments; health problems related to water, air and noise pollution; pesticides; population and radiation; examination of various micro-environments which either promote or hinder human health and well-being and their implications for community planning and utilization of human resources. Prerequisite: Junior or senior classification.
430. **Data Acquisition and Management in Health and Kinesiology. (2-2). Credit 3.** Advanced application of current technology in the areas of health and kinesiology to include data management and presentation; integration of software and creation of educational and promotional material in the areas of health and kinesiology. Prerequisite: Junior or senior classification in health or kinesiology or approval of instructor. Cross-listed with KINE 430.

440. **Contemporary Issues for Community Health Interns. (3-0). Credit 3.** Preparatory course for advanced students in the community health internship program. Prerequisite: Acceptance to internship program.
482. **Grant Writing in Health. (1-0). Credit 1.** A writing intensive course focused on grant writing in the field of health education and health promotion; grant application written by student on a health-related topic using a recursive writing process. May be taken two times for credit. Prerequisite: Admission to professional phase of program.
484. **Community Health Internship. Credit 1 to 12.** Supervised internship at selected community, public or private health agencies. Prerequisites: HLTH 415, 425 and 440; completion of all course work.
485. **Directed Studies. Credit 1 to 4 each semester.** Directed study of special problems within the discipline. Prerequisite: Junior or senior classification; approval of instructor.
489. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of the discipline. May be repeated for credit.
491. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in health. May be repeated 4 times for credit. Prerequisites: Junior or senior classification and approval of instructor.

Department of History

Professors R. J. Q. Adams, T. H. Anderson, D. Baum, J. K. Blackwelder, A. S. Broussard, W. L. Buenger (Head), J. G. Dawson, T. R. Dunlap, C. S. L. Dunning, S. Hoffert, W. D. Kamphoefner, A. P. Kramer, B. M. Linn, H. C. Livesay, R. R. Reese, J. M. Rosenheim, D. Vaught; **Associate Professors** A. C. Alonzo, S. Alpern, C. K. Blanton, C. A. Bouton, J. C. Bradford, C. E. Brooks, J. C. Coopersmith, L. Halevi, A. L. Hatfield, A. J. Kirkendall, J. H. Lenihan, E. Obadele-Starks, R. P. Resch, H. C. Schmidt, A. N. Stranges, D. Wang, L. W. Yarak; **Assistant Professors** T. O. Bickham, B. C. Brower, G. A. Chambers, L. R. Clay, L. DeVun, O. Dror, K. C. Engel, A. P. Hudson, H. Kim, J. C. Parker, R. H. Schloss, A. R. Seipp; **Senior Lecturer** D. R. C. Hudson

History (HIST)

101. (HIST 2311) **Western Civilization to 1660. (3-0). Credit 3. I, II, S** Ancient civilizations, Greek, Roman and Asian; Christianity; medieval civilization in west, eastern Europe; political, social and intellectual developments from earliest human cultures to 1660.
102. (HIST 2312) **Western Civilization Since 1660. (3-0). Credit 3. I, II, S** Religious, dynastic and imperial developments; Industrial Revolution; western democracies; rise of nationalism and communism; central and eastern Europe; intellectual revolution; World Wars I and II and the contemporary world.
103. (HIST 2321) **World History to 1500. (3-0). Credit 3.** Development of major world societies in the pre-modern era; emergence of agrarian-based modes of production, political states, religious economy and a global division of systems; Eurasian world system and the civilizations of Africa and the Americas.
104. (HIST 2322) **World History Since 1500. (3-0). Credit 3.** Interaction of major world societies in the modern era; emergence of the modern world-economy and a global division of labor; European imperialism and colonialism and reactions in Africa, Asia and Latin America.
105. (HIST 1301) **History of the United States. (3-0). Credit 3. I, II, S** Colonial heritage; Revolution; adoption of Constitution; growth of nationalism and sectionalism; Civil War; Reconstruction.
106. (HIST 1302) **History of the United States. (3-0). Credit 3. I, II, S** Since reconstruction; new social and industrial problems; rise of progressivism; U.S. emergence as world power; World War I; reaction and New Deal; World War II; contemporary America.
210. **Russian Civilization. (3-0). Credit 3.** Russian history, culture and society from origins to the present; rise of the Russian Empire; autocracy; modernization without liberalization; reforms, reaction, revolution; development of Communist regime; continuity from Imperial to Soviet period in industrialization, bureaucracy and treatment of peasants, nationalities and intellectual opposition; Gorbachev and a new "revolution."
213. (HIST 2313) **History of England. (3-0). Credit 3. I, II** British, Saxon and Norman origins; national development; struggles between church and state; crown and nobles; nobles and commons; development of parliament.
214. (HIST 2314) **History of England. (3-0). Credit 3. I, II** Agrarian and Industrial Revolutions; relations with Ireland; evolution of democracy; struggles with France and Napoleon; social legislation in the 20th century; growth of Empire until World War II.

220. **History of Christianity: Origins to the Reformation.** (3-0). **Credit 3.** History of Christian doctrine, ecclesiastical organization, and religious practice, origins through Reformation, with emphasis on religion and society; life and teachings of Jesus; apostolic church; patristic period; Christianization of Roman Empire and northern Europe; monasticism; medieval church; Gregorian reform; heresy; papal monarchy; schism and conciliarism; reformations of the sixteenth century. Cross-listed with RELS 220.
221. **History of Islam.** (3-0). **Credit 3.** Introduction to the history of Islam, from the origins of the religion to the present; development of Islamic law; gender issues; expansion of Islam to Sub-Saharan Africa and South Asia; globalized Islam. Cross-listed with RELS 221.
226. **(HIST 2301) History of Texas.** (3-0). **Credit 3. I, II, S** History of Texas from Spanish period to present day. Stress placed upon period of Anglo-American settlement, revolution, republic and development of modern state.
230. **American Military History, 1609 to Present.** (3-0). **Credit 3.** Main events, personalities and technologies related to American military history.
232. **History of American Sea Power.** (3-0). **Credit 3.** Development of American sea power from the 18th century to the present.
234. **European Military History, 1630–1900.** (3-0). **Credit 3.** European military history from Gustavus Adolphus to the Boer War including especially societal involvement as well as roles of classic commanders.
258. **American Indian History.** (3-0). **Credit 3.** Survey of American Indian history; Pre-Columbian, First Contact, Colonial Conquest, Differentiation between cultural groups; Reservation period, twentieth-century self-determination, and Pan-Indianism.
280. **The Historian's Craft.** (3-0). **Credit 3.** The world of the professional historian; meanings and uses of history; current debates; archival research; evidence and argumentation; principles and methods of the analytical narrative.
289. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of history. May be repeated for credit. Prerequisite: Approval of instructor.
300. **Blacks in the United States, 1607–1877.** (3-0). **Credit 3.** Blacks in the United States from the colonial period to 1877; the slave trade, slavery, free blacks and the impact of the Civil War and Reconstruction on blacks.
301. **Blacks in the United States Since 1877.** (3-0). **Credit 3.** Blacks in the United States from the end of Reconstruction to the present; the ideologies of black leaders, disfranchisement, lynching and the quest for equality in the 1950s and 1960s.
304. **Mexican-American Frontier to 1848.** (3-0). **Credit 3.** Origins and development of Spanish and Mexican history of Greater Southwest; exploration and conquest; Spanish entradas into Southwest; rise of institutions and colonial society; economic history; Mexican independence; Mexico's far northern frontier, 1821–1848.
305. **Mexican-American History 1848–Present.** (3-0). **Credit 3.** Social, economic and political evolution of Mexican Americans from 1848 to present; adaptation to a harsh and isolated frontier; land tenure systems; conflict in the new Southwest; change and continuity in society; immigration and settlement of Mexicans; emergence of various political movements; current issues.
307. **Latino Communities of the U.S.** (3-0). **Credit 3.** Hispanic or "Latino" communities of 20th century U.S.: Mexican Americans, Puerto Ricans, Cubans and Central Americans; differences in historical experiences; role of race, class, and gender; cultural identity as expressed in art, literature, folklore and religion; contemporary social, political, and economic issues.
308. **History of Native Peoples in the U.S. South.** (3-0). **Credit 3.** Examination of the role of indigenous populations in the history and formation of the U.S. South; cultural values and social practices; impact of European exploration and African slavery; trade patterns, imperial wars, and removal policies. Prerequisite: Junior or senior classification.
319. **U.S. Immigration and Ethnicity.** (3-0). **Credit 3.** The sources and persistence of ethnic identity in 19th and 20th century America; its interaction with religion, politics, languages, education and social mobility; various nativist and anti-immigrant movements; contrasts and continuities between contemporary immigration patterns and those of earlier eras.
320. **History of the Atlantic World.** (3-0). **Credit 3.** Introduction to the comparative study of the civilizations and cultures that bordered on the Atlantic Ocean; examination of culture and economic exchanges and adaptations, migrations, empire-building, and the emergence of new societies and cultures. Prerequisite: Junior or senior classification.

322. **History of the Iberian World. (3-0). Credit 3.** Introduction to the people and places of the Iberian World, ca. 1500-1900; social, political and economical relations between Spain, Portugal, Asia and the Americas; emergence of a shared culture and cross-cultural exchange. Prerequisite: Junior or senior classification.
324. **European Society in the Industrial Age. (3-0). Credit 3.** European social history from the 19th century to the present: transformations wrought by industrialization; changing forms of social relations, politics and protest; development and impact of the welfare state; interaction of class, race and gender.
325. **Texas Cultural History. (3-0). Credit 3.** The image of Texas history, tradition and popular culture from the 19th century to the present. Prerequisite: HIST 226 or ANTH 201, 210 or 229. Cross-listed with ANTH 325.
329. **Modern Mediterranean World. (3-0). Credit 3.** Critical examination of Mediterranean history; colonialism, industrialization, and other trans-national phenomena linking Africa, Asia, and Europe; social and political movements, migration, intellectual trends. Prerequisite: Junior or senior classification.
330. **Women in Ancient Greece and Rome. (3-0). Credit 3.** Survey of women in classical Greece and Rome; emphases on female occupations and family relationships, legal and political status, traditional values, notorious women, how women were viewed and how they viewed themselves. Prerequisite: Junior or senior classification. Cross-listed with CLAS 330 and WMST 330.
331. **Medieval Europe, 300 to 1300. (3-0). Credit 3.** European political and diplomatic history from Constantine to Philip the Fair; emergence of medieval institutions; the influence of Plato and Aristotle upon Augustine, Abelard and Thomas Aquinas, and the origins of European education and law.
332. **Renaissance and Reformation Europe, 1300 to 1660. (3-0). Credit 3.** Renaissance politics and diplomacy; political ideas of Erasmus and Machiavelli; art and humanism of the Renaissance; religious views of Luther, Calvin and Zwingli; the "new" economics.
333. **Europe in the Age of Absolutism, 1660–1815. (3-0). Credit 3.** Europe from the "Age of Louis XIV" to the Congress of Vienna; Russia, Austria and Prussia. Mercantilism, capitalism and the rise of the middle class. Origins and consequences of the Enlightenment.
334. **History of Europe in the Nineteenth Century. (3-0). Credit 3.** Cultural, economic, and political processes that shaped European civilization (east and west); the Napoleon era; industrialization and urbanization; liberalism and socialism; empire and revolution; cultural developments. Prerequisite: Junior or senior classification.
335. **Europe, 1890–1932. (3-0). Credit 3.** A political, diplomatic, social and cultural history of Europe prior to, during and shortly after World War I.
336. **Europe Since 1932. (3-0). Credit 3.** A political, diplomatic, military, social and cultural history of Europe prior to, during and since World War II.
337. **War and European Society in the Twentieth Century. (3-0). Credit 3.** War and social change in Europe during the twentieth century; relationships between front lines and home fronts; government and civil society; gender and war; ethnic and national identities in Eastern, Central, and Western Europe. Prerequisite: Junior or senior classification.
338. **The Rise of the European Middle Class. (3-0). Credit 3.** Survey of European society and social classes from the origins of capitalism in the Middle Ages to the triumph of the "middle class world" in the 19th century; rise of the middle class, development of bourgeois ideology and culture, and creation of the working class.
339. **Eastern Europe Since 1453. (3-0). Credit 3.** Eastern Europe from the fall of the Byzantine Empire to the present; the Ottoman, Habsburg, Russian and Soviet Empires; the origins of modern East European states.
341. **Latin America to 1810. (3-0). Credit 3.** Political history of South America from exploration and settlement to independence; colonial institutions; commercial systems.
342. **Latin America Since 1810. (3-0). Credit 3.** Political history of independent South American nations since independence with emphasis upon ABC countries; economic, social and cultural development; foreign relations.
343. **Inter-American Relations. (3-0). Credit 3.** Cultural, diplomatic and economic relations in the Western Hemisphere in historical perspective. Prerequisite: Junior or senior classification or approval of instructor.
344. **History of Africa to 1800. (3-0). Credit 3.** Origins of humankind in Africa; development and spread of pastoralism, agriculture and iron-working; formation of states and empires; impact of Christianity and Islam; rise of international trade in gold, ivory and slaves; African diaspora.

345. **Modern Africa. (3-0). Credit 3.** Survey of Africa since 1800; pre-colonial African states and societies; establishment and impact of European colonial rule; rise of nationalist movements; achievement of independence; problems of political stability and economic development in contemporary Africa; South Africa's apartheid regime and its opponents.
346. **History of South Africa. (3-0). Credit 3.** Selected themes in the history of South Africa from the African Iron Age to the Apartheid regime; history of race relations in the 19th and 20th centuries and the rise of a modern industrial state.
347. **Rise of Islam, 600-1258. (3-0). Credit 3.** Introduction to Islamic civilization from the rise of Islam to the Mongol conquests; examination of pre-Islamic poetry, the Qur'an, early Islamic laws on prayer, the ethical conventions of jihad, the lives of Muslim women, and the relation of Islam to Judaism and Christianity. Prerequisite: Junior or senior classification. Cross-listed with RELS 347.
348. **Modern Middle East. (3-0). Credit 3.** Survey of the Middle East since 1800; introduction to Islam and Islamic civilization; decline of the Ottoman Empire; European imperialism; rise of nationalist movements; Zionism and the emergence of Israel; Arab-Israeli conflict; impact of oil; revolution in Iran and Islamic resurgence.
349. **The Vietnam War/The American War. (3-0). Credit 3.** Vietnam's relations with the West; French colonialism; origins and development of Vietnamese nationalism; Cold War and American involvement; wartime societies in North and South Vietnam; expansion of the war to Cambodia and Laos; anti-war movements in the United States; reasons for American defeat; consequences and lessons of the war. Prerequisite: Junior or senior classification. Cross-listed with ASIA 349.
350. **Asia During World War II. (3-0). Credit 3.** The origins and development of Japanese imperialism; Japan's expansion into East and Southeast Asia; wartime societies; collaboration and resistance; effects of the war in the United States upon Japanese-Americans; the outcomes of the war; remembrance of the war. Prerequisite: Junior or senior classification. Cross-listed with ASIA 350.
351. **Traditional East Asia. (3-0). Credit 3.** History and culture of China and Japan from earliest times to the coming of the West; impact of Confucianism and Buddhism; development of social, political and economic systems. Cross-listed with ASIA 351.
352. **Modern East Asia. (3-0). Credit 3.** Impact of the West on traditional China and Japan; the response through modernization; rise of nationalism and formation of modern nation states. Cross-listed with ASIA 352.
353. **Modern South Asia. (3-0). Credit 3.** Survey of the modern nation states of South Asia, including India, Pakistan, Bangladesh, Afghanistan, Nepal, Ceylon, Bhutan, and Burma, ca., 1600 to the present; major political events; economic, social, and cultural developments. Prerequisite: Junior or senior classification.
354. **Imperial China. (3-0). Credit 3.** History of imperial China from the earliest dynasties through the mid-19th century, including major political events, the structure of Chinese government, economic development, philosophies and religion, wars and military and culture and daily life. Prerequisite: Junior or senior classification. Cross-listed with ASIA 354.
355. **Modern China. (3-0). Credit 3.** History of China from the coming of the West to the present; social, economic and political changes which have taken place during that period.
356. **Twentieth Century Japan. (3-0). Credit 3.** Industrialization and modernization of Japan; its rise from an isolated nation to a major world power and economic giant. Cross-listed with ASIA 356.
357. **Africa and the African Diaspora. (3-0). Credit 3.** History and cultures of the peoples of the African Diaspora from the fifteenth through the nineteenth centuries; social, political, and economic impact on the Americas and Europe; emphasis on race, gender, identity, and migration. Prerequisite: Junior or senior classification.
359. **American Environmental History. (3-0). Credit 3.** History of American attitudes toward nature: use of land, water, timber, oil, coal, wildlife and other natural resources in the United States; conservation movement and significant conflicts over resources; changing perception of the physical environment.
360. **History of the American Petroleum Industry. (3-0). Credit 3.** Impact of energy upon industrial America from 1840 to the present; emphasis on relationship between energy and industrial development, emergence of state and federal energy policies, role of energy in foreign policy, growth of energy-oriented industries and impact of energy development on the environment.

361. **Technology and Engineering in Western Civilization, 1400–Present.** (3-0). Credit 3. Man's material culture and his understanding of the physical world since the 15th century; role of the Renaissance and the Scientific, Agricultural and Industrial Revolutions in Europe; the resulting transformations in western civilization.
362. **History of Science.** (3-0). Credit 3. The ideas of the great scientists and their impact on society; the Newtonian Revolution; Lavoisier and the new chemistry; Darwin and evolutionary thought; Enrico Fermi, Robert Oppenheimer and the development of nuclear energy.
363. **History of Science in America.** (3-0). Credit 3. The major developments in the physical and life sciences from colonial times to the present; the lives and scientific contributions of such famous American scientists as Benjamin Franklin, Joseph Henry, Thomas Edison and J. Robert Oppenheimer.
364. **History of Technology and Engineering in America, 1607–Present.** (3-0). Credit 3. American technological development from the colonial times to the present; technology in society, factors affecting technological development, changing attitudes toward technological accomplishments and the effects of technology upon society.
365. **History of Religion in America to 1860.** (3-0). Credit 3. Religion in America from European origins through New England Puritanism, U. S. Constitutional issues, immigration, revivalism and the Civil War; relationship between dissenters, utopians and visionaries versus mainstream counterparts. Cross-listed with RELS 365.
366. **History of Religion in America from 1860 to the Present.** (3-0). Credit 3. Religion in American from the Civil War; relationship of religion and science, ethnic assimilation, emergence of fundamentalism, mass evangelism, cults and criticisms of contemporary culture; examination of social and racial problems by the major religious traditions.
367. **Colonization of North America.** (3-0). Credit 3. Geographic setting; early English, French, Dutch, Swedish discovery, conquest and settlement, 1497–1763; colonial administration; colonial life; inter-colonial wars.
368. **The Birth of the Republic, 1763–1820.** (3-0). Credit 3. Impact of French and Indian War; British colonial policy 1763–1775; War for Independence; Confederation crisis; Constitution-making and ratification; development of political parties; problem of foreign entanglements; War of 1812; conflict of nationalist and sectionalist tendencies; historiography and interpretation.
369. **The United States, 1820–1860.** (3-0). Credit 3. Jacksonian democracy; impact of nationalism and sectionalism; manifest destiny and Mexican War; slavery controversy; expansion.
370. **Civil War and Reconstruction.** (3-0). Credit 3. Survey of background and causes of the war; military, political, economic and diplomatic aspects of the war; life behind the lines; Reconstruction and post-war adjustments, 1861–1877.
371. **America in the Gilded Age, 1877–1901.** (3-0). Credit 3. The United States from 1877 to 1901; political, cultural and economic developments.
372. **Reform, War and Normalcy: The United States, 1901-1929.** (3-0). Credit 3. Emergence of Progressivism; reform in the cities and states; reforms and foreign policies of the Theodore Roosevelt, William Howard Taft and Woodrow Wilson administrations; World War I and aftermath; Harding-Coolidge normalcy; the Jazz Age; Hoover and the Great Crash.
373. **The Great Depression and World War II.** (3-0). Credit 3. The United States, 1929–1945; cultural, social, economic and political developments in the nation; global diplomacy and military strategy.
374. **The United States After World War II.** (3-0). Credit 3. The United States since World War II; political, economic, cultural and social changes and role as a world leader.
401. **Slavery in World History.** (3-0). Credit 3. Comparative history of human slavery; slavery in the Ancient World, Asia, Africa; varieties of modern slavery in the New World since 1500; abolition of slavery and continuing forms of human bondage in the contemporary world. Prerequisite: Junior or senior classification.
402. **Germany Since 1815.** (3-0). Credit 3. A survey of the unification of Germany; creation of the German Empire; Weimar Republic; rise and fall of Nazi Germany; and the role of Germany in international diplomacy.
403. **History of Nazi Germany.** (3-0). Credit 3. Inner workings of the Third Reich from inception in 1933 to collapse at the end of World II in 1945; leadership and structure of the Nazi party; family life, religion and business.

404. **Post 1945 Germanies.** (3-0). **Credit 3.** Examines Germany from the end of World War II to the end of the 20th century; includes political, social, cultural, and economic life in divided and occupied Germany; covers Germany since reunification in 1990. Prerequisite: Junior or senior classification.
405. **History of the Holocaust.** (3-0). **Credit 3.** History of the Nazi Holocaust; Third Reich; Jewish Ghetto life and concentration camps; role of the military, S.S. and German business; lessons and legacies.
406. **The Era of the French Revolution and Napoleon, 1715–1815.** (3-0). **Credit 3.** Origins and events of the French Revolution; Napoleon Bonaparte and the First Empire; social, economic, political and military developments in France and Europe.
407. **History of France Since 1815.** (3-0). **Credit 3.** Nineteenth century Bourbon, Orleanist, Bonapartist and Republican regimes; France in World Wars I and II; De Gaulle and the role of France in the 20th century.
408. **Central Europe During the Long Nineteenth Century.** (3-0). **Credit 3.** Examination of Central European history from the era of the French Revolution to the outbreak of World War I; rise of nationalism; political, economic, social, and cultural developments; ethnic, class, and gender relations; local and regional identities. Prerequisite: Junior or senior classification.
410. **Russian History to 1801.** (3-0). **Credit 3.** Origins and Christianization of Russia; establishment and decline of Kievan Rus' state; Mongol conquest and domination of Russia; rise of Moscow, establishment of tsardom, expansion of state in sixteenth and seventeenth centuries; Peter the Great's reforms; emergence of Russian Empire as a major power; era of Catherine the Great.
411. **Imperial Russia 1801–1917.** (3-0). **Credit 3.** The last century of the autocratic Romanov dynasty and the social, intellectual, economic and political forces that ended it; political culture, society in transition, international affairs and revolutionary groups in an era of reform, counter-reform, reaction and industrialization.
412. **Soviet Union 1917–Present.** (3-0). **Credit 3.** The Russian Revolution, consolidation of Bolshevik power; political and social evolution of the Soviet system from February 1917, through the Civil War, the power struggle among Lenin's successors, Stalin's industrial revolution, collectivization and terror, Khrushchev's de-Stalinization campaign, stagnation under Brezhnev, and Gorbachev's attempts at radical reform.
416. **Texas Since 1845.** (3-0). **Credit 3.** History of Texas since annexation; social, cultural, economic and political developments and the place of Texas in national affairs.
420. **European Intellectual History from the Enlightenment to 1900.** (3-0). **Credit 3.** Political and social history of selected major figures and important movements in political theory, literature, sociology, art, economics and philosophy in the 18th and 19th centuries.
421. **European Intellectual History in the Twentieth Century.** (3-0). **Credit 3.** Political and social history of selected major figures and important movements in political theory, literature, sociology, art, economics and philosophy from the turn of the century to the present.
426. **The Ancient Greeks.** (3-0). **Credit 3.** Greek History and civilization from the Archaic Age to Alexander the Great (8th–late 4th century B.C.). Prerequisite: 3 hours in history, or junior or senior classification, or approval of instructor. Cross-listed with CLAS 426.
428. **The Roman Republic.** (3-0). **Credit 3.** Roman History and civilization from the beginnings (7th century B.C.) to the late 1st century B.C.). Prerequisite: 3 hours in history, or junior or senior classification, or approval of instructor. Cross-listed with CLAS 428.
429. **The Roman Empire.** (3-0). **Credit 3.** Roman History and civilization of the Imperial Period (1st century B.C.–6th century A.D.). Prerequisite: 3 hours in history, or junior or senior classification, or approval of instructor. Cross-listed with CLAS 429.
430. **Ireland 1690–1922: Colony, Kingdom and Nation.** (3-0). **Credit 3.** Introduction to the history of eighteenth- and nineteenth-Century Ireland; examination of politics, society, culture, the economy and religion; consideration of the relationship between Ireland, Britain and continental Europe; Ireland and parliamentary politics. Prerequisite: Junior or senior classification.
435. **Tudor England, 1450–1603.** (3-0). **Credit 3.** Changes in social, economic, political and religious institutions and organization: growth of the nation state; Henry VIII and the "new monarchy"; Reformation and religious settlements; international relations; inflation and social dislocation; the role of Parliament; the age of Elizabeth and Shakespeare.
436. **Stuart England, 1603–1714.** (3-0). **Credit 3.** Social, political, economic and religious development from James I to Queen Anne, Puritanism and the Revolution of the 1640s, the Restoration, establishment of constitutional monarchy after 1688, England's rise as a world commercial power.

437. **Eighteenth Century Britain.** (3-0). **Credit 3.** Political, social, economical, intellectual, cultural, and imperial history of Britain in the eighteenth century. Prerequisite: Junior or senior classification.
438. **Nineteenth Century England.** (3-0). **Credit 3.** Political, social, economic and intellectual history of England from 1815 to 1914.
439. **Twentieth Century England.** (3-0). **Credit 3.** Constitutional, political, economic, military and social history of England since 1910.
440. **Latin American Cultural and Intellectual History.** (3-0). **Credit 3.** Main currents of culture and thought as shaped by historical circumstances.
441. **History of Mexico, 1821 to the Present.** (3-0). **Credit 3.** Political, economic and social development of Mexico since independence and her relation to other world powers.
443. **American Military History to 1901.** (3-0). **Credit 3.** American military experience from colonial days to 1901; causes, nature and effect of the wars in which the United States has participated.
444. **American Military History Since 1901.** (3-0). **Credit 3.** American military experience from 1901 to present; causes, nature and effect of wars in which the United States has participated; effect of war on American history.
445. **History of Modern Military Thought.** (3-0). **Credit 3.** Military thought and theory, 1700 to the present.
446. **Aerospace History.** (3-0). **Credit 3.** Aviation technology, doctrine, policy and the concept of air power from the 19th century to the present.
447. **Constitutional History of the United States to 1901.** (3-0). **Credit 3.** How political and social conditions in American history have produced fundamental constitutional principles, changes and practices; historical evolution of written and unwritten Constitution.
449. **History of Brazil, 1822 to the Present.** (3-0). **Credit 3.** Political, cultural and economic development of Brazil since independence; slavery and race relations; relation to other world powers. Prerequisite: Junior classification.
450. **The Old South.** (3-0). **Credit 3.** History of antebellum South; physical bases of Southern regionalism; Southern alignments on national issues; slavery-plantation economy and society of Old South; secession and formation of Confederacy.
451. **The New South, 1876 to the Present.** (3-0). **Credit 3.** Political, economic, social and intellectual developments in the South since Reconstruction.
453. **The American Frontier.** (3-0). **Credit 3.** Westward movement; patterns of westward expansion, pioneer settlement, the West in diplomacy and influence of frontier on American life and institutions.
455. **History of the American City.** (3-0). **Credit 3.** History of American Cities; a social, economic and political study of industry, labor and immigration; development of a metropolitan society.
456. **American Agricultural History.** (3-0). **Credit 3.** History of American agricultural development from the Revolutionary period to the present; technological developments, major farm industries, labor, regional development, farm movements and farm programs.
457. **American Economic History.** (3-0). **Credit 3.** Major economic forces in the development of American society from 1763; mercantilism, land policies and natural resources; westward movement and agricultural expansion; transportation and trade; growth of industry and its effects on modern business, social and political life.
459. **American Society and Culture to 1877.** (3-0). **Credit 3.** Century of social and political thought, religion, science, scholarship and education in the United States.
460. **American Society and Culture Since 1877.** (3-0). **Credit 3.** Continuation of HIST 459 from 1877 to the present.
461. **History of American Women.** (3-0). **Credit 3.** Cultural, political, legal and religious factors that helped shape the role and character of women in American society from colonial times to the present; historical role of women in the development of the nation. Cross-listed with WMST 461.
462. **American Foreign Relations.** (3-0). **Credit 3.** History of U.S. foreign relations and policies to 1913.
463. **American Foreign Relations.** (3-0). **Credit 3.** History of U.S. foreign relations and policies since 1913.

464. **International Developments Since 1918.** (3-0). **Credit 3.** General survey of world politics since close of World War I; problems and ideologies of great powers of Europe and factors and conditions which explain present political tendencies and policies.
465. **Extremism and Terrorism in the Contemporary World.** (3-0). **Credit 3.** History of extremism and terrorism since 1945; underlying social, economic, and political causes; manifestations in Asia, Europe, Latin America, the Middle East, and the United States. Prerequisite: Junior or senior classification.
469. **History of Collective Protest and Violence.** (3-0). **Credit 3.** Examination of collective protest and violence on a case study basis and in comparative and historical context; emphasis on causes, the nature of participation, assumptions and goals, and the character of repression. Prerequisite: Junior or senior classification.
470. **American Business History.** (3-0). **Credit 3.** Management strategy and structure of the modern corporation in 19th and 20th century America and the corporation's changing roles in American society.
473. **History of Modern American Women.** (3-0). **Credit 3.** Emergence of modern American women in the 1890s; examination of their history from the 1890s to the present; women as organizers, innovators, political reformers, workers, social activists, housewives, mothers, consumers and feminists. Cross-listed with WMST 473.
475. **Empire and History.** (3-0). **Credit 3.** Survey of empire in a wide historical and comparative framework using a case study approach; themes of a given case study include changing social, economic, and cultural politics of imperialism, resistance in colonial environments, colonial and post-colonial identities, and race and gender relations. May be taken 3 times for credit. Prerequisite: Junior or senior classification.
476. **Sex and Sexuality in History.** (3-0). **Credit 3.** Changing ideas about sex and sexuality over time; includes their interaction with ideas about gender, race, class, religion, science, technology, medicine, politics and popular culture; historical and cultural processes creating modern concerns about sex and sexuality. Prerequisite: Junior or senior classification. Cross-listed with WMST 476.
477. **Women in Modern European History.** (3-0). **Credit 3.** Women in Europe from the 18th century to the present: women's contributions to their societies; realities of their daily lives and their responses; perceptions of women; role of institutions in defining women's roles; significance for women of industrialization, revolution, warfare, scientific discoveries; interaction of class, race and gender. Cross-listed with WMST 477.
481. **Seminar in History.** (3-0). **Credit 3.** Literature of an issue, event, period or people in history; use of primary source materials connected with the field of the seminar; problems of bibliography, historiography and historical method; and experience in writing. Prerequisite: 21 credits of history, 9 of which must be 300-level or above. Open to senior history majors or with instructor's approval.
485. **Directed Studies.** **Credit 1 to 3.** Selected fields of history not covered in depth by other courses. Reports and extensive reading required. Prerequisite: Approval of department head.
489. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of history.
491. **Research.** **Credit 1 to 3.** Research conducted under the direction of faculty member in history. Prerequisites: 24 hours of history, with 12 or more at 300-level or above; junior or senior classification and approval of instructor.
497. **Independent Honors Studies.** **Credit 1 to 3.** Directed independent studies for upper division Honors students, regardless of academic major, in selected aspects of history. Prerequisites: Junior or senior classification either as Honors student or with overall GPR of 3.25 and letter of approval from head of student's major department and approval of head, Department of History.

Department of Horticultural Sciences

Professors M. A. Arnold, D. H. Byrne, S. D. Cotner, F. T. Davies, T. D. Davis (Head), R. D. Lineberger, J. C. Miller, Jr., B. S. Patil, D. W. Reed, A. B. Wagner, Jr., J. M. Zajicek; **Associate Professors** M. L. Binzel, L. Cisneros-Zevallos, B. G. Cobb, S. R. King, P. E. Klein, H. Koiwa, L. Lombardini, T. W. Starman; **Assistant Professors** A. Volder; **Senior Lecturers** J. L. Johnson, J. R. Novak; **Lecturer** C. L. Krueger

Horticultural Sciences (HORT)

101. **Concepts of Horticultural Science.** (1-0). **Credit 1. I, II** Introduction to the many facets of horticulture in Texas and the United States including organization, history and nature of the industry; discussion of professional development and identification of career opportunities.
201. **(AGRI 1315, 1415, HORT 1301, 1401) Horticultural Science and Practices.** (3-0). **Credit 3. I, II** Structure, growth and development of horticultural plants from a practical and scientific approach; environmental effects, basic principles of propagation, greenhouse and outdoor production, nutrition, pruning and chemical control of growth, pest control and branches of horticulture.
202. **Horticultural Science and Practices Laboratory.** (0-3). **Credit 1. I, II** Methods and practices related to production of horticultural crops; practical exercises in greenhouse and field. Prerequisite: HORT 201 or registration therein.
203. **Floral Design.** (2-2). **Credit 3. I, II** Principles of design illustrated with the use of floral materials; floral design elements and techniques including color, form, line and texture; history and utilization of floral art in society.
223. **Flower Quality Standards.** (0-2). **Credit 1. II** Judging quality standards for flowers and potted plants for retail flower shops. Intercollegiate flower judging team chosen from this class.*
225. **Horticulture Learning Community.** (1-0). **Credit 1. I** Understanding the personal and professional competencies that should develop during college career; determine learning style; develop oral and written communication skills, teamwork and leadership characteristics, analytical and critical thinking, research and problem solving skills; exposure to current critical issues in horticulture and science. Prerequisite: Horticulture or floriculture major.*
291. **Research.** **Credit 1 to 3.** Research conducted under the direction of faculty member in horticulture. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
301. **Garden Science.** (3-0). **Credit 3. I, II, S** Identification, propagation, soil management, fertilization, growth control and protection of common garden plants: indoor ornamentals, landscape ornamentals, fruits and vegetables; special topics include home landscaping, container gardens, bonsai, herbs and medicinal plants and hobby greenhouse management. The effects of organic and non-organic practices on the garden ecosystem.
302. **Garden Science Lab.** (0-3). **Credit 1. I, II, S** Practical activities in identification, propagation, fertilization, media preparation, soil management, irrigation and protection of indoor ornamentals, landscape ornamentals, fruits and vegetables common in gardens in Texas. Organic and non-organic methods.
306. **Woody Ornamental Plants.** (2-2). **Credit 3. I** Better known woody ornamental trees and shrubs; identification, morphology, classification, nomenclature and adaptability for use in landscape environments. Prerequisite: BIOL 101 or HORT 201 or approval of instructor.
308. **Landscape Plant Materials.** (2-2). **Credit 3. II** Identification and use of indigenous and introduced landscape plants; plants for special uses in urban environments; emphasis on plants' ornamental attributes, cultural requirements, and adaptability in urban and suburban environments. Prerequisite: HORT 201 or 306 or BIOL 101 or approval of instructor.
309. **Interior Plants.** (2-2). **Credit 3. II** Identification, selection and maintenance of interior foliage plants; emphasis on design solutions for commercial and private facilities. Offered in even numbered years. Prerequisites: HORT 201; junior or senior classification.
311. **Principles of Food Processing.** (2-3). **Credit 3. I** Principles and practices of canning, freezing, dehydration, pickling and specialty food manufacture; fundamental concepts of various techniques of preparation, processing, packaging and use of additives; processing plants visited. Cross-listed with FSTC 311.

315. **Component Analysis of Horticultural Systems.** (3-0). **Credit 3. I, II** Examination of the components of modern horticultural systems, from the effects of plant genetics to the application of computer technology, and their impact on crop production and utilization; introduction to all horticultural production/utilization courses discussing elements and techniques common to all without regard to commodity. Prerequisites: HORT 201 and 202.
319. **Fruit and Nut Production.** (2-3). **Credit 3. I** Rootstocks, cultivars, identification, site selection, pollination, pruning, fruit thinning, dormancy, orchard culture management, irrigation, pest control, harvesting and post harvest physiology of temperate fruit and nut species. Prerequisite: HORT 201.*
325. **Vegetable Crop Production.** (2-3). **Credit 3. I** Origin, nutritive value, economic importance, botany and cultural practices of the major vegetable crops. Lab activities include organic and non-organic production of major vegetable crops.*
326. **Plant Propagation.** (2-3). **Credit 3. II** Principles, practices and techniques followed in the sexual and asexual propagation of horticultural plants: seed technology and seed propagation, rooting and propagation of cuttings, graftage and budding systems, layering and propagation by specialized plant structures, biotechnology and tissue culture systems for micropropagation.
332. **Horticulture Landscape Graphics.** (1-2). **Credit 2. I** Graphic representation of landscape design; demonstrations of technique; examination of drawing examples and drawing production; basic hand graphics techniques for visual-thinking and presentation-quality landscape drawings. Prerequisite: Junior or senior classification.
335. **Sociohorticulture.** (3-0). **Credit 3. I, II, S** Horticulture as a therapeutic medium for special populations; use of horticulture in urban development and community garden programs. Prerequisite: Junior classification.
400. **Field Studies in Horticulture.** **Credit 1 to 3.** Field trip to observe operation of horticultural businesses, governmental agencies affecting horticultural programs, and public and private institutions active in horticulture in the U.S. and other countries; usually arranged during spring break, between semesters or during the summer; may be repeated for credit. Prerequisites: HORT 201 or 301 and approval of instructor.*
404. **Plant Breeding.** (2-2). **Credit 3. II** Application of genetics and other sciences to breeding and improvement of horticultural crops; methods and special techniques employed. Offered in even numbered years. Prerequisite: GENE 301. Cross-listed with GENE 404. Credit cannot be given for both HORT 404 and AGRO 304.*
418. **Nut Culture.** (3-0). **Credit 3. II** Orchard management, native grove development, cultivars, fruit setting, soils, nutrition, propagation, pest control, harvesting, shelling, storage and marketing of temperate tree nut crops grown in the U.S. with major emphasis on pecans. Offered in odd numbered years. Prerequisite: HORT 319 or approval of instructor.*
419. **Viticulture and Small Fruit Culture.** (3-0). **Credit 3. II** Classic winegrape culture in Europe and U.S. are taught; influence of climate, soil, cultivar, rootstock, canopy and management is presented; nutrition, water, spacing, trellis, pruning, IPM and harvest are integrated for quality yields; culture of muscadines, berries, figs and persimmons are taught. Offered in even numbered years. Prerequisite: HORT 319 or approval of instructor.
420. **Concepts in Wine Production.** (3-0). **Credit 3.** Classic wine grapes of the world and where they are produced; evaluation of wine style and quality through formal laboratory tastings. Prerequisites: HORT 201, 319, 419 or 446 or FSTC 201; must be 21 years of age; junior or senior classification.
421. **Enology.** (2-3). **Credit 3. I** Provides a basic understanding of each step of the wine making process; emphasis on home and small scale commercial wine production as related to Texas conditions. Prerequisites: Must be 21 years of age; junior or senior classification.*
422. **Citrus and Subtropical Fruits.** (3-0). **Credit 3. I** Various types of citrus: identification, culture, processing, marketing, and economic future; prepares students to function in a continuously changing production environment in production areas. Offered in even numbered years. Prerequisite: Approval of instructor.*
423. **Tropical Horticulture.** (3-0). **Credit 3. I** Production, processing and marketing of coffee, bananas, cacao, mango, cashew, pineapple, coconut and root and tuber crops; recent significant developments in plant breeding and cultural practices. Offered in odd numbered years. Prerequisites: HORT 201 and 319 or approval of instructor.

425. **Landscape Maintenance and Construction.** (2-3). **Credit 3.** II Principles and practices of grading, drainage and construction of residential and small commercial landscapes; cost and bid estimation; soil preparation; transplanting operations; control of landscape diseases and pests; maintenance of landscape areas. Prerequisite: HORT 201 or approval of instructor.
427. **Fall Greenhouse Crops.** (0-2). **Credit 1.** I Hands-on lab for growing and managing fall greenhouse crops including fall bedding plants, cut flowers, foliage, poinsettias and other flowering potted plants.
428. **Commercial Greenhouse Management.** (2-2). **Credit 3.** I Principles of greenhouse management for commercial production of floral crops; greenhouse construction and operation; regulating and controlling the environment; applying cultural practices as they affect plant processes and influence growth and development; management and marketing of high quality floriculture crops. Prerequisite: HORT 201.*
429. **Floriculture Crop Production.** (2-2). **Credit 3.** II Production of floriculture crops in the greenhouse environment; scheduling and controlling crop growth for target market periods; specific flowering crops will be used as models to demonstrate potted flowering plant, cut flower, and garden plant production systems; hands-on crop production experience in lab. Prerequisite: HORT 201.*
431. **Nursery Production and Management.** (2-2). **Credit 3.** I Container, field and protected culture production of ornamental nursery plants (shrubs, trees, ground covers, bedding plants and herbaceous perennials); retail and wholesale nursery—site selection and development, financing, niche-marketing, personnel and labor management; wholesale nursery production cycles and systems, storage and shipping.*
432. **Horticulture Landscape Design.** (2-2). **Credit 3.** II Application of the principles and elements of design to planning and developing both exterior residential landscape designs and interior commercial designs. Prerequisites: HORT 203; HORT 332; HORT 306 or 308 or approval of instructor.
435. **Urban Horticulture.** (3-0). **Credit 3.** I Introduction to urban horticulture and its role in community development and well-being; emphasis on career opportunities and the roles of the urban horticulture programmer. Offered in odd numbered years. Prerequisite: Junior or senior classification.
440. **International Horticulture.** (3-0). **Credit 3.** Examines the source of horticultural commodities; shows how geography, culture, politics, and history influence our markets, gardens and refrigerators; educates students on interpreting different garden styles. Prerequisite: Junior or senior classification.
442. **Horticulture Landscape Design II.** (2-2). **Credit 3.** Introduce computer-aided-drafting (CAD) to produce site layout, grading and planting plan, and construction details for small-scale landscape design; advanced design principles and practices in their historical context, includes design and drafting of hardscape details, manipulation of earth forms, ecological urban park design to traditional garden design. Prerequisites: HORT 203, 432 and 308 or approval of instructor; junior or senior classification.
445. **Horticultural Therapy.** (2-3). **Credit 3.** II Principles and practices of horticultural therapy; planning and implementing horticultural programs for persons with special needs. Offered in odd numbered years. Prerequisites: HORT 335 or 435 or approval of instructor; junior or senior classification.*
446. **Commercial Fruit and Vegetable Processing.** (2-3). **Credit 3.** II Pilot plant and laboratory operations pertaining to processed fruits, vegetables and beverages; new product development emphasized via individual laboratory projects. Offered in even numbered years. Prerequisite: FSTC 311. Cross-listed with FSTC 446.
451. **Retail Floristry.** (2-3). **Credit 3.** I Principles of floral design in a commercial shop enterprise; aspects of design in vase arrangements, personal flowers, sympathy flowers and flowers for special occasions; production costs and profit analysis, selling techniques and customer relations; term project required. Prerequisite: HORT 203 or approval of instructor.
452. **Floral Design: Weddings and Personal Flowers.** (2-3). **Credit 3.** II Basic principles of floral design as applied to wedding work; design principles and mechanics as applied to corsages, headpieces, hand bouquets and ceremony and reception decorations; history of wedding traditions; selling and pricing weddings. Prerequisite: HORT 203 or 451 or approval of instructor.
453. **Floral Art.** (1-2). **Credit 2.** I, II Advanced study of floral design as an art form in contrast to a commercial florist operation; interpretive expression of design principles and color stressed along with international design styles. Prerequisites: HORT 203; HORT 451 and/or 452.
454. **Special Event Design and Production.** (1-2). **Credit 2.** I, II Role of event planners, production managers, designers, and decorators within traditional event management practices; analyze how artistic components are used in visual styling to achieve a specific purpose; impact of collaborative planning, effective research, and strong communication skills, social psychological and economic influences as they relate to event planning. Prerequisite: Junior or senior classification.

481. **Seminar. (1-0). Credit 1. I, II** Review of current research literature in field of horticulture presented by senior students; transition from college to work environment, including professional development and career advancement; required of all senior students in horticulture.
484. **Internship. Credit 1 to 4. I, II, S** On-the-job experience program in the student's area of horticultural specialization. Must be taken satisfactory/unsatisfactory. May be taken three times. Prerequisites: Sophomore, junior or senior classification; approval of instructor; 2.0 GPR in major and overall.
485. **Directed Studies. Credit 1 to 4. I, II, S** Special problems and projects in any area of horticulture. Prerequisite: Junior or senior classification or approval of department head.
489. **Special Topics in... Credit 1 to 4. I, II, S** Selected topics in an identified area of horticultural science. May be repeated for credit. Prerequisite: Approval of instructor.*
491. **Research. Credit 1 to 3.** Research conducted under the direction of faculty member in horticulture. May be repeated 2 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor.

NOTE: Undergraduate floriculture courses are taught under the horticulture designation.

*Field trips required for which departmental fees may be assessed to cover costs.

Humanities

(faculty, see page 784)

(HUMA)

211. **Hebrew Scriptures. (3-0). Credit 3.** Philosophical concepts of the Hebrew Scriptures as they relate to the development of religious and ethical ideas. Cross-listed with RELS 211.
213. **New Testament. (3-0). Credit 3.** The origin and development of the religious and philosophical concepts of the New Testament. Cross-listed with RELS 213.
303. **Near Eastern Religions. (3-0). Credit 3.** Beliefs and practices of Judaism, Zoroastrianism, Christianity and Islam with particular attention to their philosophical presuppositions. Cross-listed with RELS 303.
304. **Indian and Oriental Religions. (3-0). Credit 3.** Beliefs and practices of Hinduism, Jainism, Sikhism, Buddhism, Confucianism, Taoism and Shinto with particular attention to their philosophical presuppositions. Cross-listed with RELS 304.
485. **Directed Studies. Credit 1 to 6.** Directed studies in humanities. May be repeated for credit. Prerequisite: Approval of department head.
489. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of humanities. May be repeated for credit. Prerequisite: Approval of instructor.

Industrial Distribution

(faculty, see page 683)

(IDIS)

240. **Introduction to Industrial Distribution. (2-0). Credit 2. I, II** Definition, history, types of industrial distribution; range of products; line of distribution; function of and services provided by distributors; distributor operational and financial analyses; measures of organizational effectiveness; employment and advancement opportunities in the field of industrial distribution.
281. **Manufacturing Processes. (3-3). Credit 4. I, II, S** Survey of metal, polymer and ceramic manufacturing processes including casting, forming (forging, rolling, drawing), machining (turning, milling, grinding), joining (welding, adhesives), cutting and finishing; integrated circuit and PC board manufacturing, rapid prototyping; CAD; CAM; gauging and SPC. Prerequisite: MATH 151.
300. **Industrial Electricity. (3-3). Credit 4. I, II, S** Industrial applications of electrical theory, codes, circuitry, wiring devices, motors and controllers, switch gear and solid state controls. Prerequisite: PHYS 202 for IDIS majors or PHYS 208 for ENTC majors.

303. **Mechanical Power Transmission.** (2-2). **Credit 3. I, II, S** Overview of the engineering concepts of mechanical power and the components within a system to provide transmission of that power into useful work; experimental application of the related theory as it relates to the industrial distributor; “real world” knowledge learned for application in industry. Prerequisite: Admitted to major degree sequence (upper-level) in industrial distribution.
340. **Manufacturer Distributor Relations.** (3-0). **Credit 3. I, II** Approaches and procedures for developing and maintaining effective manufacturer distributor relations: marketing channel design, channel roles, managing uncertainty, legal and ethical imperatives, conflict resolution, decision support and strategic marketing. Prerequisites: IDIS 240; admitted to major degree sequence (upper-level) in industrial distribution.
343. **Distribution Logistics.** (3-0). **Credit 3. I, II** Study of concepts, issues and techniques used to plan, analyze and control the logistics network; examination of three key logistical decision-making areas: inventories, facilities and transportation; particular interest will be the study of techniques and technologies for managing and optimizing the logistical (supply) chain. Prerequisites: STAT 201 or 303; junior or senior classification; admitted to major degree sequence (upper-level) in industrial distribution.
344. **Distributor Information and Control Systems.** (3-3). **Credit 4. I, II** Industrial distribution systems including hardware and software operations; inventory management, vendor evaluation; physical distribution systems; use of bar codes, radio frequency and other automated data entry techniques; purchasing operations. Prerequisites: IDIS 340 and 343; admitted to major degree sequence (upper-level) in industrial distribution.
364. **Distributor Operations and Financial Management.** (3-0). **Credit 3. I, II** Assessment of firm performance utilizing financial statement analysis and industry studies; methods for planning, implementing and monitoring profitability from distributor operations; procedures for controlling cash flow; credit, receivables, inventory, personnel and productivity; and related financial operations. Prerequisites: ACCT 209 and 210; admitted to major degree sequence (upper-level) in industrial distribution.
400. **Industrial Automation.** (3-3). **Credit 4. I, II, S** Industrial applications of electronic devices; instrumentation; AC and DC drives; local area networks; cell and area controllers and advanced applications of programmable controllers. Prerequisites: IDIS 300; admitted to major degree sequence (upper-level) in industrial distribution.
403. **Fluid Power Transmission.** (2-2). **Credit 3. I, II, S** Overview of the engineering concepts of hydraulics and pneumatic power and its components within a system to provide transmission of that power into useful work; experimental application of the related theory as it relates to the industrial distributor; “real world” knowledge learned for application in industry. Prerequisites: IDIS 303; PHYS 202; admitted to major degree sequence (upper-level) in industrial distribution.
420. **Electronic Distribution Networks.** (3-0). **Credit 3. I, II** Study of concepts, issues, and techniques used to plan, analyze and control industrial/electronic distribution networks; interdisciplinary approach combining team projects, individual research, case study analysis, and interaction with industry executives; design of roadmaps and target plans for territory penetration. Prerequisites: Junior or senior classification; admitted to major degree sequence (upper-level) in industrial distribution.
424. **Purchasing Applications in Distribution.** (3-0). **Credit 3. I, II** Applications of purchasing systems, specifically for the distribution industry; emphasis on supplier relations, strategic purchase planning, supplier evaluation, global purchasing techniques, cost analysis, life cycle costing, value analysis; case studies and procurement modeling for distributors. Prerequisites: IDIS 340 and 344 or registration therein; admitted to major degree sequence (upper-level) in industrial distribution.
430. **Sales Engineering.** (3-2). **Credit 4. I, II** Sales and sales management techniques for analyzing distribution challenges and providing solutions through effective communication; establishing credibility, effective questioning techniques, developing solutions, presenting solutions, anticipating objections and gaining a commitment, plus techniques for building, developing and compensating an effective sales organization. Prerequisites: IDIS 340; junior or senior classification; admitted to major degree sequence (upper-level) in industrial distribution.
434. **The Quality Process for Distributors.** (3-0). **Credit 3. I, II** Application of the “Deming” principles specifically for distributors, including customer needs analysis, research and data collection methodology, employee involvement techniques, team building, leadership, communications, statistical methods and data analysis; solutions to quality problems for distributors. Prerequisites: IDIS 424; must be taken the last semester before graduation; admitted to major degree sequence (upper-level) in industrial distribution.

444. **Leadership in Technology.** (2-3). **Credit 3. I, II** Managing change in a dynamic environment in industrial distribution including key success factors involved in firm profitability, issues of a strategic nature; negotiation processes; ethical behavior in achieving economic and social performance. Prerequisites: IDIS 430; must be taken the last semester before graduation; admitted to major degree sequence (upper-level) in industrial distribution.
481. **Seminar – Internship Preparation.** (1-0). **Credit 1. II** Develop an understanding of the distribution industry and its opportunities; prepare students for summer internships; provide students with opportunities to network with industry and companies that will be hiring summer interns. Prerequisite: Minimum of 60 credit hours.
484. **Professional Internship.** (2-0). **Credit 2. S** Independent study and on-the-job supervised experience related to a professional area of interest in industrial distribution. Prerequisites: IDIS 481; junior or senior classification.
485. **Directed Studies.** **Credit 1 to 6. I, II, S** Permits work in a special problem area on an individual basis with the intent of promoting independent reading, research and study; to supplement existing course offerings or subjects not presently covered. Prerequisites: Senior classification and approval of instructor.
489. **Special Topics in...** **Credit 1 to 4. I, II, S** Selected topics in an identified area of industrial distribution. Prerequisite: Approval of instructor.

Department of Industrial and Systems Engineering

Professors G. K. Bennett, G. L. Curry, A. V. Deshmukh, R. M. Feldman, G. A. Klutke, V. J. Leon, C. O. Malavé, B. A. Peters (Head), D. T. Phillips, W. E. Wilhelm, M. A. Wortman; Associate Professors A. P. Banerjee, S. Cetinkaya, Y. Ding, N. Gautam, D. R. Smith, H. Uster; Assistant Professors J. E. Bickel, S. Butenko, G. M. Gaulker, A. L. Johnson, K. Kianfar, L. Ntaimo, E. Tekin

Industrial Engineering (ISEN)

101. **Introduction to Industrial Engineering.** (1-0). **Credit 1.** Introduction to industrial engineering; overview of the curriculum; presentations by faculty and industry to familiarize students with the department and the scope of industrial engineering applications.
220. **Introduction to Production Systems.** (3-0). **Credit 3. I, II** Introduction to manufacturing and production systems; provides an overview of various aspects of manufacturing systems; includes design, analysis, operation and control; a perspective for manufacturing systems related problems and the complex interactions that they entail. Corequisites: CPSC 206; ENTC 181; STAT 211.
285. **Directed Studies.** **Credit 1 to 4. I, II, S** Problems of limited scope in industrial engineering approved on an individual basis intended to promote independent study. Prerequisite: Approval of department head.
302. **Economic Analysis of Engineering Projects.** (2-0). **Credit 2. I, II, S** Principles of economic equivalence; time value of money; analysis of single and multiple investments; comparison of alternatives; capital recovery and after-tax analysis of economic projects. Prerequisite: MATH 152.
303. **Engineering Economic Analysis.** (3-0). **Credit 3. I, II, S** Principles of economic equivalence; time value of money; analysis of single and multiple investments; comparison of alternatives; capital recovery and tax implications; certainty; uncertainty; risk analysis; public sector analysis and break-even concepts. Prerequisite: MATH 152.
314. **Statistical Control of Quality.** (2-3). **Credit 3. I, II** Quality control with statistical principles applied to problems in various production systems, including probability concepts, density and distribution functions, control chart concepts and sampling inspection plans; laboratory exercises for exposure to basic metrology and applied statistics for quality control applications in discrete-item manufacturing systems. Prerequisite: STAT 212.
315. **Production Systems Planning.** (3-0). **Credit 3. I, II** Principles, models and techniques for planning, analysis and design of integrated production systems; optimization principles, including linear programming, unconstrained and equality constrained optimization and dynamic programming applied to production planning; topics to include capacity expansion models, learning curves, aggregate planning models, deterministic and stochastic inventory, MRP and project scheduling. Prerequisites: ISEN 220; MATH 304. Corequisite: ISEN 420.

316. **Production Systems Operations.** (3-0). **Credit 3. I, II** Analytical principles of manufacturing systems design, analysis and control; emphasis placed on stochastic analysis; role of variability and impact on cycle time; push versus pull production strategies including Kanban and constant wip control; probability, queuing theory, Little's Law, heavy traffic approximations, and queuing networks. Prerequisites: ISEN 220, 424; MATH 304.
333. **Project Management for Engineers.** (3-0). **Credit 3.** Basic project management for engineering undergraduates; project development and economic justification; estimating; scheduling; network methods; critical path analysis; earned value management; recycling and rework; project organizational structures; project risk assessment; resource allocation; ethics; characteristics of project managers. Prerequisite: Junior or senior classification in Dwight Look College of Engineering. Cross-listed with CVEN 333 and MEEN 333.
411. **Engineering Management Techniques.** (3-0). **Credit 3.** Techniques relating to managing engineering activities; engineer's transition into management; engineering managerial functions; motivation of individual and group behavior; productivity assessment/improvement; managing the quality function and communications. Prerequisite: Senior classification in industrial engineering.
414. **Total Quality Engineering.** (2-3). **Credit 3.** Introduction to the principles of total quality engineering; total quality management philosophy, engineering approaches for designing quality into products and processes; off-line experimentation methods for the robust design; emphasis on teamwork and continuous quality improvement. Prerequisite: ISEN 314.
416. **Facilities Location, Layout and Material Handling.** (3-3). **Credit 4. I, II** Analytical treatment of facilities location, physical layout, material flow and handling, combined with heuristic algorithms to assist in the design of production/service facilities; fundamental concepts applied through a sequence of design projects. Prerequisites: ISEN 315; ISEN 316 or registration therein.
420. **Operations Research I.** (3-0). **Credit 3.** Development and application of fundamental deterministic analytical methods including linear programming, integer programming, dynamic programming and nonlinear optimization. Prerequisite: MATH 304 or equivalent.
421. **Operations Research II.** (3-0). **Credit 3.** Development and application of probabilistic analytical methods including Markov chains, queuing systems and digital simulation modeling. Prerequisites: MATH 304 or equivalent; STAT 212.
424. **Systems Simulation.** (2-3). **Credit 3. I, II** Systems simulation structure, logic and methodologies; generation of random numbers and deviates; system simulation languages, models and analysis; applications to industrial situations. Prerequisite: STAT 212.
425. **Design and Analysis of Industrial Systems with Simulation.** (2-3). **Credit 3.** In-depth study into the design-modeling and subsequent analysis of contemporary production/service systems; factory/service systems are modeled using the ARENA/SIMAN V simulation-animation language; emphasis is placed on the critical analysis of alternative flow designs of modeled systems using flow and economic parameters to assess system improvement. Prerequisites: ISEN 303 and 424.
430. **Human Factors and Ergonomics.** (3-0). **Credit 3. II** Human biological, ergonomic, and psychological capabilities and limitations; techniques and procedures for developing and applying the principles of human factors engineering to systems design; stresses interdisciplinary nature of the subject. Prerequisite: Junior or senior classification.
455. **Principles of Programmable Automation.** (2-3). **Credit 3.** Comprehensive treatment of the principles of computer numerical control, direct numerical control, computer-aided part programming and industrial robots; emphasis on the operations and applications of CNC, DNC machine tools and industrial robots; laboratory experience in using part-programmable software and robotic programming languages to develop programmable automation systems. Prerequisites: ISEN 316, ISEN 416 or registration therein.
459. **Manufacturing Systems Design.** (1-6). **Credit 3. I, II** Capstone design course emphasizing analysis and design of manufacturing systems, cellular design, flexible manufacturing systems and manufacturing integration; integrates knowledge gained from all required industrial engineering courses in a system design project; for students in their final semester of undergraduate studies. Prerequisites: ISEN 314, 316, 416.
485. **Directed Studies.** **Credit 1 to 6. I, II, S** Permits work on special project in industrial engineering. Project must be approved by department head. Prerequisite: Senior classification in industrial engineering.
489. **Special Topics in...** **Credit 1 to 5.** In-depth study of areas of current student interest and recent advances; normally used for first time offering of new courses. Prerequisite: Approval of instructor.

Department of Information and Operations Management

Professors E. E. Anderson, F. P. Buffa, G. C. Fowler, H. A. Love, E. P. Robinson, Jr. (Head), A. Sen, B. Shetty, W. E. Stein, M. J. Tretter; **Associate Professors** A. Arreola-Risa, J. Choobineh, X. Koufteros, R. Oliva; **Assistant Professors** H. N. Geismar, G. R. Heim, M. E. Ketzenberg, Y. Li, X. Peng, R. Sen; **Clinical Assistant Professors** J. Jasperston, D. Whitten; **Senior Lecturer** L. W. Darcey; **Lecturers** P. F. Ammons, B. A. Koufteros, J. M. Norton, D. Whitcomb

Information and Operations Management (INFO)

209. **Business Information Systems Concepts.** (3-0). **Credit 3. I, II** Introduction to the use of computers in data and document management and as a problem-solving tool for business; fundamental concepts of information technology and theory; opportunities to use existing application software to solve various business information systems oriented problems. May not be used to satisfy degree requirements for majors in business. Prerequisite: For students other than business and agribusiness majors.
210. **Fundamentals of Information Systems.** (3-0). **Credit 3. I, II, S** Introduction to information systems concepts; study of information systems in the functional areas of business; overview of hardware, software and popular operating systems; study of problem solving tools; human factors. Prerequisite: For business majors.
250. **Business Programming Logic and Design.** (3-0). **Credit 3.** Development of structured and object-oriented program logic and design in solving business programming problems using Visual Basic; emphasis on enforcing good techniques and logical thinking. Prerequisites: INFO 210 or approval of instructor; sophomore classification in business.
303. **Statistical Methods.** (3-0). **Credit 3. I, II, S** Collection, tabulation and presentation of numerical data; sampling, estimation of averages and variation, probability and error, hypothesis testing and correlation. Prerequisite: Admission to upper division in Mays Business School.
304. **Business Forecasting Methods.** (3-0). **Credit 3. I, II** Empirical and statistical study of economic fluctuations: business barometers and forecasting; statistical techniques for preparing individual organizational forecasts and long-range plans. Prerequisite: INFO 303 or equivalent.
305. **Intermediate Business Statistics.** (3-0). **Credit 3. I, II, S** Selected topics in statistical analysis; practical applications to functional problems in accounting, finance, marketing and management; applications of existing computer programs minimize computations. Prerequisite: INFO 303 or equivalent.
306. **Data Communications and Network-Based Systems.** (3-0). **Credit 3. I, II, S** A survey of concepts, technology and applications of on-line and network-based systems in business data communications; analysis and design of data communications, requirements in an information system environment and their impact on business organizations. Prerequisite: Admission to upper division in Mays Business School.
322. **Business Object Oriented Programming with Java.** (3-0). **Credit 3. I, II** Introduction of abstract data types, inheritance, object identity, polymorphism as they relate to building business objects and business classes; use of Java programming language depicting the object orientation concepts; use of class libraries and Java packages for business object construction. Prerequisites: Admission to upper division in Mays Business School; INFO 250.
328. **Database Management Systems.** (3-0). **Credit 3. I, II, S** Database design; use and application of Database Management Systems (DBMS) in the solution of business problems; database programming. Prerequisites: Admission to upper division in Mays Business School; INFO 250.
330. **Business Systems Analysis and Design.** (3-0). **Credit 3. I, II, S** Techniques and methods currently used in system analysis and design including object oriented methods; use of automated tools to support systems development. Prerequisite: INFO 328 or concurrent enrollment.
336. **Decision Support Systems.** (3-0). **Credit 3. I** Application of quantitative decision-making techniques to management decision problems; focus on model development, solution and implementation of results. Prerequisite: INFO 364 or concurrent enrollment.
340. **Supply Chain Management.** (3-0). **Credit 3. I** Focus on the integrated management of the total product delivery system; purchasing, inventory management and distribution functions, with emphasis on materials and information flows. Prerequisite: INFO 364.

361. **Operations Planning and Control.** (3-0). **Credit 3.** II Planning and controlling the conversion of materials, labor, capital, and information into goods and services for both manufacturing and service organizations; emphasis on managerial and technical aspects of planning and controlling operating systems. Prerequisite: INFO 364.
362. **Total Quality Management.** (3-0). **Credit 3.** An organization-wide approach to quality based on total customer satisfaction and continuous process improvement; both managerial and technical aspects of quality discussed. Prerequisite: INFO 364.
364. **Operations Management.** (3-0). **Credit 3.** I, II, S Concepts, issues and techniques used to plan, analyze and control systems of production; operational problems in producing goods and services. Prerequisite: INFO 303 or concurrent enrollment.
374. **Business Information Security and Risk Management.** (3-0). **Credit 3.** Explores business, managerial and technological aspects of information security; analysis, design, implementation and management issues surrounding effective information security; includes risk management, business continuity planning, security policy development. Prerequisite: INFO 306.
420. **Web-Enabled Applications.** (3-0). **Credit 3.** Distributed business applications using the World Wide Web; advanced discussions of the concepts of internet, intranet, extranet; different methods to design web-enabled applications; active web applications; cutting edge website design; legacy to web integration; use of web-oriented languages. Prerequisites: INFO 328 and senior classification.
422. **Complex Business Application Design.** (3-0). **Credit 3.** Business application development alternatives; COM and CORBA object models; use of Visual Basic; use of ActiveX controls, ActiveX Servers and ActiveX Documents. Prerequisites: INFO 250; senior classification.
432. **Software Quality and Measurement in Information Systems.** (3-0). **Credit 3.** Software quality and software measurement for business enterprise; software metrics; implementation of metrics based information systems project; zero-defect programming for business software projects; software quality standards such as ISO and Capability Maturity Models for an enterprise. Prerequisites: INFO 429; senior classification.
437. **Knowledge Management.** (3-0). **Credit 3.** Organizational and cognitive issues of problem formulation; decision making and knowledge management in multiple application domains; formulation and decision making in groups; group dynamics; managing group and individual knowledge; a survey of tools needed to support formulation, decision making and knowledge management; planning and analysis in organizational settings. Prerequisites: INFO 303 and 429 or equivalents; senior classification in business.
439. **Management of Information Systems.** (3-0). **Credit 3.** Theoretical and practical issues for managing computerized information systems; planning and control functions of the firm; emphasis on case studies of design projects. Prerequisites: Senior classification in business or approval of instructor.
446. **E-Services.** (3-0). **Credit 3.** Examines the deployment and utilization of information technologies by businesses, governments and not for profit organizations to deliver services, with applications in banking and financial advisory services, healthcare, and federal, state and local governments. Prerequisite: Senior classification in business or approval of instructor.
458. **Simulation.** (3-0). **Credit 3.** II Structure and use of simulation as an aid to supply chain decision-making; simulation development, computer solution and implementation. Prerequisite: INFO 364.
464. **Advanced Supply Chain Management.** (3-0). **Credit 3.** Advanced contemporary topics in supply chain and operations management; developing analytical insights into the operation of selected methodologies. Prerequisite: INFO 340 and senior classification.
465. **Information Technology for Supply Chain Management.** (3-0). **Credit 3.** II Overview of information technology applications for planning and controlling the design, manufacture and distribution of goods and services; managerial and technical aspects of information technology for product design, shop floor, factory, enterprise and supply chain management. Prerequisite: Information and operations management majors only or approval of instructor.
468. **Enterprise Resource Planning.** (3-0). **Credit 3.** I Application of advanced information technology for integrating business functions through distributed databases; applications for planning, scheduling, purchasing and costing to multiple layers of the organization. Prerequisite: INFO 364.
477. **Large-Scale Information Systems Project.** (3-0). **Credit 3.** I, II Design and implementation of large-scale business application projects needing database management system and networks; multi-language and/or multi-platform environments; very large legacy system upgrade and maintenance; platform migration. Prerequisites: INFO 330; senior classification or approval of instructor.

484. **Information and Operations Management Internship.** Credit 1 to 4. **I, II, S** A directed internship in an organization to provide students with a learning experience supervised by professionals in organizational settings appropriate to the student's professional objectives. Prerequisites: Information and operations management major and approval of department head.
485. **Directed Studies.** Credit 1 to 4 each semester. **I, II, S** Directed study of selected problems in an area of information and operations management not covered in other courses. Prerequisites: Admission to upper division in Mays Business School and approval of department head.
489. **Special Topics in...** Credit 1 to 4. **I, II, S** Selected topic in an identified field of information systems or supply chain management. Prerequisites: Admission to upper division in Mays Business School and approval of instructor.

Integrated Mathematics and Science

(faculty, see page 668)

(MASC)

351. **Problem Solving in Mathematics.** (3-0). Credit 3. Problem solving strategies in math and science; evaluate conjectures and arguments; writing and collaborating on problem solutions; posing problems and conjectures; constructing knowledge from data; developing relationships from empirical evidence; connecting mathematics concepts; readings, discussions, and analyses will model and illustrate mathematics problems solving and proofs. Prerequisite: 9 hours of 300-level mathematics courses; admission to teacher education; junior classification.
450. **Integrated Mathematics.** (3-0). Credit 3. Integration and connections among topics and ideas in mathematics and other disciplines; connections between algebra and geometry and statistics and probability; focus for integration with authentic problems requiring various branches of mathematics. Prerequisites: MASC 351; admission to teacher education; junior classification.

Interdisciplinary Studies

(INST)

For additional information regarding Interdisciplinary Studies (INST) courses, contact the Department of Teaching, Learning and Culture's Office of Undergraduate Advising, 107 Harrington Tower.

291. **Research.** Credit 1 to 4. Research conducted under the direction of faculty member in teaching, learning and culture. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
301. **Educational Psychology.** (3-0). Credit 3. **I, II, S** Application of psychology to problems of teaching. Nature and operation of principles of learning, transfer of training; nature, measurement and significance of individual differences; conditions influencing efficiency of learning. Prerequisite: Junior or senior classification.
310. **Understanding Special Populations.** (3-0). Credit 3. Referral, assessment and categorization of special populations including physical, cognitive and affective characteristics; cultural, ethnic, economic and linguistic differences; giftedness; special education and compensatory programs; awareness of legislative history that results in rights for special populations. Prerequisite: Sophomore classification or above.
322. **Foundations of Education in a Multicultural Society.** (3-0). Credit 3. **I, II, S** Historical, philosophical and cultural foundations of education emphasizing education for a multicultural society. Prerequisite: Junior classification or above.
332. **Second Language Instruction and Assessment.** (3-0). Credit 3. Techniques and methods of intensive English instruction for Limited English Proficient students; lesson planning and instructional modification; use of instructional strategies and appropriate assessment practices. Prerequisite: Admission to teacher education.
334. **Assessment of English Language Learners.** (3-0). Credit 3. Theoretical and practical aspects of ESL/EFL testing, including formal and informal assessment procedures and instruments, assessments and referral and processes of ESL with special needs, and gifted ESL learners. Prerequisites: INST 322 and 332.
462. **Language Acquisition and Development.** (3-0). Credit 3. Role of the child, the community and the school through stages of language development; relationship of linguistic, cultural and conceptual processes to second language learning.

463. **Second Language Methodology: ESL/Bilingual. (3-0). Credit 3.** Techniques and methods of intensive English instruction for limited-English-speaking proficient students; use of instructional materials and language assessment instruments.
491. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in teaching learnign and culture. May be repeated 2 times for credit. Prerequisites: Junior or senior classification and approval of instructor.

International Business (IBUS)

301. **Business Study Abroad. Credit 1 to 18.** For students in approved programs abroad. May be repeated for credit. Prerequisites: Admission to upper division in Mays Business School and selected for program; approval of study abroad coordinator and academic dean.
401. **Global Marketing. (3-0). Credit 3.** I Survey of the aspects involved in marketing products and services in the international market; tariffs, cultural restrictions, business environment and legal restrictions. Prerequisite: MKTG 321. Cross-listed with MKTG 401.
402. **International Marketing: Study Abroad. (3-0). Credit 3.** Introduces marketing students to the facets of designing and implementing a marketing strategy in an international setting; provides a traditional classroom experience along with personal exposure to a variety of European cultures; facilitates understanding of the international marketplace in which these students will function. Prerequisites: Junior classification; MKTG 321 or 309. Cross-listed with MKTG 402.
403. **International Market Entry Strategies. (3-0). Credit 3.** A research-based course in which students prepare an analysis of a country, or region outside the U.S., and use it in the preparation of a marketing plan for a good or service to be introduced and marketed in that country. Prerequisites: MKTG 321; concurrent registration in MKTG/IBUS 402; junior or senior classification. Cross-listed with MKTG 403.
445. **International Accounting. (3-0). Credit 3.** Introduction and examination of accounting issues unique to multinational enterprises and international business activity. Does not count towards the accounting requirement for the CPA exam. Prerequisites: ACCT 315 or 327; FINC 341. Cross-listed with ACCT 445.
446. **Funding International Business. (3-0). Credit 3. I, II** International business transactions, balance of payments and exchange rate systems, exchange rate risk and hedging techniques, sources of funding, relation to international financial institutions and capital instruments; relates international business funding to national and commercial development. Prerequisite: FINC 341 with a grade of C or better. Cross-listed with FINC 445.
450. **International Environment of Business. (3-0). Credit 3.** Broad survey of international business issues; analyzes the environment in which international businesses operate; introduces multinational enterprises, global competition, international organizations, treaties and international law, national trade policies and the determinants of competitiveness of firms in international markets. Prerequisites: Admitted to upper division in Mays Business School. Cross-listed with MGMT 450.
452. **International Management. (3-0). Credit 3.** An overview of international management to include international dimensions of organizational behavior, theory, strategy and human resource management; application of theoretical ideas to real-world situations through case analyses, presentations, projects and interactive class discussion. Prerequisite: MGMT 450 or co-enrollment in MGMT 450 and 452. Cross-listed with MGMT 452.
455. **Asian Business Environment. (3-0). Credit 3.** The scope of business environments of Asia; geographical, demographic and cultural makeup; economic integration; human and cultural elements; financial and communication infrastructures; risk and market analysis; trade and investment patterns; Asian MNC's. Prerequisite: Admission to upper division in Mays Business School.
456. **European Integration and Business. (3-0). Credit 3.** History and institutional structure of the European Union; its regional cultures, values, economies and rifts; challenges faced by corporations and people in the region, including issues involving doing business with the European Union. Prerequisite: Admission to upper division in Mays Business School.
457. **Global Entrepreneurship. (3-0). Credit 3.** Practical issues associated with taking small- and medium-size business global; includes importing and exporting, developing global strategies, evaluating market opportunities, regional impact on economies and people. Prerequisite: Admission to upper division in Mays Business School. Cross-listed with MGMT 457.

458. **International Negotiations.** (3-0). **Credit 3.** Skill building strategies and exercises in communication, listening and issue identification; how to negotiate globally; importance of knowing people and cultures; practice and theory of effective negotiation; awareness of diverse constructions of reality and communicating across different groups. Prerequisite: Admission to upper division in Mays Business School.
459. **Latin American Markets.** (3-0). **Credit 3.** Comparing and contrasting the Latin American, Canadian and U.S. markets across different variables, including culture, economics, social and legal aspects. Prerequisite: MKTG 321.
460. **Academy for Future International Leaders.** (3-0). **Credit 3.** A practical orientation to international business and cultural issues to prepare selected Texas A&M students for the international marketplace; joint effort among all colleges at Texas A&M; designed to complement any academic major by helping students gain a global perspective of their chosen field of study. Prerequisite: Junior or senior classification.
484. **International Business Internship.** **Credit 1 to 4.** International business internship with practicing professionals under the direction of a faculty member. Prerequisites: Admission to upper division in Mays Business School; approval of department head.
485. **Directed Studies.** **Credit 1 to 6.** Directed study on selected problems in the area of international business. Prerequisites: Admission to upper division in Mays Business School and approval of instructor.
489. **Special Topics in...** **Credit 1 to 4.** I, II Selected topics in an identified area of international business. May be repeated for credit. Prerequisites: Admission to upper division in Mays Business School and approval of instructor.

International Studies (INTS)

201. **Introduction to International Studies.** (3-0). **Credit 3.** Introduction to the basic concepts and frameworks for analyzing global events and understanding the current international situation; for freshman and transfer international studies majors.
289. **Special Topics in...** **Credit 1 to 4.** Introduces students to the broad range of disciplines and issues explored in the international studies curriculum. May be repeated for credit. Prerequisite: Freshman or sophomore classification.
481. **Senior Seminar in International Studies.** (3-0). **Credit 3.** Capstone course designed to produce in-depth research projects; based on student's international experience and specific area of expertise acquired in major. Prerequisites: International Studies major; INTS 201; senior classification; completed international experience.
484. **Directed Internship.** (3-0). **Credit 3.** Directed internship in a private firm, government or non-profit agency outside the United States; provide on-the-job experience appropriate to the student's program of work and career objectives. To be taken on a satisfactory/unsatisfactory basis. Maximum of 3 credit hours may count towards degree. Prerequisites: Completion of 100- and 200-level language requirement; junior or senior classification; approval of internship coordinator.
485. **Directed Studies.** (3-0). **Credit 3.** Research problems and readings for students majoring in international studies; directed independent study of an international issue related to student's area of interest. Prerequisite: Junior or senior classification or approval of instructor.
489. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of international studies. May be repeated for credit. Prerequisite: Junior or senior classification or approval of instructor.
491. **Research.** **Credit 1 to 3.** Research conducted under the direction of faculty member in international studies. Prerequisites: INTS 201; junior or senior classification and approval of instructor.
497. **Independent Honors Study.** (3-0). **Credit 3.** Directed independent studies designed to produce a senior honors thesis; based on international experience and interdisciplinary expertise acquired in major. Prerequisites: INTS major; honors candidate; completed international experience.

Italian

(faculty, see page 698)

(ITAL)

- 101. (ITAL 1411) **Beginning Italian I.** (3-2). **Credit 4.** Elementary language study with oral, written and reading practice; preparation for conversation; part of class preparation will be done in language laboratory.
- 102. (ITAL 1412) **Beginning Italian II.** (3-2). **Credit 4.** Continuation of ITAL 101; part of class preparation will be done in the language laboratory. Prerequisite: ITAL 101.
- 201. (ITAL 2311) **Intermediate Italian I.** (3-0). **Credit 3.** Readings of average difficulty; review of grammar; practice in conversation and composition. Prerequisite: ITAL 102.
- 202. (ITAL 2312) **Intermediate Italian II.** (3-0). **Credit 3.** Continuation of ITAL 201 with more advanced material. Prerequisite: ITAL 201.
- 289. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of Italian studies. May be repeated for credit. Prerequisite: Approval of instructor.
- 303. **Composition and Conversation.** (3-0). **Credit 3.** Readings of contemporary Italian prose; intensive review of grammar and syntax; development of written and oral skills; expansion of vocabulary; translations, compositions and short presentation. Prerequisites: ITAL 202 or equivalent.
- 451. **Introduction to Italian Culture.** (3-0). **Credit 3.** Introduction to the culture of the Italian Peninsula, from Middle Ages to present; study of major works of literature, political science, visual arts, music and cinema, to set Italy's culture in its social and historical context; taught in English. Prerequisite: ITAL 201 or registration therein, or approval of instructor. Cross-listed with EURO 451.
- 453. **Italian Literature.** (3-0). **Credit 3.** Survey of Italian literature from Middle Ages to the present; focus on the Italian Renaissance's relevance for contemporary Europe, the birth of a secular view of culture, and the dialogue with the classical tradition. Prerequisite: ITAL 201 or registration therein, or approval of instructor. Cross-listed with EURO 453.
- 455. **Italian Cinema.** (3-0). **Credit 3.** Survey of Italian cinema from Neorealism to the present; taught in English. Prerequisite: ITAL 201 or registration therein, or approval of instructor. Cross-listed with EURO 455 and FILM 455.
- 485. **Directed Studies.** **Credit 1 to 4.** Individual supervision of readings or assigned projects, selected for each student individually; written and oral reports. Prerequisite: Approval of instructor and department head.
- 489. **Special Topics in...** **Credit 1 to 4, I, II, S** Selected topics in an identified area of Italian. May be repeated for credit. Prerequisite: Approval of instructor.

Japanese

(JAPN)

Lecturers G. Adams, C. Johnson

- 101. (JAPN 1411) **Beginning Japanese I.** (3-2). **Credit 4.** Elementary language study with oral, written and reading practice; preparation for conversation; part of class preparation to be done in the language laboratory.
- 102. (JAPN 1412) **Beginning Japanese II.** (3-2). **Credit 4.** Continuation of JAPN 101; part of class preparation to be done in the language laboratory. Prerequisite: JAPN 101.
- 110. **Functional Japanese: History and Culture.** (3-0). **Credit 3.** Designed to complement beginning Japanese courses; emphasis on oral production and ability to function in a variety of real-life situations; includes survey of Japanese history. Prerequisite: Ability to read Hiragana and Katakana.
- 201. (JAPN 2311) **Intermediate Japanese I.** (4-0). **Credit 4.** Readings of average difficulty; review of grammar; practice in conversation and composition. Prerequisite: JAPN 102.
- 202. (JAPN 2312) **Intermediate Japanese II.** (4-0). **Credit 4.** Continuation of JAPN 201 with more advanced material. Prerequisite: JAPN 201.
- 289. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of Japanese studies. May be repeated for credit. Prerequisite: Approval of instructor.

301. **Upper Level Japanese I. (3-0). Credit 3.** Reading and listening practice using authentic and near-authentic materials; conversation practice in different levels of formality; composition and grammar; conducted in Japanese. Prerequisite: JAPN 202.
302. **Upper Level Japanese II. (3-0). Credit 3.** Continuation of JAPN 301 with more advanced material. Prerequisite: JAPN 301.
401. **Advanced Japanese I. (3-0). Credit 3.** Readings with selected grammar and kanji lessons; focus on Japanese traditional and popular culture, religion, and history; taught in Japanese. Prerequisite: JAPN 302 or equivalent.
402. **Advanced Japanese II. (3-0). Credit 3.** Readings with selected grammar and kanji lessons; focus on Japanese private and business life, education, politics, and contemporary culture; taught in Japanese. Prerequisite: JAPN 302 or equivalent.
489. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of Japanese studies. May be repeated for credit. Prerequisite: Approval of instructor.

Journalism Studies (JOUR)

Director of Journalism Studies R. S. Sumpster; Senior Lecturer E. L. Walraven

102. (COMM 1307) **American Mass Media. (3-0). Credit 3.** Introductory survey of mass communication media, their history and social role, to provide an understanding of the development and importance of mass communication media in modern society. Prerequisite: Freshman or sophomore classification, or approval of program director.
200. **Mass Media Information. (3-0). Credit 3.** Strategies and procedures in identifying, gathering, analyzing and organizing information for the mass media; sources and methods; evaluation and validation of evidence; legal and ethical considerations. Prerequisites: JOUR 102 with a grade of B or better, 80 percent on the GSP test or SAT or ACT equivalent, 2.5 GPR or higher, and freshman or sophomore classification; or approval of program director.
203. (COMM 2311) **Media Writing I. (2-3). Credit 3.** Basic journalistic techniques common to all media; integration of news gathering, writing and editing; ethics. Limited to minors in journalism, or with approval of program director. Prerequisites: JOUR 102 and 200, freshman or sophomore classification and enrollment in journalism minor; or approval of program director.*
301. **Mass Communication, Law and Society. (3-0). Credit 3.** Mass media as social institutions; social responsibility and ethics of the press; history, constitutional development, and law of the First Amendment. Prerequisites: JOUR 102 and 200, junior or senior classification and enrollment in journalism minor; or approval of program director. Cross-listed with COMM 307.*
303. **Media Writing II. (2-3). Credit 3.** Interpretative news gathering and writing for various media; basic communication law and ethics; assigned practice on campus or other publications. Prerequisites: JOUR 203, junior or senior classification and enrollment in journalism minor; or approval of program director.*
304. **Editing for the Mass Media. (2-2). Credit 3.** Principles and practice of editing including: improving and tightening print and broadcast copy; writing headlines, titles and subheads; photo editing and cutlines; graphics and layout. Prerequisites: JOUR 203, junior or senior classification and enrollment in journalism minor; or approval of program director.*
484. **Internship. Credit 1 to 3.** Directed internship in a private firm or public agency to provide on-the-job experience appropriate to the student's degree program and career objectives. To be taken on a satisfactory/unsatisfactory basis. Maximum of 3 credits may apply toward degree. Prerequisites: Enrollment in journalism minor or students completing journalism major, completion of most other journalism courses and approval of instructor.*
485. **Directed Studies. Credit 1 to 4 each semester.** Research problems related to communication field. Individual work, fitted to special needs of specific student as determined by his or her interests and aptitude. Prerequisites: Enrollment restricted to students completing the journalism minor and approval of the program director.*

489. **Special Topics in...** Credit 1 to 4. Selected topics in an identified area of journalism and mass communication. May be repeated for credit. Prerequisites: Enrollment restricted to students completing the journalism minor and approval of the program director.*
490. **Journalism as a Profession.** (3-0). Credit 3. Exit-level course for interdisciplinary minor in journalism; requires students to produce publication-quality projects under mentorship of Journalists-in-Residence and faculty; includes seminars in contemporary news media issues and practices. Prerequisites: Enrollment in journalism minor, completion of most other journalism courses; or approval of the program director.*

*Students must complete ENGL 104 with a grade of C or higher or equivalent credit before enrolling in JOUR 203 or any upper-division (300–400) journalism course.

Kinesiology

(faculty, see page 721)

(KINE)

One hour of KINE 198 Health and Fitness and 1 hour of KINE 199 activity classes are included in all curricula. The KINE 199 used to meet core curriculum requirements must be taken on a satisfactory/unsatisfactory grade basis except kinesiology majors. Additional KINE 199 courses may be taken for a grade or satisfactory/unsatisfactory except kinesiology majors. The purpose of these courses is to improve the student's level of fitness and/or pursuit of lifetime sport and to provide knowledge and skill development to meet present and future wellness objectives. KINE 198 Health and Fitness classes may not be repeated for credit.

The University Core Curriculum requirement for Visual and Performing Arts may be fulfilled by taking 3 hours of dance classes designated for Visual and Performing Arts. Sections of KINE 160-174 designated for Visual and Performing Arts credit may not be repeated and may not be used to fulfill the KINE 199 University Core Curriculum requirement.

121. **Physical and Motor Fitness Assessment.** (1-2). Credit 2. Assessment of individual physical fitness and motor ability profiles for students majoring in kinesiology. Prerequisite: Kinesiology major.
160. **Visual and Performing Arts—Ballet I.** (0-2). Credit 1. Fundamentals of ballet including historical background and cultural heritage; appreciation of ballet as an instrument of expression; opportunity to learn and perform proper body mechanics with correct alignment in relation to classical ballet.
161. **Visual and Performing Arts—Ballet II.** (0-2). Credit 1. Intermediate study of ballet; historical background and the knowledge and understanding of its cultural heritage; increased level of difficulty in barre, center and across the floor; concentration and continual refinement of body/spatial awareness, musicality, alignment and execution of correct classical technique; placement exam required on the second day of class. Prerequisite: Beginning ballet or approval of instructor.
162. **Visual and Performing Arts—Ballet III.** (0-2). Credit 1. Technical study of classical and contemporary ballet; elevated barre work, traditional components including turns, footwork, adagios, advanced center/floor phrases; study of Cecchetti, Vaganova, and collaborative methods; focus on strength, concentration and correct technique on performance combinations; placement exam required on the second day of class. Prerequisite: KINE 161 or DCED 161 or approval of instructor.
163. **Visual and Performing Arts—Beginning Ballroom Dance.** (0-2). Credit 1. Historical background, influences reflected by cultural attitudes and interests toward ballroom dance; knowledge of basic social dance etiquette; basic competencies in step patterns, rhythm and timing, body carriage, formation positions and leading and following techniques; identify movement skills and correct use of vocabulary.
164. **Visual and Performing Arts—Intermediate Ballroom Dance.** (0-2). Credit 1. Historical and cultural background, increased competencies in step patterns, rhythmical timing skills, body carriage formations, positions, and leading and following technique; identify and perform complex movement skills used in the Latin form of ballroom dance. Prerequisite: Beginning ballroom dance or approval of instructor.
165. **Visual and Performing Arts—Beginning Folk Dance.** (0-2). Credit 1. Folk dance expressed through appreciation of various countries' values, traditions and symbolic meanings; historical background and cultural influences relating to folk dancing; knowledge through reading, video observation and vocabulary.
166. **Visual and Performing Arts—Jazz Dance I.** (0-2). Credit 1. Fundamentals of jazz dance; historical background and cultural influences; basic steps and concepts used to develop skills necessary for jazz movement; encourage individual style and creativity towards development and performance of combinations.

167. **Visual and Performing Arts—Jazz Dance II. (0-2). Credit 1.** Intermediate study of jazz dance; review of historical background and cultural heritage; includes several jazz styles; proper body mechanics and alignment; placement exam required on the second day of class. Prerequisite: Beginning jazz dance or approval of instructor.
168. **Visual and Performing Arts—Jazz Dance III. (0-2). Credit 1.** Advanced study of jazz dance; reviews historical background and cultural heritage including significant jazz artists and their influence on jazz dance and society; increased development of coordination, endurance and flexibility necessary to performing extensive jazz combinations; placement exam required on the second day of class. Prerequisite: KINE 167 or approval of instructor.
169. **Visual and Performing Arts—Tap Dance I. (0-2). Credit 1.** Beginning study of tap dance; historical background of tap dance including origins and influences that shape its cultural heritage; opportunity to learn and perform basic concepts of tap dance.
170. **Visual and Performing Arts—Tap Dance II. (0-2). Credit 1.** Intermediate level of tap dance; reviews the historical background, origins and influences of tap dance; review and continued study of basic concepts of tap; opportunity to create, learn, perform and identify more complex rhythmical steps; placement exam required on the second day of class. Prerequisite: Beginning tap dance or approval of instructor.
171. **Visual and Performing Arts—Modern Dance I. (0-2). Credit 1.** Beginning technical study of modern dance; historical background in regards to the pioneers of modern dance and the development of modern dance within society; modern dance concepts including: contraction/release, fall/recovery, use of breath and body weight, lateral curve, locomotor/axial movement phrases, spatial awareness.
172. **Visual and Performing Arts—Modern Dance II. (0-2). Credit 1.** Intermediate study of modern dance; reviews historical background and its development within society; continual study and understanding of modern dance concepts; fall/recovery, contract/release, use of breath and weight, spine work, inversion, and spatial awareness; placement exam required on the second day of class. Prerequisite: Beginning modern dance or approval of instructor.
173. **Visual and Performing Arts—Modern Dance III. (0-2). Credit 1.** Physical and artistic exploration of both traditional and contemporary training methods; understand and utilize three dimensional spine work, inversion, floor work and dynamics; placement exam required the second day of class. Prerequisite: KINE 172 or DCED 172 or approval of instructor.
174. **Visual and Performing Arts—Laban Movement Analysis. (0-2). Credit 1.** Studies the abilities of the body in relation to movement time space effort and force; explores a wide range of movement elements and concepts, such as body shape, body actions, symmetry, bound flow, locomotor movement, types of axis and single/multi unit movement.
175. **Gender Neutral Partnering. (0-2). Credit 1.** Explores the fundamental principles of partnering; explores the properties of momentum, weight sharing, contact improvisation, breath, timing and trust; develops movement phrases on the principles of impromptu and partnering. Prerequisite: KINE 172 or DCED 172 or approval of instructor.
198. **Health and Fitness Activity. (0-2). Credit 1.** Half lecture; half activity; student choice of designated fitness or strength related activities; lecture portion covers current health topics.
199. **(PHED 1151, 1152, 2155, 2255, any PHED activity course) Required Physical Activity. (0-2). Credit 1.** Selection from a wide variety of activities designed to increase fitness and/or encourage the pursuit of lifetime activity.
213. **(PHED 1301) Foundations of Kinesiology. (3-0). Credit 3.** History, principles, objectives, current concepts of kinesiology.
214. **Health and Physical Activity for Children. (3-0). Credit 3.** Coordinated school health and physical activity programs appropriate for elementary aged children; focus on the content of the curriculum and the philosophical underpinnings of programming related to health and physical activity. Prerequisite: KINE 198. Cross-listed with HLTH 214.
215. **Fundamentals of Coaching. (1-0). Credit 1.** Study modern theories and applications related to coaching; philosophies, styles, techniques, team organization, liability and administration. Prerequisite: Kinesiology majors and coaching minors only.
230. **Outdoor Adventure Programs. (2-2). Credit 3.** Development of knowledge and skills necessary for implementing school and youth programs in outdoor adventure activities such as canoeing, backpacking, rappelling, map and compass/orienteering and camping.

240. **Computer Technology in Health and Kinesiology. (2-2). Credit 3.** Application of current technology in the areas of health and kinesiology; fundamentals of computers and their use; application of commercial software to health and kinesiology settings; use of computer networks for communications and research. Prerequisite: Freshman or sophomore classification in health or kinesiology. Cross-listed with HLTH 240.
285. **Directed Studies. Credit 1 to 4.** Work on a specified topic with the intent of promoting independent reading, research and study; supplement existing course offerings or subjects not presently covered. Prerequisites: Freshman or sophomore classification; approval of instructor.
289. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of kinesiology. May be repeated for credit.
291. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in kinesiology. May be repeated 4 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
300. **Field Experiences in Outdoor Education. Credit 1 to 3 each semester.** Field-based learning experience designed as leadership training in various outdoor adventure activities such as backpacking, canoeing and rock climbing. May be repeated for credit. Prerequisite: KINE 230 or approval of instructor.
302. **Applied Exercise Physiology for Coaches. (1-0). Credit 1.** Survey of the physiology of exercise with an emphasis on topics in applied physiology that coaches should understand in working with student athletes of both genders and different ages. Prerequisites: KINE 306; junior or senior classification or approval of instructor.
304. **Psychology of Sport and Physical Activity. (3-0). Credit 3.** The relationship of psychology to sport; topics include history, application of learning principles, social psychology, personality variables, psychological assessment, youth sport, women in sport, the psychology of coaching, sports law and ethics. Prerequisite: Junior classification. Cross-listed with PSYC 304.
306. **Functional Anatomy for Coaches. (0-2). Credit 1.** Introduction to musculoskeletal anatomy and movement analysis and the applications of these topics to basic sport skills. Prerequisite: Junior or senior classification or approval of instructor.
307. **Lifespan Motor Development. (3-0). Credit 3.** Developmental characteristics and contemporary issues associated with motor behavior across the lifespan. Prerequisite: Junior or senior classification or approval of instructor.
308. **Integrated Adventure Education. (2-3). Credit 3.** Philosophy of outdoor education in a physical education program; designing and implementing outdoor adventure activities in an experiential and interdisciplinary manner for reinforcing the Texas Essential Knowledge and Skills. Prerequisites: Junior or senior classification or instructor approval.
310. **Pool and Waterfront Management. (3-0). Credit 3.** Sanitary codes and pool sanitation; safety; problems of pool and waterfront management; selection of personnel.
311. **Fundamental Rhythms and Dance. (2-3). Credit 3.** Theory and practice in fundamental rhythms and dance as appropriate for elementary and secondary school curricula. Prerequisite: Approval of instructor.
312. **Coaching of Baseball. (1-2). Credit 2.** Theory and practice of coaching fundamentals in baseball. Prerequisite: KINE 215.
314. **Coaching of Soccer. (1-2). Credit 2.** Study of modern theories and applications related to coaching soccer. Prerequisites: KINE 215 and KINE 199–Soccer or approval of instructor.
317. **Coaching of Football. (1-2). Credit 2.** Theory and practice of coaching fundamentals in football. Prerequisite: KINE 215.
318. **Athletic Injuries. (3-0). Credit 3.** Introduction to the profession of athletic training; comprehensive analysis of the theories and practices in preventing, recognizing and treating common athletic injuries. Prerequisites: HLTH 216; BIOL 319; BIOL 320; junior or senior classification.
319. **Sociology of Sport. (3-0). Credit 3.** Social institution of sport and its consequences for American society; social organization from play to professional sport; violence, discrimination, women in sport; socialization implications from participation in sports. Prerequisite: Junior or senior classification. Cross-listed with SOCI 319.
320. **Advanced Athletic Injuries. (3-0). Credit 3.** Principles and procedures of therapeutic modalities, therapeutic exercise and rehabilitation as they relate to physical education, athletic training and physical therapy. Prerequisites: KINE 318 and approval of instructor.
321. **Coaching of Volleyball. (1-2). Credit 2.** Coaching fundamentals in volleyball. Prerequisites: KINE 215 and KINE 199–Volleyball or approval of instructor.

326. **Outdoor Education.** (3-0). **Credit 3.** Procedures and techniques for extending the classroom to the outdoors; resources, activities and strategies for using the outdoors as an educational tool. Prerequisite: KINE 230.
351. **Coaching of Basketball.** (1-2). **Credit 2.** Theory of fundamental skills needed to coach basketball with emphasis on knowledge of rules, strategies and skill analysis. Prerequisites: KINE 215 and KINE 199–Basketball or approval of instructor.
355. **Coaching of Track.** (1-2). **Credit 2.** Theory and practice of coaching fundamentals in track and field events. Prerequisite: KINE 215.
406. **Motor Learning and Skill Performance.** (3-0). **Credit 3.** Learning in psychomotor domain; motor learning theories, physiological bases of skill behavior, motor and skill learning, state of performer and application of instructional techniques in motor learning and skill performance. Prerequisites: Junior or senior classification; admission to professional phase of program or approval of instructor for non-kinesiology majors.
408. **Theory and Practice of Adventure Education.** (3-0). **Credit 3.** Foundational theories of adventure education; research and current practice in the application of the theories and their related skills. Prerequisites: KINE 230 and 326; junior or senior classification.
409. **Logistics and Strategies for Backcountry Expeditions.** (3-0). **Credit 3.** Organization and planning strategies for potential wilderness leaders seeking to lead groups on extended trips into the backcountry; logistical requirements for maximum safety, expedition effectiveness and minimum impact on the environment; developing sound judgment and positive expedition behavior practices. Prerequisites: KINE 230 and 326 or approval of instructor.
425. **Tests and Measurements.** (3-0). **Credit 3.** Comprehensive examination of the conceptual and theoretical aspects of measurement and evaluation in the field of kinesiology; emphasis on the application of statistical techniques germane to measurement and evaluation. Prerequisites: Junior or senior classification; admission to professional phase of program or approval of instructor for non-kinesiology majors.
426. **Exercise Biomechanics.** (3-3). **Credit 4.** An integrated, mechanistic study of biomechanics of human motion during physical activity and exercise; biology and mechanical properties of the human movement system including bones, tendons, ligaments, cartilage, skeletal muscles, joints and whole body systems investigated. Prerequisites: PHYS 201; junior or senior classification; admission to the professional phase of program or approval of instructor for non-kinesiology majors.
427. **Therapeutic Principles.** (3-0). **Credit 3.** Examination of human tissue types, characteristics, and physiology pertaining to injury, pain transmission, and the healing process; study of common therapeutic modalities such as ultrasound and electricity with emphasis on physiological mechanisms of effect. Prerequisites: Junior or senior classification; admission to the professional phase of program or approval of instructor for non-kinesiology majors.
429. **Adapted Physical Activity.** (2-2). **Credit 3.** Kinesiology for individuals with handicapping conditions; emphasis on cognitive recognition of such handicaps as postural deviations, emotional disturbances, convulsive disorders, vision and auditory problems, and other learning disability conditions. Prerequisite: Admission to professional phase of program or approval of instructor for non-kinesiology majors.
430. **Data Acquisition and Management in Health and Kinesiology.** (2-2). **Credit 3.** Advanced application of current technology in the areas of health and kinesiology to include data management and presentation; integration of software and creation of educational and promotional material in the areas of health and kinesiology. Prerequisites: Junior or senior classification in health or kinesiology or approval of instructor. Cross-listed with HLTH 430.
431. **Ropes Course and Group Process.** (2-2). **Credit 3.** Techniques of group facilitation for initiatives of ropes/challenge course events; activity presentation and sequencing, safety techniques and construction principles, and processing experiences for transfer of learning. Prerequisite: KINE 230; 326 or KINE 199 (Venture Dynamics).
433. **Physiology of Exercise.** (3-0). **Credit 3.** Physiological bases of exercise and physical conditioning; measurement of metabolic efficiency during exercise, neuromuscular efficiency and body composition. Prerequisites: Junior or senior classification; admission to the professional phase of program or approval of instructor for non-kinesiology majors.

434. **Advanced Exercise Physiology. (3-0). Credit 3.** Investigates mechanisms responsible for skeletal muscle power production during exercise and the energetic support for the muscles through intermediary metabolism and oxygen flux from the lungs to the muscle mitochondria; examines the effects of training on these processes. Prerequisites: KINE 433; junior or senior classification.
439. **Exercise Evaluation and Prescription. (3-3). Credit 4.** Theory and techniques for evaluation of human performance and cardiovascular disease risk factors in healthy and diseased populations; exercise prescription for disease prevention and rehabilitation. Prerequisites: KINE 433; senior classification; admission to the professional phase of program or approval of instructor for non-kinesiology majors.
482. **Seminar. (1-0). Credit 1.** Acquaint students with current research and the research process in their chosen field of study (kinesiology). May be taken 4 times for credit. Prerequisites: Admission to professional phase of program or approval of instructor; junior or senior classification.
483. **Practicum in Kinesiology. Credit 3.** Participation and study in the areas of fitness assessment, exercise and/or sport programming, and fitness/sport administration; acquisition and practice of professional and/or clinical skills in kinesiology. Prerequisites: Senior classification; admission to the professional phase; approval of instructor.
484. **Internship in Kinesiology. Credit 1 to 12.** Supervised internship with corporate fitness centers, rehabilitation centers, hospitals, recreation centers and similar agencies and organizations. Prerequisites: KINE 483; completion of all course work.
485. **Directed Studies. Credit 1 to 4.** Special problems in kinesiology assigned to individual students or to groups. Prerequisites: Junior or senior classification; approval of instructor.
489. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of kinesiology. May be repeated for credit.
491. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in kinesiology. May be repeated 4 times for credit. Prerequisites: Junior or senior classification and approval of instructor.

Kinesiology Field Based

(faculty, see page 721)

(KNFB)

315. **Elementary School Physical Activities. (2-2). Credit 3.** Physical activities, materials and curriculum in elementary schools. Prerequisite: Junior or senior classification.
322. **Teaching and Schooling in Modern Society. (2-3). Credit 3.** Developing an understanding of students in multiple settings and levels; development, structure, history, finance, and management of schools in a democratic society; philosophical, ethical and moral dimensions of teaching; professional role of teacher. Prerequisite: Majors only.
323. **Introduction to Secondary School Teaching. (2-2). Credit 3.** Introduce fundamental teaching skills and theories necessary for preparing reflective teachers; examine classroom management, learning strategies and assessment techniques; classroom lectures combined with field-based experiences to link theory into practice. Prerequisites: KNFB 322; admission to professional phase of program; junior or senior classification.
416. **Middle and Secondary School Physical Activities. (2-2). Credit 3.** Physical activities, teaching strategies, media techniques and curriculum in middle and secondary schools. Prerequisites: Admission to professional phase of program; approved acceptance to field experience.
450. **Supervised Student Teaching. (0-30). Credit 6. I, II** Observation and participation in an accredited public school classroom; techniques of teaching student's teaching fields, and appropriate instructional strategies for assigned student population. Prerequisites: Admission to professional phase of program and to student teaching.

Department of Landscape Architecture and Urban Planning

Professors E. M. Bright, M. K. Lindell, F. O. Ndubisi (Head), W. G. Peacock, J. E. Rodiek, G. O. Rogers, A. D. Seidel, M. A. Sharkawy, R. S. Ulrich, J. W. Varni; **Associate Professors** S. Bame, S. D. Brody, C. S. Huang, M. D. Murphy, J. R. Naderi, M. C. Neuman, D. A. Sweeney, N. J. Volkman, T. M. Woodfin; **Assistant Professors** B. Dvorak, E. Dumbaugh, C. Giusti, C. Lee, M. Li, J. Saginor, S. S. Van Zandt; **Senior Lecturer** C. Prater, D. Wunneburger; **Lecturer** J. Martin

Land Development (LDEV)

467. **Land Development.** (3-0). **Credit 3.** Financially feasible, environmentally sustainable, project design/construction/finance processes; resolution of site and environmental issues with market and financial considerations; design concepts for value enhancement of land, residential, commercial and retail development. Prerequisite: Junior or senior classification or approval of instructor.
485. **Directed Studies.** **Credit 1 to 6.** Individual instruction in selected aspects of land development not adequately covered by other courses with stress on reports and readings in selected areas of land development. Prerequisite: Junior classification or approval of instructor.
489. **Special Topics in...** **Credit 1 to 6.** Selected topics in an identified area of land and real estate development. May be repeated for credit. Prerequisite: Junior classification or approval of instructor.

Landscape Architecture (faculty, see above) LAND)

200. **Introduction to Landscape Architectural Practice.** (1-0). **Credit 1.** I Explores and evaluates the diversity of landscape architectural practice; defines the traditional practice forms and examines evolving and boundary expanding opportunities for future practice; introduces the departmental curriculum and faculty.*
240. **History of Landscape Architecture.** (3-0). **Credit 3.** I An introduction to the history of land use and design from prehistory to the present in areas other than the United States; emphasis on European and Asian planning and design precedent. Africa and Australia are also discussed. Prerequisite: Sophomore classification or higher.*
254. **Landscape Architecture Communications I.** (2-4). **Credit 3.** Introduction to basic drafting and drawing required for landscape architecture projects, introduction to basic concepts, principles of graphic composition and pencil sketching techniques. Prerequisite: ENDS 115 or approval of instructor.
255. **Landscape Architectural Communications II.** (2-4). **Credit 3.** I Advanced study in traditional and computer-based communication techniques in landscape architecture including studio explorations in concept and analysis graphics, color sketching, perspective drawing and rendering, desktop publishing, image capturing and manipulation, and compilation of graphic presentations; lecture, demonstrations and studio assignments. Prerequisite: LAND 254 or approval of instructor.*
291. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in landscape architecture. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
310. **Landscape Theory.** (3-0). **Credit 3.** Relevant theoretical discourse in landscape architecture and urban planning; urban theory, social and cultural theory; environmental philosophy and environmental aesthetics. Prerequisite: Junior classification or approval of instructor.
318. **Landscape Design I.** (2-7). **Credit 4.** I Beginning studio course in land design; forces that produce usable three-dimensional site-space relationships; problems presented to give a basic knowledge of the scope of landscape architecture. Prerequisites: LAND 255; junior classification.*

319. **Landscape Design II.** (2-7). **Credit 4. II** Continuation of LAND 318; basic design principles that combine natural systems (such as landform, water, vegetation, wildlife habitat, soils, climate) and man-built systems (such as roads, buildings, utilities). Prerequisites: LAND 318 and 329; junior classification.*
320. **Landscape Design III.** (2-9). **Credit 5. I** Design process, synthesis and design refinement; problems to stimulate highly creative self-motivated results. Prerequisites: LAND 319 and 330.*
321. **Landscape Design IV.** (2-9). **Credit 5. II** Continuation of LAND 320; land design projects of increased complexity with site scale problems used to demonstrate complete design thought. One or more field trips may be required as part of the course. Prerequisite: LAND 320.*
329. **Landscape Construction I.** (2-4). **Credit 3. II** Aspects of land manipulation and consideration of earth bound elements in landscape development; contours, landform, grading design, drainage principles, cut and fill computations, basic hydraulics, drafting. Prerequisite: Junior or senior classification.*
330. **Landscape Construction II.** (2-4). **Credit 3. I** Various construction elements typically found in landscape development; statics and mechanics of simple structures; wood, masonry, concrete construction procedures and techniques; drafting, lettering and clarity of details. Portfolio required. Prerequisites: LAND 318 and 329.*
331. **Landscape Construction III.** (2-4). **Credit 3. II** Construction document preparation, working drawings, project layout and design; theory and principles of irrigation and lighting design. Field trips and portfolio required. Prerequisites: LAND 320 and 330.*
340. **Development of Landscape Architecture in North America.** (3-0). **Credit 3.** The interaction between people and the land in North America from pre-European settlement to the present; trends and settlement patterns, resource exploitation, relationships of cultural, social, technological and political factors to land use, and on the growth and current roles of the profession of landscape architecture. Prerequisite: Sophomore classification.*
420. **Landscape Design V.** (3-9). **Credit 6. I** Advanced site scale problems to include major design project supported with complete programming, design and project management components. Prerequisites: LAND 321 and 331.*
421. **Landscape Design VI.** (2-9). **Credit 5. II** Advanced study and research designed to take the student beyond the core design experience; introduction of issues, methodologies, tools and techniques developing in professional practice. Prerequisite: LAND 420.*
442. **Professional Practice.** (3-0). **Credit 3.** Introduction to the procedures, project management and ethical framework in which professional landscape architectural practice occurs including proposal preparation, fee structures, forms of practice, project management and construction documents. Prerequisites: LAND 420; senior classification; approval of instructor.*
461. **Geographic Information System Application in Resource Management.** (2-4). **Credit 3.** Process of and planning for change in the urban environment and its infrastructure; Geographic Information System (GIS) tools introduced and used to support this work; GIS theory and resource management modeling. Prerequisites: Junior classification and approval of instructor.*
485. **Directed Studies.** **Credit 1 to 6. I, II, S** Special problems in various phases of landscape architecture assigned to individual students or to groups. Consultation and assigned collateral reading. Prerequisite: Approval of department head.*
489. **Special Topics in...** **Credit 1 to 4. I, II, S** Selected topics in an identified field of landscape architecture. May be repeated for credit.*
491. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in landscape architecture. May be repeated 2 times for credit. Prerequisites: Junior or senior classification and approval of instructor.

*Field trips may be required for which departmental fees may be assessed.

College of Liberal Arts (LBAR)

181. **Freshman Honors Seminar in the Liberal Arts. (1-0). Credit 1.** Freshman seminar on interdisciplinary topics of interest in the humanities and social sciences with an introduction to honors study in the liberal arts. Must be taken on a satisfactory/unsatisfactory basis. Restricted to students in the College of Liberal Arts and the General Studies Program. Prerequisite: Freshman or sophomore classification.
201. **Career Planning in Liberal Arts. (1-0). Credit 1.** Survey of professional options, methods, strategies and skills involved in career planning; explores social, cultural, economic, family and personal dimensions of various career paths; addresses goal setting and decision-making. Course must be taken on a satisfactory/unsatisfactory basis. Prerequisite: Must be a liberal arts student.
203. **Foundations of the Liberal Arts: Humanities. (3-0). Credit 3.** The intellectual roots and characteristic values and methods of liberal arts studies with emphasis on humanities disciplines. Offered as an honors course only. Restricted to students in the College of Liberal Arts and the General Studies Program. Prerequisite: Approval of the dean of liberal arts.
204. **Foundations of the Liberal Arts: Social Sciences. (3-0). Credit 3.** The intellectual roots and characteristic values and methods of liberal arts studies with emphasis on social science disciplines. Offered as an honors course only. Restricted to students in the College of Liberal Arts and the General Studies Program. Prerequisite: Approval of the dean of liberal arts.
285. **Directed Studies. Credit 1 to 3.** Readings for specific needs of major or minor in departments in Liberal Arts.
289. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of liberal arts. May be repeated for credit. Prerequisite: Freshman or sophomore classification in liberal arts or approval of instructor.
291. **Research. Credit 1 to 3.** Research conducted under the direction of a faculty member in Liberal Arts. Prerequisites: 3 hours of 200-level courses in any department in the College of Liberal Arts; freshman or sophomore classification and approval of instructor.
300. **Liberal Arts Study Abroad. Credit 1 to 18.** For students in approved programs abroad. May be repeated for credit. Prerequisites: Admission to approved program; approval of study abroad coordinator and academic dean.
330. **Introduction to International Study. Credit 1 to 3.** Readings and research preparatory to participation in a summer or semester at an international site. Prerequisite: Approval of the dean of liberal arts.
331. **Studies in European Civilization and Culture I. Credit 1 to 6.** European civilization and culture as seen especially through literature, history, philosophy and the arts. To be taught only at an overseas site. Prerequisite: LBAR 330 or approval of instructor.
332. **Studies in European Civilization and Culture II. Credit 1 to 6.** European civilization and culture as seen especially through political, social and economic developments. To be taught only at an overseas site. Prerequisite: LBAR 330 or approval of instructor.
333. **Studies in Italian Civilization and Culture I. Credit 1 to 6.** Italian civilization and culture as seen especially through literature, history, philosophy and the arts. To be taught only at an overseas site. Prerequisite: LBAR 330 or approval of instructor.
381. **Junior Seminar: Interdisciplinary Honors Seminar. (3-0). Credit 3.** Interdisciplinary studies in the humanities and the social sciences. Fulfills the junior seminar requirement of the Liberal Arts Honors Plan. May be repeated for credit. Restricted to students in the College of Liberal Arts and the General Studies Program. Prerequisite: Approval of the dean of liberal arts.
392. **Cooperative Education: Liberal Arts. (1-0). Credit 1.** Educational work assignment for a student in a career-related field; supervision by the employer, co-op coordinator and course instructor; technical report approved by the course instructor required. To be taken on a satisfactory/unsatisfactory basis. Prerequisite: Approval of college co-op coordinator.
484. **Internship. Credit 1 to 12.** Directed internship in a private firm, government or non-profit agency; provides experiential learning appropriate to the student's major and career objectives. Must be taken on a satisfactory/unsatisfactory basis. May be repeated for credit. Prerequisites: Junior or senior classification and approval of major advisor.

485. **Directed Studies. Credit 1 to 3.** Readings for specific needs of major or minor in departments in Liberal Arts.
489. **Special Topics in...** Credit 1 to 4. Selected topics in an identified area of liberal arts. May be repeated for credit.
491. **Research. Credit 1 to 3.** Research conducted under the direction of a faculty member in Liberal Arts. May be repeated 2 times for credit. Prerequisites: 12 credits in courses in departments in the College of Liberal Arts, including 3 at 300-level; junior or senior classification and approval of instructor.

Linguistics

(faculty, see page 688)

(LING)

209. **Introduction to Linguistics. (3-0). Credit 3.** Nature of human language and of linguistics; includes an introduction to phonology, syntax, semantics and morphology and the role of spoken and written discourse in sustaining societal arrangements. Cross-listed with ENGL 209. Credit cannot be given for both LING 209 and ENGL 209.
224. **Structure of Present-Day English. (3-0). Credit 3.** Descriptive survey of the major elements of grammar of modern English, including word and clause types and their combinatory potential for creating sentences and longer text types; of special interest to both native and nonnative speakers and teachers of English. Cross-listed with ENGL 224. Credit cannot be given for both ENGL 224 and LING 224.
291. **Research. Credit 1 to 3.** Research conducted under the direction of faculty member in linguistics. Prerequisites: LING 209; freshman or sophomore classification and approval of instructor.
307. **Language and Culture. (3-0). Credit 3.** Language and its correlations with other aspects of culture; nature and definition of language; non-technical overview of linguistic science and language as it is related to other behavior. Prerequisite: LING 209.
310. **History of the English Language. (3-0). Credit 3.** Phonological, grammatical and lexical history of the English language; brief discussion of some other Indo-European languages; principles of linguistic change, as reflected in English. Prerequisite: LING 209. Cross-listed with ENGL 310. Credit cannot be given for both ENGL 310 and LING 310.
311. **Sound Structure of Language. (3-0). Credit 3.** Introduction to the sounds and writing systems of language, focusing on human articulation and the systematic nature of speech sounds and their written representation; intensive practice in phonetic transcription of English and other languages. Prerequisite: LING 209. Cross-listed with ENGL 311. Credit cannot be given for both ENGL 311 and LING 311.
402. **Language and Society. (3-0). Credit 3.** Focus on the intersection of language and society, particularly language in use or in context through samplings from the field of sociolinguistics; topics including pidgin and creole languages, style-shifting, code-switching, and the effects of age, class, region, ethnicity and gender on language. Prerequisite: LING 209.
425. **Introduction to Applied Linguistics. (3-0). Credit 3.** Applied linguistics, with particular reference to acquisition of English and other languages later than in infancy, research on second language acquisition and the relationship between language acquisition research and language teaching methodology. Prerequisites: LING 209; junior or senior classification.
481. **Senior Seminar. (3-0). Credit 3.** Seminar on significant figures, movements and issues in linguistics or rhetoric, with special attention to the methods and materials of scholarship. Prerequisites: Junior or senior classification; 6 credits in linguistics.
485. **Directed Studies. Credit 1 to 3.** Directed individual study of topics in linguistics. May be repeated for credit.
489. **Special Topics in...** Credit 1 to 4. Selected topics in an identified area of linguistics. May be repeated for credit.
491. **Research. Credit 1 to 3.** Research conducted under the direction of faculty member in linguistics. May be repeated 2 times for credit. Prerequisites: 6 credits of linguistics; junior or senior classification and approval of instructor.

Department of Management

Professors M. R. Barrick (Head), L. Bierman, L. A. Eden, R. W. Griffin, M. A. Hitt, R. D. Ireland, G. R. Jones, R. L. Paetzold, M. W. Pustay, R. W. Woodman, A. Zardkoohi; **Associate Professors** W. R. Boswell, S. T. Certo, B. L. Kirkman, C. O. Porter, L. Tihanyi, M. J. Wesson; **Assistant Professors** M. A. Belliveau, J. E. Coombs, B. A. Gilbert, K. T. Haynes, H. A. Ndofo, A. J. Shipp, D. G. Sirmon, E. E. Umphress, R. D. Zimmerman; **Clinical Professor** B. D. Welch; **Clinical Associate Professors** V. L. Buenger, R. H. Lester; **Clinical Assistant Professors** D. Panina, K. D. Swim, Jr.; **Executive Professor** J. L. Wilkerson; **Senior Lecturers** S. A. Carr, O. E. Elmore, Jr., C. E. Hailey, ; **Lecturers** J. Baxter, R. E. Brown, D. H. Lewis, L. S. Wesson

Management (MGMT)

105. (BUSI 1301) **Introduction to Business.** (3-0). **Credit 3. I, II** Survey of economic systems, forms of business ownership and running the small business; organizing and managing businesses; managing human resources; managing production and information; managing marketing, introducing financial issues including accounting, money and banking, securities markets; business issues and challenges including legal and regulatory environment, business ethics and international business. Limited to students in freshman or sophomore classification.
209. **Business, Government and Society.** (3-0). **Credit 3. I, II, S** Impact of the external environment—legal, political, economic and international—on business behavior; market and non-market solutions to contemporary public policies confronting business persons examined including antitrust law, employment and discrimination law, product safety regulation, consumer protection and ethics. May not be used to satisfy degree requirements for majors in business. Prerequisites: Sophomore classification; for students other than business and agribusiness majors.
211. (BUSI 2302) **Legal and Social Environment of Business.** (3-0). **Credit 3. I, II, S** Role of government in business and society; analysis of social policy and legal institutions; ethical problems in management decisions; administrative law; antitrust law; employment and discrimination law; regulation of business transactions; protection of property rights; regulation of information in markets including securities and product safety; international business law. Prerequisite: Sophomore classification.
212. (BUSI 2301) **Business Law.** (3-0). **Credit 3. I, II, S** Legal principles of business; legal reasoning; dispute resolution and procedure; contract law; bankruptcy law; property law; Uniform Commercial Codes sections concerning contracts, security interests, negotiable instruments and sales. Prerequisite: Sophomore classification.
309. **Survey of Management.** (3-0). **Credit 3. I, II, S** Survey for non-business majors of the basic functions and responsibilities of managers; includes the environmental context of management, planning and decision making, organization structure and design, leading and managing people, and the controlling process; issues of globalization, ethics, quality and diversity integrated throughout the course. May not be used to satisfy degree requirements for majors in business. Prerequisites: Junior classification; for students other than business and agribusiness majors.
363. **The Management Process.** (3-0). **Credit 3. I, II, S** Management as an academic discipline; goal setting; planning, controlling and decision-making; models for thinking about organizations; organization change; models for understanding individual behavior; job performance and job satisfaction; interpersonal behavior, motivation and leadership, behavior in work groups; careers in management, ethics and international management. Prerequisite: Admission to upper division in Mays Business School.
372. **Managing Organizational Behavior.** (3-0). **Credit 3. I, II, S** Provides the tools for understanding the organizational actions of individuals, groups and organizations; relates theory and research to organizational problems by reviewing advanced concepts in motivation and perception, decision-making, communication and influence, group behavior, conflict and cooperation, social networks, politics, corporate culture, organizational structure and environmental influences. Prerequisite: MGMT 363.
373. **Managing Human Resources.** (3-0). **Credit 3. I, II, S** Strategic issues in managing human resources; shared responsibilities of line managers and human resource staff for developing and implementing human resource policies and procedures; human resource planning; job design, analysis and evaluation; staffing; compensation; performance appraisal; training and development; career management; labor relations; legal, ethical and international issues. Prerequisite: MGMT 363.

424. **Organizational Design, Change and Development.** (3-0). **Credit 3. I, II** Aspects of effectively planning for and introducing changes in organizational structures and procedures based on environmental demands; examination of the successful management of organizational and behavioral changes, focusing on planned and unplanned changes, and emphasizing development of change strategies and measurement of change effectiveness. Prerequisites: MGMT 363.
425. **Human Resource Selection.** (3-0). **Credit 3.** Theory and application of methods for the recruitment and selection of managerial, non-professional and professional employees; exposure to scientific issues such as reliability and validity, legal issues such as equal opportunity and affirmative action, and selection techniques such as interviews and testing. Prerequisite: MGMT 373.
427. **Human Resource Compensation.** (3-0). **Credit 3.** Theories and techniques of designing and managing programs of direct compensation and benefits, including the role of rewards in motivation, job evaluation, pay discrimination and comparable worth, internal and external equity comparisons and benefit plans. Prerequisite: MGMT 373.
429. **Labor and Industry.** (3-0). **Credit 3.** Brief review of the history of organized labor; critical study of labor-management relations; analysis of fundamentals of labor contracts and administration of contract parts. Prerequisite: Admission to upper division in Mays Business School.
430. **Employment Discrimination Law.** (3-0). **Credit 3.** Legal issues surrounding employment discrimination, including disparate treatment and impact; intent; affirmative action; sexual harassment; pregnancy, sex, race, religious, salary, disability, age, and ethnic discrimination; policy issues and perspectives to aid human resource specialists and managers. Prerequisite: Admission to upper division in Mays Business School and senior classification. Cross-listed with WMST 430.
435. **Labor Law and Policy.** (3-0). **Credit 3.** Federal and state public policy and laws regulating human resource management including National Labor Relations Act, Railway Labor Act, Fair Labor Standards Act, employment discrimination statutes, statutes regarding public sector unionization, and other relevant legal authorities; various forms of dispute settlement including litigation, mediation, fact finding and arbitration; legal ramifications of strategic human resource management decision making. Prerequisite: Admission to upper division in Mays Business School and senior classification.
439. **Negotiations.** (3-0). **Credit 3.** Overview of the various theories and processes of negotiation relevant to the broad spectrum of negotiation problems faced by employees and managers, and in situations outside of organizations; discovery of optimal solutions to problems and means to implement solutions through classroom simulations, role playing and case studies. Prerequisite: MGMT 363.
440. **Creativity and Innovation in Business.** (3-0). **Credit 3.** Examines factors that may foster or stifle individual, team, organizational creative performance; presents techniques that may improve the student's creative thinking skills. Prerequisite: MGMT 363.
450. **International Environment of Business.** (3-0). **Credit 3. I, II** Broad survey of international business issues; analyzes the environment in which international businesses operate; examines international economic issues including trade theory, investment theory, foreign exchange and capital markets, and balance of payments; introduces multinational enterprises, global competition, international organizations, treaties and international law, national trade policies and the determinants of competitiveness of firms in international markets. Prerequisites: Admission to upper division in Mays Business School. Cross-listed with IBUS 450.
452. **International Management.** (3-0). **Credit 3.** An overview of international management to include international dimensions of organizational behavior, theory, strategy and human resource management; application of theoretical ideas to real-world situations through case analyses, presentations, projects and interactive class discussion. Prerequisite: MGMT 450 or co-enrollment in MGMT 450 and 452. Cross-listed with IBUS 452.
457. **Global Entrepreneurship.** (3-0). **Credit 3.** Practical issues associated with taking small- and medium-size business global; includes importing and exporting, developing global strategies, evaluating market opportunities, regional impact on economies and people. Prerequisite: Admission to upper division in Mays Business School. Cross-listed with IBUS 457.
459. **Telecommunications Management.** (3-0). **Credit 3.** A survey of the methods and techniques of managing organizations involved in the development, production, distribution and exhibition of information and entertainment to the public via electronic means; integrates descriptions of core delivery technologies, including broadcast, cable, telephony and Internet with underlying business concepts to provide a comprehensive picture of the global telecommunications industry. Prerequisite: MGMT 363.

460. **Managing Projects.** (3-0). **Credit 3. I, II** Application of management processes to complex interdisciplinary organizational environments through the study of program and project management; adoptions of traditional management theories to the project environment; master typical project management microcomputer software for project planning; resource allocation; project budgeting; and control of project cost, schedule and performance. Prerequisite: MGMT 363.
461. **Entrepreneurship and New Ventures.** (3-0). **Credit 3. I, II** The entrepreneurial process from conception of a business idea to the actual start up of the venture; environmental scanning for new opportunities; matching individual skills and attributes with the requirements of the venture; evaluating the viability, growth potential and markets for the venture; securing financing; beginning operations. Prerequisite: Admission to upper division in Mays Business School and senior classification.
464. **The Political Environment of Business.** (3-0). **Credit 3. I, II** Role of business in contemporary society; the large corporation and its external environment; ownership and control controversy; private and collective choice processes; role of regulation; social issues including pollution, discrimination, consumer protection, corporate social and ethical responsibilities, corporate political activity; international business relations. Prerequisites: MGMT 363 and senior classification.
466. **Strategic Management.** (3-0). **Credit 3. I, II, S** Strategic issues facing organizations, including top management decision making and social responsibility; environmental and industry analysis; establishing organizational mission and objectives; corporate, business and functional level strategy formulation; global and multidomestic strategies; strategic implementation and control; integrating operations, finance, marketing and human resource strategies; case analysis. Prerequisites: MGMT 363; FINC 341; INFO 364; MKTG 321; senior classification.
470. **Small Business Management and Growth.** (3-0). **Credit 3. I, II** Unique aspects of managing and growing small businesses including strategic and operational planning; ethical issues; organizational controls and tools; marketing management and techniques; financial analysis and accounting; risk management; securing growth capital; franchising; family businesses and succession; human resource management; international opportunities. Prerequisite: Admission to upper division in Mays Business School and senior classification.
475. **Leadership Development.** (3-0). **Credit 3.** Provides participants both academic grounding and practical experience in health, education and economic development issues that are facing the nation; exercises and simulations designed to improve leadership skills. Prerequisite: MGMT 363.
481. **Seminar in Management.** (1-0). **Credit 1.** Discussions and observation of current management practice in the public and private sectors of the nation; reading and discussion of current events and changes taking place in management theory and/or its application and practice in actual business and government situations. May be repeated for credit. Prerequisite: Admission to upper division in Mays Business School; management major or approval of instructor.
484. **Management Internship.** **Credit 1 to 4. I, II, S** Internship in management: staffing; planning; organizing; leading and controlling. Enrollment is limited to those who have managerial responsibilities for the resources used by a business firm or the like. Prerequisite: Management major; MGMT 363; approval of instructor prior to internship.
485. **Directed Studies.** **Credit 1 to 3 each semester. I, II, S** Directed study on selected problems in the area of management not covered in other courses. Prerequisites: Admission to upper division in Mays Business School; senior classification and approval of department head.
489. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of management. Consult the professor offering a particular special topics course for details. May be repeated for credit. Prerequisite: Admission to upper division in Mays Business School and approval of instructor.

Department of Marketing

Professors L. L. Berry, P. S. Busch, J. S. Conant (Head), C. M. Futrell, R. T. Hise, S. Jain, S. W. McDaniel, W. M. Pride, V. Shankar, D. M. Szymanski, P. R. Varadarajan; **Associate Professors** L. G. Gresham, J. H. Leigh, A. Sorescu, M. S. Yadav; **Assistant Professors** H. Chen, K. Haws, R. Janakiraman, K. Winterich; **Clinical Associate Professors** J. T. Parish, M. R. Zimmer; **Senior Lecturer** S. Lampo; **Lecturers** C. Bridges, K. Hollinger, R. Ramkumar, K. T. Smith

Marketing (MKTG)

321. **Marketing.** (3-0). **Credit 3. I, II, S** Institutions, processes and problems involved in transferring goods from producers to consumers; economic and social aspects. Prerequisite: Admission to upper division in Mays Business School.
322. **Buyer Behavior.** (3-0). **Credit 3. I, II, S** Individual and group behavior of consumers or industrial buyers. Application of behavioral science principles to buying situations. Prerequisite: MKTG 321.
323. **Marketing Research.** (3-0). **Credit 3. I, II, S** Nature and uses of marketing research in business; methods of collecting and interpreting marketing information and specific application to problems in marketing. Prerequisites: MKTG 321; INFO 303.
325. **Retailing Concepts and Policies.** (3-0). **Credit 3. II** Policies, methods and procedures of retail management. Prerequisite: MKTG 321.
326. **Strategic Retailing.** (3-0). **Credit 3. I** Companies' retail strategies in a changing environment; emphasis on the retailing of services. Prerequisite: MKTG 321.
327. **Retail Merchandising.** (3-0). **Credit 3. I, II** Retail theories and best merchandising practices conducive to enhancing sales and profit growth. Prerequisites: MKTG 321; junior or senior classification.
330. **Current Issues in Marketing.** (3-0). **Credit 3. I** New issues and trends concerning marketing activities, such as marketing's role in poverty, its relations with minority groups and consumerism. Prerequisite: MKTG 321.
344. **Marketing Channels Management.** (3-0). **Credit 3. II, S** Role of retailers, wholesalers and producers in the management of the marketing channel. Prerequisite: MKTG 321.
345. **Promotion Strategy.** (3-0). **Credit 3. II, S** Planning, executing, and controlling of any demand-stimulation practices; advertising, personal selling, packaging, publicity and sales promotion. Prerequisite: MKTG 321.
347. **Advertising.** (3-0). **Credit 3. I** Place of advertising in business, advertising media, methods of advertising, consumer habits and psychology, advertising campaigns, cost analysis, legal and ethical problems in advertising. Prerequisite: MKTG 321.
401. **Global Marketing.** (3-0). **Credit 3. I, II, S** Survey of the aspects involved in marketing products and services in the international market; tariffs, cultural restrictions, business environment and legal restrictions. Prerequisite: MKTG 321. Cross-listed with IBUS 401.
402. **International Marketing: Study Abroad.** (3-0). **Credit 3.** Introduces students to the facets of doing business in an international setting; provides exposure to a variety of foreign cultures; facilitates understanding of the international marketplace in which these students will function. Prerequisites: MKTG 321 or MKTG 409; junior classification; 2.5 GPR overall. Cross-listed with IBUS 402.
403. **International Market Entry Strategies.** (3-0). **Credit 3.** A research-based course in which students prepare an analysis of a country, or region outside the U.S., and use it in the preparation of a marketing plan for a good or service to be introduced and marketed in that country. Prerequisites: MKTG 321 or MKTG 409; concurrent registration in MKTG/IBUS 402; junior or senior classification. Cross-listed with IBUS 403.

409. **Introduction to Marketing.** (3-0). **Credit 3. I, II, S** A survey course of the basic principles of marketing and key decision areas; product, promotion, distribution and pricing. May not be used to satisfy degree requirements for majors in business. Prerequisites: Junior classification; for students other than business and agribusiness majors.
435. **Personal Selling.** (3-0). **Credit 3. I, II, S** General principles of personal selling in both consumer and industrial markets plus specialty selling. Prerequisite: MKTG 321.
436. **Sales Management.** (3-0). **Credit 3. II, S** Problems confronting sales executives; organization of sales departments, product research, selection and recruiting; compensation plans, routing, supervision and cost analysis. Prerequisite: MKTG 321.
438. **Strategic Internet Marketing.** (3-0). **Credit 3. II** Implications of the internet and related digital technologies for marketing strategy; evolution of the electronic marketplace; impact of the electronic marketplace on the marketing mix decisions of firms; competitive advantage; public policy issues; future trends and developments. Prerequisites: MKTG 321; junior or senior classification.
440. **Services Marketing.** (3-0). **Credit 3. II** Prepares students to be effective executives in a services economy; specific strategies for marketing intangible products and improving quality of service; nature and characteristics of services and the success factors in services marketing. Prerequisite: MKTG 321.
442. **Product Management.** (3-0). **Credit 3. I, II** Innovation, planning, and development of new products and revitalization of existing products; product design, packaging and marketing testing. Prerequisite: MKTG 321.
447. **Advertising Procedures.** (3-0). **Credit 3. II** Advertising procedures for newspapers, magazines, radio and television; retail, mail order, national and industrial advertising; advertising agencies; advertising research. Prerequisite: MKTG 347.
448. **Marketing Management.** (3-0). **Credit 3. I, II, S** Marketing decision-making in case situations; integration of product, promotion, pricing and distribution strategies for purposes of determining and evaluating marketing strategies. Prerequisite: Graduating marketing senior.
484. **Marketing Internship.** (3-0). **Credit 3.** Professional internship in a for-profit or not-for-profit organization under the supervision of a marketing professional and direction of a Texas A&M University marketing faculty member. Prerequisites: MKTG 321; junior or senior classification; approval of instructor.
485. **Directed Studies.** **Credit 1 to 3 each semester. I, II, S** Directed study of selected problems in the area of marketing not covered in other courses. Prerequisites: MKTG 321; approval of department head; 2.5 GPR in major and overall.
489. **Special Topics in...** **Credit 1 to 4. I, II, S** Selected topics in an identified area of marketing. May be repeated once for credit. Prerequisites: Admission to upper division in Mays Business School and approval of instructor.

Department of Mathematics

Professors M. Aguiar, G. D. Allen, G. A. Battle, G. R. Blakley, H. P. Boas, A. Boggess (Head), I. Borosh, J. H. Bramble, G. Chen, R. G. Douglas, K. J. Dykema, Y. Efendiev, T. Erdelyi, C. Foias, S. A. Fulling, S. C. Geller, R. Grigorchuk, J. Guermond, D. A. Hensley, A. M. Hobbs, W. B. Johnson, P. Kuchment, J. Landsberg, D. R. Larson, R. Lazarov, D. R. Lewis, P. Lima-Filho, F. J. Narcowich, J. E. Pasciak, C. Percy, M. S. Pilant, G. Pisier, J. T. Pitts, A. Poltoratski, K. R. Rajagopal, J. N. Reddy, J. M. Rojas, W. Rundell, H. K. Schenck, J. F. Schielack, T. Schlumprecht, J. C. Slattery, K. C. Smith, R. R. Smith, F. Sortile, P. F. Stiller, E. Straube, P. Treckoff, J. R. Walton, J. D. Ward, C. H. Yan, J. Zhou, J. Zinn; **Associate Professors** A. Comech, P. Daripa, R. D. DeBlasie, R. A. Gustafson, P. Howard, T. R. Kiffe, B. D. Lowe, V. V. Nekrashevych, D. A. Panchenko, M. Papanikolas, G. Petrova, B. Popov, M. H. Rahe, V. P. Schielack, Jr., N. Sivakumar, M. J. Stecher, S. D. Taliaferro, T. I. Vogel, S. Witherspoon, P. B. Yasskin; **Assistant Professors** M. V. Anshelevich, W. Bangerth, G. Berkolaiko, G. Kanschat, D. Kerr, L. F. Matusevich, C. Robles, E.C. Rowell, Z. Sunik, M. P. Young, Y. Vorobets; **Senior Lecturers** A. L. Austin, A. Belmonte, K. L. Bollinger, M. Drost, J. Epstein, Y. C. Hester, J. E. Kahlig, G. S. Klein, D. Manuel, H. Moghbelli, M. Mogilevsky, S. Nite, S. Scarborough, J. Sutherland, J. Whitfield; **Lecturers** A. Allen, B. Aurispa, C. Chen, A. L. Collins, K. Kilmer, D. Lazarov, J. Lewis, P. Poage, H. L. Ramsey, N. Simpson, J. Zarestky

Mathematics (MATH)

102. (MATH 1314) **Algebra.** (3-0). Credit 3. I, II, S Sets, structure of number system; absolute values, solution sets of linear and nonlinear equations, of systems of equations, and of inequalities; relations and functions, graphical representations, progressions, mathematical induction, determinants.
103. (MATH 1316) **Plane Trigonometry.** (3-0). Credit 3. Angular measure; definitions of trigonometric functions, evaluation of functions of special angles, fundamental relations, solution of triangles, trigonometric reductions, angular measure, functions of composite angle, logarithms, inverse trigonometric functions, trigonometric equations.
131. **Mathematical Concepts—Calculus.** (3-0). Credit 3. I, II, S Limits and continuity; rates of change, slope; differentiation: the derivative, maxima and minima; integration: the definite and indefinite integral techniques; curve fitting. Prerequisites: High school algebra I and II and geometry. Credit will not be given for more than one of MATH 131, 142, 151 and 171.
141. (MATH 1324) **Business Mathematics I.** (3-0). Credit 3. I, II, S Linear equations and applications, systems of linear equations, matrix algebra and applications, linear programming (graphical method), probability and applications, statistics. Prerequisites: High school algebra I and II and geometry. Credit will not be given for more than one of MATH 141 and 166.
142. (MATH 1325) **Business Mathematics II.** (3-0). Credit 3. I, II, S Derivatives, curve sketching and optimization, techniques of derivatives, logarithms and exponential functions with applications, integrals, techniques and applications of integrals, multivariate calculus. Prerequisites: High school algebra I and II and geometry or satisfactory performance on a qualifying examination. Credit will not be given for more than one of MATH 131, 142, 151 and 171.
150. (MATH 2412) **Functions, Trigonometry and Linear Systems.** (3-2). Credit 4. I, II, S Graphs, functions, college algebra and trigonometry, linear systems and vectors.
151. (MATH 2413) **Engineering Mathematics I.** (3-2). Credit 4. I, II, S Rectangular coordinates, vectors, analytic geometry, functions, limits, derivatives of functions, applications, integration, computer algebra (Maple). Prerequisite: MATH 150 or equivalent. Credit will not be given for more than one of MATH 131, 142, 151 and 171.
152. (MATH 2414) **Engineering Mathematics II.** (3-2). Credit 4. I, II, S Differentiation and integration techniques and their applications (area, volumes, work), improper integrals, approximate integration, analytic geometry, vectors, infinite series, power series, Taylor series, computer algebra (Maple). Prerequisite: MATH 151 or equivalent. Credit will not be given for both MATH 152 and 172.
166. **Topics in Contemporary Mathematics II.** (3-0). Credit 3. I, II, S Finite mathematics, matrices, probability and applications. Prerequisites: High school algebra I and II and geometry. Credit will not be given for more than one of MATH 141 and 166.

170. **Freshman Mathematics Laboratory. (0-2). Credit 1.** Computing and problem solving laboratory; introduction to the various mathematical disciplines; development of skills in mathematical problem solving and skills in teamwork. May be taken two times for credit. Prerequisites: Concurrent enrollment in MATH 171 or 172; admission to College of Science.
171. **Analytic Geometry and Calculus. (4-0). Credit 4. I, II** Vectors, functions, limits, derivatives, Mean Value Theorem, applications of derivatives, integrals, Fundamental Theorem of Calculus. Prerequisite: MATH 150 or equivalent. Credit will not be given for more than one of MATH 131, 142, 151 and 171.
172. **Calculus. (4-0). Credit 4. I, II** Techniques of integration, applications of integrals, improper integrals, sequences, infinite series, vector algebra and solid analytic geometry. Prerequisite: MATH 151 or 171. Credit will not be given for both MATH 152 and 172.
202. **Discrete Mathematics for Computer Science. (3-0). Credit 3.** Logic, methods of proof, set theory, functions and sequences, growth of functions, mathematical induction, divide-and-conquer recursions, relations, equivalence relations, and finite-state machines. Prerequisite: MATH 151 or equivalent.
220. **Fundamentals of Discrete Mathematics. (3-0). Credit 3.** Foundations of mathematics including logic, set theory, combinatorics, and number theory. Prerequisite: MATH 172.
221. **Several Variable Calculus. (4-0). Credit 4. I, II** Vector algebra and solid analytic geometry; calculus of functions of several variables; Lagrange multipliers; multiple integration, theory, methods and application; line and surface integrals, Green's and Stokes' theorems; Jacobians. Prerequisite: MATH 172 or approval of instructor. Credit will not be given for more than one of MATH 221, 251 and 253.
251. **Engineering Mathematics III. (3-0). Credit 3. I, II, S** Vector algebra, calculus of functions of several variables, partial derivatives, directional derivatives, gradient, multiple integration, line and surface integrals, Green's and Stokes' theorems. Prerequisite: MATH 152 or equivalent. Credit will not be given for more than one of MATH 221, 251 and 253.
253. **(MATH 2415) Engineering Mathematics III. (3-2). Credit 4. I, II, S** Vector algebra; calculus of functions of several variables, partial derivatives, directional derivatives, gradient, multiple integration, line and surface integrals, Green's and Stokes' theorems, computer algebra. Prerequisite: MATH 152 or equivalent. Credit will not be given for more than one of MATH 221, 251 and 253.
281. **Seminar in Mathematics. (1-0). Credit 1.** Designed to familiarize students with mathematics pertaining to real world applications in such areas as biology, signal processing, quantum computation and robotics. May be taken four times for credit.
285. **Directed Studies. Credit 1 to 4.** Special problems not covered by any other lower-division course in the curriculum; intended for freshman and sophomore students. Prerequisite: Approval of department head.
289. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of mathematics. May be repeated for credit. Prerequisite: Approval of instructor.
291. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in mathematics. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
302. **Discrete Mathematics. (3-0). Credit 3. I, II, S** Formal structures for describing data, algorithms and computing devices; theory and applications of sets, graphs and algebraic structures. Prerequisite: MATH 152.
304. **Linear Algebra. (3-0). Credit 3. I, II, S** Introductory course in linear algebra covering abstract ideas of vector space and linear transformation as well as models and applications of these concepts, such as systems of linear equations, matrices and determinants. Prerequisite: MATH 152.
308. **Differential Equations. (3-0). Credit 3. I, II, S** Ordinary differential equations, solutions in series, solutions using Laplace transforms, systems of differential equations. Prerequisites: MATH 251 or equivalent; knowledge of computer algebra system.
311. **Topics in Applied Mathematics I. (3-0). Credit 3. I, II, S** Matrices, determinants, systems of linear equations, eigenvalues, eigenvectors, diagonalization of symmetric matrices, special functions; vector analysis, including normal derivative, gradient, divergence, curl, line and surface integrals, Gauss', Green's and Stokes' theorems. Prerequisites: MATH 221, 251 or 253; MATH 308 or concurrent enrollment therein.
323. **Linear Algebra. (3-0). Credit 3. I, II** Linear equations and matrices; real vector spaces, linear transformations, change of bases, determinants, eigenvalues and eigenvectors, diagonalization, inner products. Prerequisites: MATH 152 or 172; MATH 220 or approval of instructor.

325. **The Mathematics of Interest.** (3-0). **Credit 3.** The mathematical theory associated with interest; annuities; internal rate of return; coupon bonds; valuation of noncallable bonds; yield of maturity; interest rate sensitivity; duration and convexity; reinvestment risk; total return; compound return; STRIPS; yield curve; short selling; hedge ratio; bond swaps. Prerequisites: MATH 142, 151 or 171; junior classification.
365. **Structure of Mathematics I.** (3-0). **Credit 3. I, II, S** Informal logic, sets, relations, functions, whole numbers, numeration systems, binary operations, integers, elementary number theory, modular systems, rational numbers and the system of real numbers. Designed primarily for elementary teacher certification. Others must have consent of instructor. Prerequisites: Must have completed University Core Curriculum mathematics requirements with a grade of C or better.
366. **Structure of Mathematics II.** (3-0). **Credit 3. I, II, S** Geometry, measurement and coordinate geometry. Designed primarily for elementary teacher certification. Others must have consent of instructor. Prerequisite: MATH 365 or equivalent with a grade of C or better.
367. **Basic Concepts of Geometry.** (3-0). **Credit 3. I, II, S** Formal development of geometry: finite [Euclidean and non-Euclidean]. Designed primarily for elementary mathematics teacher certification. Others must have consent of instructor. Prerequisite: MATH 366 or equivalent with a grade of C or better.
368. **Introduction to Abstract Mathematical Structures.** (3-0). **Credit 3.** Mathematical proofs, sets, relations, functions, infinite cardinal numbers, algebraic structures, structure of the real line; designed primarily for elementary teacher certification. Prerequisite: MATH 366 or equivalent with a grade of C or better.
375. **Intermediate Real Analysis.** (3-0). **Credit 3.** Development of the real numbers, limits, foundations and major theorems of calculus. Designed primarily for mathematics teacher certification. Others must have consent of instructor. Prerequisite: MATH 220 or equivalent.
376. **Intermediate Abstract Algebra.** (3-0). **Credit 3. II** Relations, functions, binary operators, rings, homomorphisms, integral domains and fields. Designed primarily for mathematics teacher certification. Others must have consent of instructor. Prerequisites: MATH 220 or 302; MATH 304 or equivalent.
401. **Advanced Engineering Mathematics.** (3-0). **Credit 3. II** Engineering mathematics including Perturbation Theory, Fourier series and partial differential equations. Designed primarily for engineering majors. Others must have consent of instructor. Prerequisite: MATH 308.
403. **Mathematics and Technology.** (3-0). **Credit 3.** Mathematical problem-solving and communication through the use of various technologies (both hardware and software). Intended primarily, but not limited to, students working toward teacher certification. Prerequisite: MATH 367 or 467 with a grade of C or better.
407. **Complex Variables.** (3-0). **Credit 3.** Fundamental theory of analytic functions, including residues and their applications. Prerequisite: MATH 221 or equivalent.
409. **Advanced Calculus I.** (3-0). **Credit 3. I, II** Axioms of the real number system; point set theory of \mathbb{R}^1 ; compactness, completeness and connectedness; continuity and uniform continuity; sequences, series; theory of Riemann integration. Prerequisites: MATH 220 and 221.
410. **Advanced Calculus II.** (3-0). **Credit 3. I, II** Differential and integral calculus of functions defined on \mathbb{R}^m including inverse and implicit function theorems and change of variable formulas for integration; uniform convergence. Prerequisites: MATH 222 and 409.
411. **Mathematical Probability.** (3-0). **Credit 3. I, II** Probability spaces, discrete and continuous random variables, special distributions, joint distributions, expectations, law of large numbers, the central limit theorem. Prerequisite: MATH 221 or equivalent.
412. **Theory of Partial Differential Equations.** (3-0). **Credit 3. I** Formulation and solution of partial differential equations of mathematical physics; Fourier series and transform methods, complex variable methods, methods of characteristics and first order equations. Prerequisite: MATH 308 or 451 or approval of instructor.
414. **Fourier Series and Wavelets.** (3-0). **Credit 3.** Fourier series and wavelets with applications to data compression and signal processing. Prerequisite: MATH 222 or 304 or 311.
415. **Modern Algebra I.** (3-0). **Credit 3. I** Groups, rings, fields. Prerequisite: MATH 222.
416. **Modern Algebra II.** (3-0) **Credit 3. II** Continuation of topics introduced in MATH 415. Prerequisite: MATH 415.
417. **Numerical Analysis I.** (3-3). **Credit 4. I, II, S** Linear systems, matrix decomposition and eigensystems, numerical integration, interpolation and numerical solution of ordinary differential equations. Prerequisites: MATH 222, 304 or 311; MATH 308 or equivalent; ability to program.

423. **Linear Algebra II.** (3-0). **Credit 3.** I, II, S Eigenvalues, similarity and canonical forms, applications to differential equations and quadratic forms. Prerequisite: MATH 222, 304 or approval of instructor.
425. **The Mathematics of Contingent Claims.** (3-0). **Credit 3.** The mathematical theory associated with asset price dynamics; binomial pricing models; Black-Scholes analysis; hedging; volatility smile; implied volatility trees; implied binomial trees. Prerequisite: MATH 172 or equivalent; MATH 308 or equivalent; basic probability.
427. **Introduction to Number Theory.** (3-0). **Credit 3.** Prime and composite integers; Euclidean algorithm; modular arithmetic; Chinese remainder theorem; unique factorization; quadratic reciprocity; Riemann zeta function; representation of numbers as a sum of squares. Prerequisites: MATH 220 and 222; junior or senior classification or approval of instructor.
431. **Structures and Methods of Combinatorics.** (3-0). **Credit 3.** Enumerative techniques generating functions, partially ordered sets, elementary graph theory, elementary Ramsey theory. Prerequisite: MATH 220 or 302 or approval of instructor.
433. **Applied Algebra.** (3-0). **Credit 3.** An introduction to groups, rings, fields with emphasis on modular arithmetic; applications to number theory, coding theory, and other areas. Prerequisites: Math 220 or 302; Math 222 or 304.
436. **Introduction to Topology.** (3-0). **Credit 3.** Metric spaces; continuity of metric spaces; topological spaces; basic notions; separation axioms; compactness; local compactness; connectedness; basic notions in homotopy theory; quotient spaces, paracompactness and topological manifolds. Prerequisites: MATH 220 and 221 or approval of instructor.
439. **Differential Geometry of Curves and Surfaces.** (3-0). **Credit 3.** Local and global theory of parameterized curves; regular surfaces, local coordinates, first fundamental form, orientation, area; Gauss map, second fundamental form; Gauss Bonnet theorem; additional topics to be selected by the instructor. Prerequisites: MATH 222 and 308 or approval of instructor.
442. **Mathematical Modeling.** (3-0). **Credit 3.** The construction of mathematical models from areas such as economics, game theory, integer programming, mathematical biology and mathematical physics. Prerequisites: MATH 304 and 308 or equivalents.
446. **Principles of Analysis I.** (3-0). **Credit 3.** Construction of the real and complex numbers; topology of metric spaces, compactness and connectedness; Cauchy sequences, completeness and the Baire Category Theorem; Continuous Mappings; introduction to Point-Set Topology. Prerequisites: MATH 409; junior or senior classification.
447. **Principles of Analysis II.** (3-0). **Credit 3.** II Riemann-Stieltjes integration; sequences and series of functions; the Stone-Weierstrass and Arzela-Ascoli Theorems; introduction to Lebesgue measure theory and integration. Prerequisites: MATH 446 or approval of instructor; junior or senior classification.
451. **Theory of Ordinary Differential Equations.** (3-0). **Credit 3.** Existence and uniqueness of solutions to differential equations, linear systems, nonlinear equations, stability analysis, qualitative behavior of solutions, and modeling with differential equations. Prerequisites: MATH 222 or equivalent; MATH 308 or equivalent.
467. **Modern Geometry.** (3-0). **Credit 3.** Rigorous development of Euclidean Geometry; Classic non-Euclidean models; Matrix representations of transformations in \mathbb{R}^3 ; Isometries; Transformation and symmetric groups; Similarity and Affine transformations. Prerequisite: MATH 222 or 304.
469. **Introduction to Mathematical Biology.** (3-0). **Credit 3.** Introduction to mathematical modeling techniques in the biological sciences; continuous versus discrete models; deterministic versus stochastic models; includes population dynamics and ecology, spread of infectious diseases, population genetics and evolution, spatial pattern formation. Prerequisites: MATH 304, 308 or equivalent.
470. **Communications and Cryptography.** (3-0). **Credit 3.** Introduction to coded communications, digital signatures, secret sharing, one-way functions, authentication, error control and data compression. Prerequisites: MATH 222 or 304 and CPSC 110 and approval of instructor.
471. **Communications and Cryptography II.** (3-0). **Credit 3.** Additional topics in coded communications; information and entropy, elliptical curves, error corrections, quantum methods. Prerequisites: MATH 470 or consent of instructor.
482. **Research Seminar.** (3-0). **Credit 3.** Problems, methods and recent developments in mathematics, with emphasis on student projects, and written and oral presentations. May be repeated for credit. Prerequisites: MATH 409 or 415 (may be taken concurrently); junior or senior classification; approval of instructor.

485. **Directed Studies. Credit 1 to 8. I, II, S** Special problems in mathematics not covered by any other course in the curriculum. Work may be in either theory or laboratory. Prerequisite: Approval of department head.
489. **Special Topics in... Credit 1 to 4. I, II, S** Selected topics in an identified area of mathematics. May be repeated for credit. Prerequisite: Approval of instructor.
490. **The Putnam Challenge. (1-0). Credit 1.** Intensive individualized training for preparation for the Putnam Exam, a national contest for mathematics majors. May be taken four times for credit. Prerequisites: Approval of instructor; junior or senior classification.
491. **Research. Credit 1 to 3.** Active research of basic nature under supervision of Department of Mathematics or affiliated department graduate faculty member. Students can earn a maximum of 4 hours of credit to use in their degree plans. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Mathematics or Applied Mathematical Sciences major; junior classification or approval of mathematics advisor.

Department of Mechanical Engineering

Professors N. K. Anand, M. J. Andrews, K. Annamalai, R. M. Bowen, T. Cagin, J. A. Caton, D. W. Childs, D. E. Claridge, J. C. Han, K. T. Hartwig, Y. A. Hassan, J. D. Humphrey, S. Jayasuriya, R. Langari, S. C. Lau, A. R. McFarland, G. L. Morrison, O. O. Ochoa, D. L. O'Neal (Head), A. B. Palazzolo, A. G. Parlos, K. R. Rajagopal, J. N. Reddy, L. A. San Andres, T. M. Schobeiri, H.-J. Sue, W. D. Turner; **Associate Professors** T. S. Creasy, J. C. Criscione, C. H. Culp, X. Gao, R. B. Griffin, W. M. Heffington, H. A. Hogan, S. Hsieh, N. P. Hung, I. Karaman, W. Kim, T. R. Lalk, H. Liang, D. McAdams, E. Peterson, A. R. Srinivasa, K. Subbarao, C. Suh, D. V. Swaroop, J. Wang; **Assistant Professors** J. A. Alvarado, R. Arroyave, D. Banerjee, A. Duggleby, J. Grunlan, B. Guo, T. Jacobs, D. Kim, O. Ley, J. Linsey, A. Muliana, M. Radovic, B. Rasmussen, C. Schwartz, S. Wen, C. Yu, X. Zhang; **Lecturers** C. A. Bollfrass, M. W. McVay

Mechanical Engineering (MEEN)

221. **Statics and Particle Dynamics. (2-2). Credit 3.** Application of the fundamental principles of Newtonian mechanics to the statics and dynamics of particles; equilibrium of trusses, frames, beams and other rigid bodies. Prerequisites: Admission to upper division in an engineering major; MATH 251 or 253 or registration therein; PHYS 218.
222. **Materials Science. (3-0). Credit 3.** Mechanical, optical, thermal, magnetic and electrical properties of solids; differences in properties of metals, polymers, ceramics and composite materials in terms of bonding and crystal structure. Prerequisites: CHEM 102, or 104 and 114, or CHEM 107; PHYS 218.
260. **Mechanical Measurements. (2-3). Credit 3.** Introduction to the basic principles of engineering experimentation including: instrumentation and measurement techniques, signal processing and data acquisition, statistical data analysis, and interpretation and reporting of results. Prerequisites: MEEN 221, ECEN 215, MATH 308 and MEEN 315 or registration therein.
289. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of mechanical engineering. May be repeated for credit. Prerequisite: Approval of instructor.
291. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in mechanical engineering. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
315. **Principles of Thermodynamics. (2-2). Credit 3.** Theory and application of energy methods in engineering; conservation of mass and energy; energy transfer by heat, work and mass; thermodynamic properties; analysis of open and closed systems; the second law of thermodynamics and entropy; gas, vapor and refrigeration cycles. Prerequisites: MEEN 221; MATH 251 or 253.
333. **Project Management for Engineers. (3-0). Credit 3.** Basic project management for engineering undergraduates; project development and economic justification; estimating; scheduling; network methods; critical path analysis; earned value management; recycling and rework; project organizational structures; project risk assessment; resource allocation; ethics; characteristics of project managers. Prerequisite: Junior or senior classification in Dwight Look College of Engineering. Cross-listed with CVEN 333 and ISEN 333.

344. **Fluid Mechanics.** (3-0). **Credit 3. I, II** Application of laws of statics, buoyancy, stability, energy and momentum to behavior of ideal and real fluids; dimensional analysis and similitude and their application to flow through ducts and piping; lift and drag and related problems. Prerequisites: MEEN 221 and MEEN 315.
345. **Fluid Mechanics Laboratory.** (0-3). **Credit 1. I, II** Introduction to basic fluid mechanics instrumentation; experimental verification and reinforcement of the analytical concepts introduced in MEEN 344. Prerequisites: MEEN 260; MEEN 344 or registration therein.
357. **Engineering Analysis for Mechanical Engineers.** (3-0). **Credit 3. I, II** Practical foundation for the use of numerical methods to solve engineering problems: Introduction to Matlab, error estimation, Taylor series, solution of non-linear algebraic equations and linear simultaneous equations; numerical integration and differentiation; initial value and boundary value problems; finite difference methods for parabolic and elliptic partial differential equations. Prerequisites: ENGR 112 and MATH 308.
360. **Materials and Manufacturing Selection in Design.** (3-3). **Credit 4.** Selection of materials and manufacturing processes in design; emphasis on mechanical properties of materials; production and control of microstructures; manufacturing processes for producing a variety of shapes for different components and structures; use of design methodology. Prerequisites: MEEN 260; CVEN 305; MEEN 222.
363. **Dynamics and Vibrations.** (2-2). **Credit 3.** Application of Newtonian and energy methods to model dynamic systems (particles and rigid bodies) with ordinary differential equations; solution of models using analytical and numerical approaches; interpreting solutions; linear vibrations. Prerequisites: MEEN 357 or CVEN 302 or registration therein; MEEN 221; MATH 308; CVEN 305.
364. **Dynamic Systems and Controls.** (2-3). **Credit 3.** Mathematical modeling, analysis, measurement and control of dynamic systems; extensions of modeling techniques of MEEN 363 to other types of dynamic systems; introduction to feedback control, time and frequency domain analysis of control systems, stability, PID control, root locus; design and implementation of computer-based controllers in the lab. Prerequisites: MEEN 260 and 363; ECEN 215.
368. **Solid Mechanics in Mechanical Design.** (2-2). **Credit 3.** Stress analysis of deformable bodies and mechanical elements; stress transformation; combined loading; failure modes; material failure theories; fracture and fatigue; deflections and instabilities; thick cylinders; curved beams; design of structural/mechanical members; design processes. Prerequisites: CVEN 305; MEEN 357 and 360 or registration therein; junior or senior classification.
381. **Seminar.** (0-2). **Credit 1. I, II** Presentations by practicing engineers and faculty addressing: effective communications, engineering practices, professional registration, ethics, career-long competence, contemporary issues, impact of technology on society and being informed; students prepare a resume, a lifelong learning plan, two papers, two oral presentations and complete an online assessment of the mechanical engineering program. Prerequisite: Upper-level classification in mechanical engineering.
401. **Introduction to Mechanical Engineering Design.** (2-3). **Credit 3.** The design innovation process; need definition, functional analysis, performance requirements and evaluation criteria, conceptual design evaluation, down-selected to an embodiment; introduction to systems and concurrent engineering; parametric and risk analysis, failure mode analysis, material selection, and manufacturability; cost and life cycle issues, project management. Prerequisites: MEEN 360, 364, 368, 461.
402. **Intermediate Design.** (2-3). **Credit 3.** Product detail design and development process including case studies; project management, marketing considerations, manufacturing, detailed design specifications; failure modes, application of codes and standards, selection of design margins; product (component) development guidelines; intellectual property, product liability and ethical responsibility. Prerequisites: MEEN 401; junior or senior classification.
404. **Engineering Laboratory.** (2-3). **Credit 3. I, II** Systematic design of experimental investigations; student teams identify topics and develop experiment designs including: establishing the need; functional decomposition; requirements; conducting the experiment; analyzing and interpreting the results and written and oral reports documenting the objectives, procedure, analysis, and results and conclusion of two or three experiments. Prerequisites: MEEN 260, 360, 364, 461; MEEN 401 or registration therein; junior or senior classification.
408. **Introduction to Robotics.** (3-0). **Credit 3.** Forward and inverse kinematics of robot manipulators, path planning, motion planning for mobile robots, dynamics of robot manipulators, control algorithms; computed torque algorithm, adaptive control algorithms and current topics in mobile robots; cooperative motion planning of mobile robots and formation control. Prerequisite: MEEN 364 or equivalent; junior or senior classification.

410. **Internal Combustion Engines.** (3-0). **Credit 3.** Thermodynamics of cycles for internal combustion engines and gas turbines, including fuels and combustion; performance characteristics of various types of engines. Prerequisite: MEEN 344 or equivalent or approval of instructor.
411. **Mechanical Controls.** (3-0). **Credit 3.** Application of classical and modern control theory techniques to modeling, analysis and synthesis of linear, mechanical control systems. Prerequisite: MEEN 364.
414. **Principles of Turbomachinery.** (3-0). **Credit 3.** Aero-thermodynamic and mechanical design of turbomachinery components including steam and gas turbine stages, compressor stages, and inlet and exhaust systems, and their integration into power and thrust generation units; design and off-design behaviors of turbine and compressor stages and units; design with SolidWorks. Prerequisites: MEEN 421 or approval of instructor; junior or senior classification.
421. **Thermal-Fluids Analysis and Design.** (3-0). **Credit 3.** Integration of thermodynamics, fluid mechanics and heat transfer through application to the design of various thermal systems comprised of several components requiring individual analyses; analysis of the entire system; representative applications of thermal-fluids analysis with a design approach. Prerequisites: MEEN 461; MEEN 315; junior or senior classification.
431. **Advanced System Dynamics and Controls.** (3-0). **Credit 3.** Unified framework for modeling, analysis, synthesis, design and simulation of mechanical systems with energy exchange across multiple domains; study of mechanical, electrical, hydraulic and thermal subsystems; Newtonian mechanics, rigid body dynamics, multiple degrees of freedom vibrations and control system design. Prerequisites: MEEN 364; junior or senior classification.
432. **Automotive Engineering.** (3-0). **Credit 3.** Introduction to vehicle dynamics; application of engineering mechanics principles to analysis of acceleration and braking, cornering and handling; analysis and design of drive train, suspension, brakes, and tires to achieve desired performance. Prerequisite: MEEN 363.
433. **Mechatronics.** (2-3). **Credit 3.** Basic principles of digital logic and analog circuits in mechanical systems; electrical-mechanical interfacing; sensors and actuators; digital control implementation; precision design and system integration. Prerequisite: MEEN 364 or equivalent.
436. **Principles of Heating, Ventilating and Air Conditioning.** (3-0). **Credit 3.** Application of thermodynamics fluid mechanics, and heat transfer to the design of HVAC equipment; selection of equipment, piping and duct layouts. Prerequisite: MEEN 461 or equivalent.
437. **Principles of Building Energy Analysis.** (3-0). **Credit 3.** Analysis of building energy use by applying thermodynamics and heat transfer to building heating and cooling load calculations; heat balance and radiant time series calculation methods; psychrometric analysis, indoor air quality, effect of solar radiation on heating and cooling of buildings. Required design project. Prerequisites: MEEN 315 or equivalent; junior or senior classification.
441. **Design of Mechanical Components and Systems.** (3-0). **Credit 3.** Design of machine elements, characteristics of prime movers, loads and power transmission elements as related to mechanical engineering design. Prerequisite: Junior classification in mechanical engineering.
442. **Computer Aided Engineering.** (3-0). **Credit 3.** Effective and efficient use of modern computer hardware and software in modeling, design, and manufacturing; simulation of a broad spectrum of mechanical engineering problems. Prerequisites: MEEN 363 and 368.
444. **Finite Element Analysis in Mechanical Engineering.** (3-0). **Credit 3.** Introduction to basic theory and techniques; one- and two-dimensional formulations for solid mechanics applications; direct and general approaches; broader aspects for field problems; element equations, assembly and solution schemes; computer implementation, programming and projects; error sources and application consideration. Prerequisites: MEEN 357 and 368 or equivalents.
448. **Fundamentals of Nondestructive Testing.** (3-0). **Credit 3.** Physical principles of magnetics, wave propagation and reflection, radiography, penetrants and eddy currents as they apply to nondestructive testing; new NDT techniques, origin of defects, types of failure, material anisotropy, NDT and design. Prerequisite: MEEN 360.
451. **Viscoelastic Materials.** (3-0). **Credit 3.** Mechanical and mathematical basis for modeling linear viscoelastic materials which focus on polymeric solid materials; characterization of viscoelastic material properties from experimental tests; applications of stress and deformation relationships for viscoelastic structural members subjected to axial, torsional, and bending loads. Prerequisites: CVEN 305; junior or senior classification.

455. **Engineering with Plastics.** (3-0). **Credit 3.** Polymer structure, processing, property characterization at the molecular, microscopic and macroscopic dimensional levels for thermosets, thermoplastics, elastomers, fibers and advanced fibrous nonparticle filled composites and smart multi-performance structures. Prerequisite: MEEN 222 or approval of instructor.
458. **Processing and Characterization of Polymers.** (3-0). **Credit 3.** Introduction of flow behavior in polymers; structure-property-process relationship; mixing rules for polymer blends; mechanical properties; laboratory demonstrations: injection molding, extrusion, melt mixing, and study of morphology using OM, SEM, and TEM. Prerequisite: MEEN 222.
459. **Mechanical Vibrations.** (3-0). **Credit 3.** Basic theory of vibrating systems with single and multiple degrees of freedom and principles of transmission and isolation of vibrations, vibration measurement and application for machinery health monitoring. Prerequisites: MEEN 363; MATH 308.
460. **Corrosion Engineering.** (3-0). **Credit 3.** Basic corrosion phenomena are described, including mixed potential theory, types of corrosion, experimental methods, and prevention techniques. Prerequisite: MEEN 360 or equivalent.
461. **Heat Transfer.** (3-0). **Credit 3. I, II** Heat transfer by conduction, convection and radiation: steady and transient conduction, forced and natural convection, and blackbody and gray body radiation; multi-mode heat transfer; boiling and condensation; heat exchangers. Prerequisites: MEEN 344; MATH 308.
464. **Heat Transfer Laboratory.** (0-3). **Credit 1.** Basic measurement techniques in conduction, convection, and radiation heat transfer; experimental verification of theoretical and semi-empirical results; uncertainty analysis. Prerequisites: MEEN 461 or registration therein.
467. **Mechanical Behavior of Materials.** (3-0). **Credit 3.** Fundamentals of flow and fracture in metals, emphasizing safe design by anticipating response of materials to complex stress and environmental service conditions; micromechanisms of flow, fatigue, creep and fracture; fracture mechanics approach to design. Special emphasis given to microstructure-mechanical property relationship and damage tolerant design. Prerequisite: MEEN 360.
471. **Elements of Composite Materials.** (3-0). **Credit 3.** Fundamentals concerned with relating structure of multiphase materials to physical properties; plastic, metallic and ceramic matrices reinforced with continuous and discontinuous fibers, whiskers and particulates. Prerequisites: MEEN 368 and 360 or approval of instructor.
472. **Gas Dynamics.** (3-0). **Credit 3.** Fundamental analysis of compressible flows and its application to supersonic airfoils/projectiles, jet and rocket nozzles, normal and oblique shock waves, explosion waves, shock tubes, supersonic wind tunnels, and compressible pipe flows. Prerequisite: MEEN 344.
475. **Materials in Design.** (3-0). **Credit 3.** The heuristics of synthesis of material properties, configuration and processing in the optimization of material selection in the design process; product design and development overview, failure mode effects analysis, design margin establishment; role of the generic failure modes and codes and standards; fundamental characteristics of process methods. Prerequisites: MEEN 360; CVEN 305.
476. **Nanoscale Issues in Manufacturing.** (3-0). **Credit 3.** Fundamentals of manufacturing techniques at the nanoscale and larger length scales; design approaches and issues; direct fabrication of nanostructures; nanomanufacturing as a building block to larger objects; fabrication of composites and devices utilizing nanoscale components. Prerequisites: MEEN 222 or approval of instructor; junior or senior classification.
477. **Air Pollution Engineering.** (3-0). **Credit 3.** Design of air pollution abatement equipment and systems to include cyclones, bag filters, and scrubbers; air pollution regulations; permitting; dispersion modeling; National Ambient Air Quality Standards. Prerequisite: ENGR 214 or equivalent. Cross-listed with BAEN 477 and SENG 477.
485. **Directed Studies.** **Credit 1 to 6. I, II, S** Special problems relating to a specific project in some phase of mechanical engineering. A commitment of two semesters with 6 hours 485 credit is required. Prerequisites: Approval of department head and senior classification.
489. **Special Topics in...** **Credit 1 to 4. I, II, S** Selected topics in an identified area of mechanical engineering. Prerequisite: Approval of instructor.
491. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in mechanical engineering. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor.

Mechanics and Materials (MEMA)

467. **Finite Element Fundamentals and Engineering Applications.** (3-0). **Credit 3. I, II** Introduction to the fundamental theory and concepts of the finite element method; review of energy and variational principles; direct approach and energy formulations; truss and beam structural members and planar stress analysis; design considerations; original computer and design projects required. Prerequisites: AERO 306 and 320; CVEN 302 and 345; MEEN 357 or equivalent; MEEN 368 or equivalent.

Microbiology (faculty, see page 634) (MICR)

289. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of microbiology. May be repeated for credit. Prerequisite: Approval of instructor.
291. **Research.** **Credit 1 to 4.** Active research of basic nature under the supervision of a Department of Biology faculty member. Prerequisite: Freshman or sophomore classification and approval of instructor.
489. **Special Topics in...** **Credit 1 to 4. I, II** Selected topics in an identified area of microbiology. May be repeated once for credit.
491. **Research.** **Credit 1 to 4.** Active research of basic nature under the supervision of a Department of Biology faculty member. Prerequisite: Junior or senior classification and approval of instructor.

Middle Grades Education (faculty, see page 668) (MIDG)

352. **Inquiry and Problem-Based Learning Strategies for Middle Grades.** (2-6). **Credit 3.** Study of instructional strategies appropriate to development of middle grades students; development of interdisciplinary and multidisciplinary curricula; student centered strategies related to inquiry and problem-based learning; multiple teaching techniques. Prerequisites: MEFB 351; admission to teacher education; junior classification; Corequisite: MEFB 352.

Middle Grades Education Field Based (faculty, see page 668) (MEFB)

351. **Introduction to Middle Grades: Adolescent Development, Philosophy and Organization.** (2-6). **Credit 3.** Study of young adolescents in domains of physical, social, emotional, cognitive, interpersonal, moral growth and development; organizational structure of middle schools supporting development of young adolescents through teaming and interdisciplinary work; investigates roles and responsibilities of middle level teachers. Prerequisite: Junior classification.
352. **Curriculum and Instruction for Middle Grades Curriculum.** (2-6). **Credit 3.** Study of educational theory and instructional strategies appropriate to middle grades education including planning and development of interdisciplinary and multidisciplinary curricula; student centered learning and methodologies. Field based course. Prerequisites: MEFB 351; admission to teacher education; junior classification.
450. **Social Studies Methods in the Middle Grades.** (2-6). **Credit 3.** Trends and issues related to middle grades curriculum development and instruction in social studies and humanities; integration of content, planning, teaching-learning experiences; evaluation of teaching and learning in social studies. Prerequisites: MEFB 352; admission to teacher education; senior classification; Corequisites: MEFB 490; RDNG 470 and 490.
460. **Math Methods in Middle Grades.** (2-6). **Credit 3.** Examines theories, provides practice in teaching methods essential to successful mathematics learning; focuses on content and criteria central to teaching mathematics for understanding, skill development, and problem solving; readings, discussions, analyses; modeling and practicing mathematics teaching and learning. Prerequisites: MEFB 352; admission to teacher education; senior classification; Corequisites: MEFB 470, 490; MASC 450.

470. **Science Methods in Middle Grades. (2-6). Credit 3.** Problems-based-learning course integrating science content, scientific inquiry skills and field-based instruction; technology-mediated teaching, learning, and assessment. Prerequisites: MEFB 352; admission to teacher education; senior classification; Corequisites: MEFB 460, 490; MASC 450.
480. **Evaluation and Measurement: Program, Performance and Student Achievement in Middle Grades. (2-6). Credit 3.** Studies evaluation and assessment in relationship to student learning and performance; teacher improvement and performance; program alignment with TEKS measured by TAAS; develops understanding of the need for congruence between curriculum, instructional strategies, and evaluation of teaching and learning performance. Prerequisites: MEFB 352; MIDG 352; admission to teacher education; senior classification; Corequisites: If mathematics/science teaching—MEFB 460, 470, 490; MASC 450; if language/social studies teaching—MEFB 450 and 490; RDNG 470 and 490.
490. **Organization, Motivation and Management in Middle Grades Classrooms. (2-6). Credit 3.** Field-based course focusing on communication, methodology and management perspectives consistent with democratic classrooms; organizational structures that focus on student centered, inclusionary learning interventions for disabilities; analysis of systemic conditions placing young adolescents from diverse backgrounds at risk. Prerequisites: MEFB 352; MIDG 352; admission to teacher education; senior classification; Corequisites: If mathematics/science teaching—MEFB 450; RDNG 470 and 490; if language/social studies teaching—MEFB 460, 470, MASC 450.
497. **Residency in Middle Grades Education. Credit 6 to 9.** Observation and participation in an accredited public school middle grades classroom; techniques of teaching student's teaching fields; appropriate instructional strategies for assigned student population. May be taken two times. Prerequisites: Completion of methods courses; admission to teacher education; senior classification.

Department of Military Science

Professor Colonel S. Hawes; Assistant Professors Majors M. D. Bajema, L. A. Parks, J. E. Sheridan, J. A. Stephenson; Captains J. R. Crady, M. D. Fulton, J. A. Miller, N. T. Reed, K. W. Zuber; Senior Military Instructors Sergeant Major D. D. Freeman; Master Sergeants J. T. Altmeyer, C. Jamison, S. Ramsey; Sergeants First Class C. O. Brazil, A. Chavez, T. J. Simpson

(MLSC)

Basic Courses of Military Science

121. **First Year Basic I. (1-3). Credit 2. I, II** Basic leadership skills taught through classroom instruction, practical, and field exercises. Historical overview of Army values, the ROTC program, its purpose in the Army and advantages for the cadet; introduction to personal challenges and competencies that are critical for effective leadership; learn how personal development of life skills such as time management, physical fitness and stress management relate to leadership, officership and the Army profession. Upon completion of this semester, the cadet will be prepared to receive more complex leadership instruction.
122. **First Year Basic II. (1-3). Credit 2. I, II** This course builds upon the fundamentals introduced in the previous semester by focusing on leadership theory and decision-making as well as squad tactics. Lessons in this semester include: problem solving, critical thinking, leadership theory, group interaction, goal setting, effective communication and basic marksmanship training. Upon completion of this semester, cadets will be prepared to advance to more complex leadership instruction concerning the dynamics of organizations.
221. **Second Year Basic I. (2-3). Credit 3. I, II** Explores the dimensions of creative and innovative tactical leadership strategies and styles by studying historical case studies and engaging in interactive student exercises. Cadets practice aspects of personal motivation and team building in the context of planning, executing, and assessing team exercises. Focus is on continued development of the knowledge of leadership values and attributes though an understanding of rank, uniform, customs and courtesies. Leadership case studies provide a tangible context for learning the Soldier's Creed and Warrior Ethos.
222. **Second Year Basic II. (2-3). Credit 3. I, II** Examines the challenges of leading in complex contemporary operational environments. Dimensions of the cross-cultural challenges of leadership in a constantly changing world are highlighted and applied to practical Army leadership tasks and situations. Cadets develop greater self awareness as they practice communication and team building skills. Contemporary Operating Environment (COE) case studies give insight into the importance and practice of teamwork and tactics in real world scenarios.

Advanced Courses of Military Science

321. **First Year Advanced Military Science. (3-1). Credit 3. I** Challenges cadets to study, practice, and evaluate adaptive leadership skills as they are presented with challenging scenarios related to squad tactical operations. Cadets receive systematic and specific feedback on their leadership attributes and actions. Cadets will negotiate the Field Leadership Reaction Course, Day and Night Land Navigation, Basic Rifle Marksmanship as well as Situational Training Exercises which are conducted during Labs. Based on such feedback, as well as their own self evaluations, cadets continue to develop their leadership and critical thinking abilities. The focus is developing cadet's tactical leadership abilities to enable them to succeed at the ROTC summer Leadership Development and Assessment Course (LDAC).
322. **First Year Advanced Military Science. (3-1). Credit 3. II** Uses increasingly intense situational leadership challenges to build cadet awareness and skill in conducting tactical operations up to platoon level. Cadets review aspects of combat, stability, and support operations. They also conduct military briefings and develop proficiency in garrison operation orders. Throughout the duration of this course the cadet's ability to train and lead others effectively is being assessed through a myriad of individual and collective tasks. The focus is on exploring, evaluating, and developing skills in decision-making, persuading, and motivating members in the Contemporary Operating Environment (COE). MSLC 322 cadets are evaluated on what they know and do as leaders as they prepare to attend the ROTC summer Leadership Development Assessment Course (LDAC).
421. **Second Year Advanced Military Science. (3-1). Credit 3. I** Develops cadet proficiency in planning, executing, and assessing complex operations, functioning as a member of a staff, and providing leadership performance feedback to subordinates. Cadets are given situational opportunities to assess risk, make ethical decisions, and provide coaching to fellow ROTC cadets. Leadership laboratory focuses on coaching and counseling younger cadets to prepare them for leadership roles.
422. **Second Year Advanced Military Science. (3-1). Credit 3. II** Explores the dynamics of leading in the complex situations of current military operations. Cadets examine differences in customs and courtesies, military law, principles of war, and rules of engagement in the face of international terrorism. Significant emphasis is placed on preparing cadets for their first unit of assignment. Leadership laboratory continuation of MLSC 421.
485. **Directed Studies. Credit 1 to 3. I, II** Directed study of problems in the field of military science. Prerequisites: Junior or senior classification with approval of department head.
489. **Special Topics in... Credit 1 to 4.** Selected topics in an identified field of military science. May be repeated for credit.

Modern Languages (MODL)

221. **World Literature. (3-0). Credit 3.** Representative works in translation of major authors and texts from various cultures to A.D. 1500, including such authors as Homer, biblical writers, Greek dramatists, Sappho, Virgil, Marie de France, Dante, Lao Tzu, and works like Gilgamesh and The Bhagavad Gita. Prerequisite: ENGL 104. Cross-listed with ENGL 221.
222. **World Literature. (3-0). Credit 3.** Representative works in translation of major authors from A.D. 1500 to the present from various cultures, including such authors as Cervantes, Moliere, Goethe, Tolstoy, Mahfouz, Munif, Achebe, Tolstaya, Vargas Llosa and Duras. Prerequisite: ENGL 104. Cross-listed with ENGL 222.
250. **Contemporary Spanish Culture. (1-0). Credit 1.** Cultural and practical orientation for students participating in the summer study abroad programs in Spain; brief introduction to contemporary social and cultural institutions; discussions of Spanish university system; oral reports and final paper; readings and discussion in English and Spanish. Prerequisite: SPAN 101 or equivalent.
260. **Contemporary Mexican Culture. (1-0). Credit 1.** Introduction to contemporary Mexican social, cultural, and political institutions; discussion of Mexican university system; readings and discussion in Spanish and English. For preparation for study abroad program in Mexico. Prerequisite: SPAN 101 or equivalent.
289. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of modern languages. May be repeated for credit. Prerequisite: Approval of department head.
352. **Hispanic Literature and Film. (3-0). Credit 3.** The language of film, and film as fiction; the relationship between film and literature; films as expressions of cultural realities through the adaptation of Hispanic literary works; readings and lectures in English.

362. **Hispanic Literature in the United States. (3-0). Credit 3.** Contemporary literature by Hispanic authors of the United States writing in English; representative works from the major Hispanic communities of the U.S. Prerequisite: ENGL 104. Cross-listed with ENGL 362.
363. **Borderlands: U.S. and Mexico. (3-0). Credit 3.** Multiple images of the U.S./Mexico border, their creation, their evolution, and their conflicting representations in filmic, literary and musical texts. Prerequisite: ENGL 104 and junior or senior classification.
364. **Diversity Lessons from Medieval Spain. (3-0). Credit 3.** Crucible of cultures – Christian, Jewish, and Muslim – that was medieval Spain and modern implications of that experience in diversity. Prerequisites: ENGL 104 and junior or senior classification.
368. **El Camino de Santiago: Medieval to Contemporary Pilgrimages. (3-0). Credit 3.** Survey of the literature, art, architecture, geography, history, music, cuisine, social dynamics and economic impact along the pilgrimage route to Santiago de Compostela from the early Middle Ages to contemporary times. Prerequisites: ENGL 104 and junior or senior classification.
484. **Internship. (3-0). Credit 3.** Directed internship in a private firm or public agency to provide experience and learning appropriate to the student's degree program and career objectives. Must be taken on a satisfactory/unsatisfactory basis. Prerequisite: Junior or senior classification.
485. **Directed Studies. Credit 1 to 4. I, II** Individual supervision of readings or assigned projects, selected for each student individually. Written and oral reports. No class meetings. Prerequisite: Approval of department head.
489. **Special Topics in... Credit 1 to 4. I, II, S** Selected topics in an identified area of modern languages. May be repeated for credit. Prerequisite: Approval of department head.

Molecular and Environmental Plant Sciences

Professors T. W. Boutton, D. D. Briske, J. T. Cothren, F. T. Davies, Jr., E. A. Funkhouser, T. C. Hall, J. L. Heilman, M. A. Hussey, T. D. McKnight, C. W. Magill, M. G. Messina, J. C. Miller, Jr., J. E. Mullet, W. D. Park, C. O. Patterson, D. W. Reed, S. A. Senseman, D. M. Stelly, T. L. Thomas, D. M. Vietor, R. H. White; Associate Professors F. J. Betran, M. L. Binzel, B. G. Cobb, H. T. Cralle, J. H. Gould, L. R. Griffing, T. S. Isakeit, S. R. King, P. E. Klein, C. Loopstra, C. O. Patterson, A. E. Pepper, P. J. Rizzo, M. G. Tjoelker, H. Zhang, K. Zhu-Salzman; Assistant Professors S. A. Finlayson, D. B. Hays, H. Koiwa, M. V. Kolomiets, L. Lombardini, L. Tarpley, W. K. Versaw

Molecular and Environmental Plant Sciences (MEPS)

201. **Social and Environmental Aspects of Plant Physiology. (3-0). Credit 3. I** Environmental and social issues related to plants and their impact on human populations, such as nutrition, sustainability, biotechnology, landscape, medicine, clothing and building. A wide array of information will be linked in such a way that the information is usable to students in business, political science, education, liberal arts and biology.
291. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in molecular and environmental plant sciences. May be repeated 3 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
313. **Introduction to Plant Physiology. (3-0). Credit 3. II** General course dealing with principal life processes of higher plants; influence of environmental factors on these processes. Agricultural and ecological significance of life processes of plants. Prerequisites: BIOL 101; CHEM 102 or 104; CHEM 222 or 228.
315. **Laboratory in Introductory Plant Physiology. (0-3). Credit 1. II** General laboratory study of topics covered in MEPS 313; measurement of life processes of plants in response to the environment; introduction to experimental techniques in whole plant and cellular physiology. Prerequisite: MEPS 313 or registration therein or approval of instructor.
316. **Introduction to Theory and Practice of Plant Physiology. (2-3). Credit 3.** Theory of plant physiology related to purposeful practices for improving plant adaptation, productivity and quality and for protecting and remediating environments in agriculture; laboratory experiments of physiology of plant structure, components and culture; water relations and stress; nitrogen and mineral nutrition; gas exchange; hormonal regulation. Prerequisites: BIOL 101; CHEM 101; junior or senior classification.

411. **Biotechnology for Crop Improvement.** (3-0). **Credit 3.** I Use of biotechnology to improve agricultural, horticultural and forest crops; techniques and methods used and case studies where biotechnology has been used to alter traits such as pathogen resistance, protein or oil consumption, ripening, fertility and wood properties. Prerequisite: BIOL 113 or equivalent. Cross-listed with GENE 411.
485. **Directed Studies.** **Credit 1 to 4 each semester.** I, II, S Individual problems or research not covered by other course work. Report required. Prerequisites: Junior or senior classification and prior approval of instructor or department head.
489. **Special Topics in...** **Credit 1 to 4.** I, II, S Selected topics in an identified area of plant physiology. May be repeated for credit.
491. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in molecular and environmental plant sciences. May be repeated 3 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor.

Music

(faculty, see page 781)

(MUSC)

102. **Fundamentals of Music.** (3-0). **Credit 3.** I,II Introduction to the basic elements of music (pitch, rhythm, scales, intervals and triads) and how these elements interrelate to form musical compositions; the application of musical understanding to particular instruments such as the guitar, keyboard, recorder and voice.
200. **Topics in Music.** (3-0). **Credit 3.** The study of a circumscribed musical topic in its sociohistorical context; emphasis on the aesthetic, social and cultural issues affecting music rather than on technical analysis. May be repeated for credit.
201. (MUSI 1306) **Music and the Human Experience.** (3-0). **Credit 3.** I, II An introduction to music and related issues; designed to enhance the student's knowledge and perception of music; selected works in various styles within historical, psychological and aesthetic contexts.
204. **Music Theory I.** (2-1). **Credit 2.** I Basic concepts of harmonic and contrapuntal structures in diatonic tonal music, musical analysis of these structures, and musical composition; using these structures for piano solo, voice and piano and other small ensembles; includes harmonic progression, root/first/second inversion harmonies, cadences and 2v 1st-, 2nd-, and 4th-species counterpoint. Prerequisite: MUSC 102 or placement exam and music major or minor status; concurrent enrollment in MUSC 208.
205. **Music Theory II.** (2-1). **Credit 2.** II Continuation of harmonic and contrapuntal principles in chromatic tonal music, musical analysis of these structures, and musical composition using these structures for small ensembles; includes secondary functions, common-chord modulation, basic reductive techniques and compound melody, phrase structure, 2v imitative counterpoint, and 2v 3rd- and 5th-species. Prerequisite: MUSC 204 and 208 and music major or minor status; concurrent enrollment in MUSC 210.
206. **Music Theory III.** (2-1). **Credit 2.** I Continued study of harmonic, contrapuntal and set-theoretical principles, composition and analysis of highly chromatic tonal music and twentieth-century music; includes mode mixture, Neapolitans, augmented sixths, "tall" chords, substitute chords, passing harmonies, enharmonicism, extended chromaticism, modes, artificial scales, impressionism, pandiatonicism, atonality, serialism, aleatory, sound mass, minimalism and electronic music. Prerequisite: MUSC 205 and 210, and music major or minor status; concurrent enrollment in MUSC 212.
207. **Form and Analysis.** (2-1). **Credit 2.** II Focus on phrase structure, traditional small and large forms in full score, Baroque compositional procedures, reductive (pre-Shenkerian) analytical techniques and Schoenbergian composition theory; extensive listening, reading and analysis; includes binary, ternary, rondo, variation, sonata and fugue; musicianship studies from earlier courses. Prerequisite: MUSC 206 and 212 and music major or minor status.
208. **Musicianship I.** (0-2). **Credit 1.** I Application of concepts taught in MUSC 204; focus on ear training, aural analysis, sight singing, rhythm and rudimentary keyboard skills. Prerequisites: MUSC 102, and music major or minor status; concurrent enrollment in MUSC 204
210. **Musicianship II.** (0-2). **Credit 1.** II Application of concepts taught in corequisite course MUSC 205; focus on ear training, aural analysis, sight singing, rhythm and rudimentary keyboard skills. Prerequisites: MUSC 204 and 208 and music major or minor status; concurrent enrollment in MUSC 205.

212. **Musicianship III. (0-2). Credit 1.** I Application of concepts taught in MUSC 206; focus on ear training, aural analysis, sight singing, rhythm and rudimentary keyboard skills. Prerequisites: MUSC 205 and 210 and music major or minor status; concurrent enrollment in MUSC 206.
214. **Perspectives on World Music. (3-0). Credit 3.** A thematic overview of basic issues in ethnomusicology; provides students with an appreciation for the diversity of ways in which music sound and music making are organized in world cultures; includes music making and the performance event, music and identity, music and nationalism, and music and globalization. Prerequisites: MUSC 204, ENGL 104 and ANTH 201, or approval of instructor.
215. **Fieldwork in World Music. (3-0). Credit 3.** Hands-on experience with readings in and critical analysis of ethnographic musical research; philosophies and practices of fieldwork on the world's music. Prerequisites: MUSC 214 or approval of instructor.
245. **Composition I. (0-2). Credit 1.** Instruction in composition; the writing of small-form musical compositions employing contemporary styles; techniques in writing for instrumental, vocal, electronic and mixed-media resources. May be taken 2 times for credit. Prerequisite: MUSC 207 or approval of instructor.
250. (MUSI 1181, 1182, 2181, 2182) **Individual Performance—Piano I. (0-2). Credit 1.** Instruction in piano performance; the study of a broad range of literature with special emphasis on the historical and theoretical aspects that reveal the performance practices of specific periods; individual and group laboratory instruction. May be repeated for credit. Prerequisite: Satisfactory audition.
251. **Individual Performance—Voice I. (0-2). Credit 1.** Instruction in vocal performance; the study of a broad range of literature with special emphasis on the historical and theoretical aspects that reveal the performance practices of specific periods; individual and group laboratory instruction. May be repeated for credit. Prerequisite: Satisfactory audition.
252. **Individual Performance—Band and Orchestra Instrument Performance I. (0-2). Credit 1.** Instruction in instrumental performance; the study of a broad range of literature with special emphasis on the historical and theoretical aspects that reveal the performance practices of specific periods; individual and group laboratory instruction. May be repeated for credit. Prerequisite: Satisfactory audition.
280. **Ensemble Performance—Symphonic Band. (0-3). Credit 1.** Three select musical performing ensembles (symphonic, concert and campus bands) composed of 65 to 100 members each and devoted to learning the extensive literature written for wind band; activities include at least two concerts per semester; annual tours during spring for the symphonic band. Students may register in up to but no more than two different sections of this course. May be repeated for credit. Prerequisite: Satisfactory audition.
281. **Ensemble Performance—Small Ensembles. (0-3). Credit 1.** Participation in small ensemble performance; the study and performance of small ensemble repertory from all historical periods and styles. May be repeated for credit. Prerequisite: Satisfactory audition.
282. **Ensemble Performance—Jazz Ensemble. (0-3). Credit 1.** A select musical performing ensemble of 18 to 25 members devoted to performing all styles and periods of jazz music from big band to modern jazz; activities include at least 2 performances each semester. May be repeated for credit. Prerequisite: Satisfactory audition.
283. **University Student Orchestra. (0-3). Credit 1.** The rehearsal and performance of orchestra literature of various historical backgrounds; full ensemble rehearsal, individual practice, an public performances; development of knowledge, understanding, and appreciation for aspects of music ranging from the Renaissance to the Modern Era. May be repeated 10 times for credit. Prerequisite: Previous orchestral experience; successful audition with Conductor.
285. **Directed Studies. (0-3). Credit 1.** Directed studies in specific problems in identified areas of music. May be repeated for credit up to 9 hours. Prerequisite: Approval of instructor and department head; MUSC majors and minors only.
286. **Ensemble Performance—Symphony Orchestra. (0-3). Credit 1.** Participation in the Brazos Valley Symphony Orchestra, a community/university ensemble; includes rehearsals off campus and varying course requirements depending on the setting and needs of the student. May be repeated for credit. Prerequisite: Satisfactory audition.
289. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of music. May be repeated for credit. Prerequisite: Approval of instructor.

290. **Ensemble Performance—Choir. (0-3). Credit 1.** A select musical performing ensemble composed of 40 to 70 members devoted to learning and performing works from the vast repertory of choral music from all historical periods and styles; several performances, occasionally with orchestra, each semester on and off campus. Students may register in up to but no more than two different sections of this course. May be repeated for credit. Prerequisite: Satisfactory audition.
302. **Sonic Design. (3-0). Credit 3.** For the student who has obtained a thorough knowledge of music theory; focus on significant styles and techniques in contemporary music including jazz and popular trends; understanding of contemporary sonic design achieved through written exercises, reading, and critical listening. Prerequisite: MUSC 207 or approval of instructor.
311. **Music in Early Western Culture. (3-0). Credit 3. I** Survey of styles, genres, and forms in Western music, focusing on the lives and works of the principal composers from Greek antiquity to the end of the Baroque period within the context of political, social and cultural developments. Prerequisite: MUSC 205 or approval of instructor.
312. **Music in Modern Western Culture. (3-0). Credit 3. II** Survey of styles, genres, and forms in Western music, focusing on the lives and works of the principal composers from the middle of the eighteenth century to the present within the context of political, social and cultural developments. Prerequisite: MUSC 205 or approval of instructor.
315. **Music in the 20th Century. (3-0). Credit 3.** The understanding and enjoyment of twentieth century music; survey of the broad panorama of the contemporary scene and an assessment of the forces that have shaped the musical climate we inhabit. Prerequisite: MUSC 206 or approval of instructor.
316. **Music and Technology. (3-1). Credit 3. I** The study of music produced with the aid of electronic and computer technologies; critical listening and analysis of music literature; understanding of technical concepts; required laboratory provides creative practical experience in studio and live performance applications of sound synthesis, digital sampling, signal processing, MIDI sequencing, hard disk recording and multimedia. Prerequisite: MUSC 206 or approval of instructor.
317. **Sound Recording. (3-0). Credit 3. II** A theoretical and practical study of studio recording techniques; acoustics and psychoacoustics, microphone selection and placement, multitrack digital recording and mixing, digital signal processing, MIDI and SMPTE synchronization, and audio post-production techniques; recording projects designed to develop engineering skills and techniques. Prerequisite: MUSC 316 or approval of instructor.
318. **Electronic Composition. (3-0). Credit 3.** Project-based study of techniques for writing electronic and mixed media music; critical analysis of important electroacoustic works; software and hardware based sound synthesis, sampling, digital signal processing, MIDI sequencing and interactive music programming techniques. Prerequisite: MUSC 316 or approval of instructor.
319. **Music in the United States. (3-0). Credit 3.** Explores musical tradition found within the United States, native as well as imported, written and oral, amateur and professional, classical and popular, regional and international among both majority and minority populations and communities from the Civil War to the present. Prerequisite: Approval of instructor.
321. **The Symphony Orchestra and Its Music. (3-0). Credit 3.** The development of the symphony orchestra with particular attention to its vast musical repertory, and the colorful personalities associated with it; the organization and management of this musical institution including local arts support and volunteerism. Prerequisite: Approval of instructor.
324. **Music in World Cultures. (3-0). Credit 3.** Examines music from an ethnomusicological perspective focusing on musical performance and the complex interrelationship of music to culture, society, and daily life; surveys music from a variety of cultures through a series of case studies. Prerequisite: MUSC 102 or approval of instructor. Cross-listed with ANTH 324.
325. **Dance and World Cultures. (3-0). Credit 3.** Examination of international relationships between dance, culture, identity, gender, youth and politics; relationships between dancing, gender and politics in northern Greece; variety of dance practices around the globe. Prerequisite: Junior or senior classification. Cross-listed with PERF 325.
326. **Dance and Identity in the United States. (3-0). Credit 3.** Analysis of dance events as complex sites for social action; examines dances performed by diverse groups of people; considers such issues as identity, community, diversity, gender and representation in the United States. Prerequisite: Junior or senior classification. Cross-listed with PERF 326.

327. **Popular Musics in the African Diaspora. (3-0). Credit 3.** Examines a range of popular musics from the twentieth century that have emerged in conjunction with the historical global spread of peoples and cultures from the African continent; technical knowledge about music is not required; focuses on social and cultural contexts for popular music. Prerequisite: MUSC 324 or approval of instructor. Cross-listed with PERF 327.
345. **Composition II. (0-2). Credit 1.** Advanced instruction in composition; the writing of large-form musical compositions employing contemporary styles; techniques in writing for instrumental, vocal, electronic and mixed-media resources. May be repeated for credit. Prerequisite: MUSC 245 or approval of instructor.
350. **Individual Performance—Piano II. (0-2). Credit 1.** Advanced instruction in piano performance; the study of a broad range of literature with special emphasis on the historical and theoretical aspects that reveal the performance practices of specific periods; individual and group laboratory instruction. May be repeated for credit. Prerequisite: MUSC 250 or approval of instructor.
351. **Individual Performance—Voice II. (0-2). Credit 1.** Advanced instruction in vocal performance; the study of a broad range of literature with special emphasis on the historical and theoretical aspects that reveal the performance practices of specific periods; individual and group laboratory instruction. May be repeated for credit. Prerequisite: MUSC 251 or approval of instructor.
352. **Individual Performance—Band and Orchestra Instrument Performance II. (0-2). Credit 1.** Advanced instruction in instrumental performance; the study of a broad range of literature with special emphasis on the historical and theoretical aspects that reveal the performance practices of specific periods; individual and group laboratory instruction. May be repeated for credit. Prerequisite: MUSC 252 or approval of instructor.
400. **Senior Seminar and Project. (3-0). Credit 3.** Culminating senior project on an individually-chosen research topic, presentation of a recital, or lecture-demonstration. Prerequisite: Senior classification (completion of all 300- and 400-level coursework required for the B.A. in Music); music major status; approval of instructor, advisor, and department head.
402. **Music and Sound for Media. (3-0). Credit 3.** Study of theory, history literature and techniques of music composition and sound design for film, theatre, dance and interactive media; examination of the collaborative creative process; projects in sound design and composition. Prerequisites: MUSC 317 and 318 or approval of instructor.
485. **Directed Studies. Credit 1 to 3.** Advanced directed study of identified topic in music. May be repeated for credit up to 6 credit hours. Prerequisite: Approval of instructor and department head; 24 hours of music; MUSC majors and minors only.
489. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of music. May be repeated for credit. Prerequisite: Approval of instructor.

Department of Naval Science

Professor Colonel G. L. Smith, USMC (Head); Associate Professor Commander J. H. Haltom, USN; Assistant Professors Major K. Prindiville, USMC; Captain T. Heichelbech, USMC; Lieutenants N. R. Burley, USN, J. Crowley, USN, K. Finegan, USN, H. A. Ojeda, USN, R. L. Lohstreter, USN, J. Wisdom, USN

Naval Science (NVSC)

101. **Introduction to Naval Science. (2-1). Credit 2.** I Seapower and the naval service; mission, organization, regulations, and broad warfare components of the Navy; overview of officer and enlisted rank and rating structures, procurement and recruitment, training and education, promotion and advancement, and retirement policies. Basic tenets of naval courtesy and customs, discipline, naval leadership and ship's nomenclature. Major challenges facing Naval officers; areas of equal opportunity, fraternization and drug/alcohol abuse.
102. **Leadership and Management I. (3-1). Credit 3.** I Principles of leadership and management and their application to the duties and responsibilities of a Junior Naval Officer; management theory, professional responsibility, and human resource system programs; skills in leadership, goal setting and communication developed through guided participation in case studies and situational problems.
203. **Naval Ships Systems I: Engineering. (3-1). Credit 3.** I Study of engineering concepts and their applications in U.S. Naval vessels; basic ship design, hydrodynamic forces, stability, propulsion, electrical systems, and shipboard safety, organization and firefighting.

205. **Naval Sea Power and Maritime Affairs. (2-2). Credit 3. II** A survey of naval history emphasizing the major developments in naval strategy, tactics, technology, and the effects of political climate; significant naval engagements and historic figures; includes an introduction to the theory of war, Mahan's naval strategy, the role of maritime commerce and the importance of a maritime policy to maintain global stability.
301. **Navigation. (2-2). Credit 3. II** Theory, principles and procedures of ship navigation in coastal and open ocean environments; piloting, celestial navigation, ocean and tidal currents and associated publications and logs; introduction to USN electronic and satellite navigational systems.
302. **Naval Operations and Seamanship. (2-2). Credit 3. I** Duties and responsibilities of the OOD (U/W), navigator and bridge watch team during routine and special at sea evolutions; relative motion, formation tactics, international and inland rules of the nautical road and applied aspects of ship handling; familiarization with naval communications and messages. Prerequisite: NVSC 301.
303. **Evolution of Warfare. (3-1). Credit 3. II** Art and concepts of land warfare; its evolution from the beginning of recorded history to present day; influence that leadership, political, economic, sociological and technological development have had on warfare throughout history.
401. **Naval Systems. (3-1). Credit 3. II** Types and purpose of naval ships and aircraft; propulsion systems, damage control, and elements of design and stability characteristics; theory and operational principles of Naval Weapon systems, types of weapons and platforms, capabilities and limitations, and basics of naval ordinance.
402. **Leadership and Ethics. (3-1). Credit 3. II** Naval junior officer ethics and responsibilities; small unit management and administration; current Navy/Marine Corps policies and their application within the Navy and Marine Corps. This course should be taken the semester of graduation.
410. **Amphibious Warfare. (3-1). Credit 3. I** Historical survey of the projection of seapower ashore; background of military history with emphasis on Marine Corps contributions; selected amphibious operations and the evolution of current amphibious doctrine. Development of concepts, principles and techniques of amphibious operations. Prerequisite: NVSC 303.
485. **Directed Studies. Credit 1 to 4. I, II, S** Directed study in problems in the field of Naval Science not covered by other courses in department. Prerequisite: Approval of department head.
489. **Special Topics in... Credit 1 to 4.** Selected topics in an identified field of naval science. May be repeated for credit. Prerequisite: Junior or senior classification or approval of instructor.

Neuroscience (NRSC)

311. **Comparative Psychology. (3-0). Credit 3.** Survey of problems, principles, and methods of animal psychology; animal learning, motivation discriminative processes, and abnormal, social, and instinctual behaviors. Prerequisites: PSYC 107; PSYC 203 and 204 or junior or senior classification. Cross-listed with PSYC 311.
320. **Sensation-Perception. (3-0). Credit 3.** Review of sensory physiology, sensory and perceptual phenomena and the major perceptual theories; current research in the field. Prerequisites: PSYC 107; PSYC 203 and 204 or junior or senior classification. Cross-listed with PSYC 320.
331. **Social Neuroscience. (3-0). Credit 3.** Integration of biological and psychological explanations of social behavior; recent research and theories in social neuroscience; emotion, motivation, aggression, face processing, empathy, social cognition, and social relationships. Prerequisites: PSYC 107 or approval of instructor; junior or senior classification. Cross-listed with PSYC 331.
332. **Neuroscience of Learning and Memory. (3-0). Credit 3.** Brain mechanisms of learning and memory from molecular to behavioral levels; synaptic plasticity, model systems, multiple memory systems, diseases of learning and memory. Prerequisites: PSYC 107 or approval of instructor; junior or senior classification. Cross-listed with PSYC 332.
333. **Biology of Psychological Disorders. (3-0). Credit 3.** Neurobiology and clinical explanation of molecular mechanisms underlying psychiatric disorders and their drug treatments; depression and bipolar, anxiety disorders, mood disorders, psychosis and schizophrenia. Prerequisites: PSYC 107, PSYC 335 or one year of biology; junior or senior classification. Cross-listed with PSYC 333.
335. **Physiological Psychology. (3-0). Credit 3.** Physiological bases of sensation, motor functions, emotion motivation, and complex psychological processes. Prerequisites: 6 hours of biology; PSYC 203 and 204 or junior or senior classification. Cross-listed with PSYC 335.

340. **Psychology of Learning. (3-0). Credit 3.** Survey of significant concepts, experimental methods and principles of learning. Prerequisites: PSYC 107 or INST 301; PSYC 203 and 204 or junior or senior classification. Cross-listed with PSYC 340.
360. **Health Psychology and Behavioral Medicine. (3-0). Credit 3.** Survey of health psychology emphasizing behavioral and lifestyle factors in health and illness, prevention and modification of health-compromising behaviors, health care utilization, and psychological management of chronic disorders and terminal illness. Prerequisite: PSYC 107. Cross-listed with PSYC 360.
434. **Regulatory and Behavioral Neuroscience. (3-0). Credit 3.** Bioelectricity, nerve cell functions, brain functions; physiologic basis of behavior. Prerequisites: BIOL 319; WFSC 416 or BIOL 388. Cross-listed with BIOL 434.
450. **Mammalian Functional Neuroanatomy. (3-2). Credit 4.** Functional morphology of the domestic animal and human brain using gross specimens, microscopic sections, interactive computer-, DVD-, and video-assisted instructional programs supplemented with clinical case studies. Prerequisites: Junior or senior classification; BIMS, biology, biochemistry, or psychology majors, or neuroscience minors with overall 3.5 TAMU GPA; or approval of instructor. Cross-listed with VIBS 450.
485. **Directed Studies. Credit 1 to 3.** Directed readings or research problems in selected areas designed to supplement existing course offerings. Individual report required. Prerequisite: Approval of instructor.
489. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of neuroscience. May be repeated for credit. Prerequisite: Approval of instructor.
491. **Research. Credit 1 to 4.** Research conducted under the direction of a faculty member in neuroscience. May be repeated 3 times for credit. Prerequisites: Junior or senior classification and approval of instructor.

Department of Nuclear Engineering

Professors M. L. Adams, Y. A. Hassan, R. J. Juzaitis (Head), W. H. Marlow, J. E. Morel, K. L. Peddicord, J. W. Poston, Sr., W. D. Reece; Associate Professors F. R. Best, W. S. Charlton, J. R. Ford, K. Vierow; Assistant Professors S. Bragg-Sitton, S. M. McDeavitt, J. C. Ragusa, L. Shao, P. Tsvetkov; Senior Lecturer L. A. Braby; Lecturer N. Ostrovskaya

Nuclear Engineering (NUEN)

101. **Principles of Nuclear Engineering. (1-0). Credit 1. I, II** Introduction to nuclear engineering including global and national energy requirements, radioactivity, radiation protection, and fission and fusion reactor concepts.
201. **Introduction to Nuclear Engineering I. (3-0). Credit 3. I** Atomic and nuclear physics discoveries that have led to the development of nuclear engineering, atomic models, relativity, x-rays, types of nuclear reactors; problem solving techniques. Prerequisites: MATH 251 or registration therein; PHYS 208.
289. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of nuclear engineering. May be repeated for credit. Prerequisite: Approval of instructor
301. **Nuclear Reactor Theory. (3-0). Credit 3. I** An introduction to neutron diffusion theory, neutron moderation, conditions for criticality of nuclear reactors. Prerequisites: NUEN 302.
302. **Introduction to Nuclear Engineering II. (3-0). Credit 3. II** Basic radioactivity, nuclear and neutron physics as applied to nuclear engineering. Prerequisites: NUEN 201; MATH 308 or registration therein.
303. **Nuclear Detection and Isotope Technology Laboratory. (2-3). Credit 3. II** Interaction of radiation with matter; behavior of various nuclear radiation detectors studied both theoretically and experimentally in laboratory; properties of radionuclides useful to industry considered and evaluated from engineering point of view; writing intensive course. Prerequisites: NUEN 309; ECEN 215.
304. **Nuclear Reactor Analysis. (3-0). Credit 3. II** The group diffusion method, multiregion reactors, heterogeneous reactors, reactor kinetics, changes in reactivity. Prerequisites: NUEN 301.
309. **Radiological Safety. (3-0). Credit 3. I** Interactions of nuclear radiations with matter and biological systems; theory and practice of radiation dosimetry as applied to radiation protection; design and application of radiation dosimetry systems for personnel monitoring, area radiation monitoring and accident situation; includes external and internal dosimetry as well as long-term risk analysis. Prerequisite: NUEN 302. Cross-listed with SENG 309.

329. **Analytical and Numerical Methods.** (4-0). **Credit 4. I** Introduction to use of numerical analysis and advanced analytical techniques for obtaining nuclear reactor flux distributions, temperatures and transients; use of digital computer in obtaining nuclear reactor design information. Prerequisites: MATH 311 and NUEN 301.
405. **Nuclear Engineering Experiments.** (2-3). **Credit 3. I** Experimental measurements of basic nuclear reactor parameters; reactor operation and reactor safety. Prerequisites: NUEN 303; NUEN 304 or senior classification.
406. **Nuclear Engineering Systems and Design.** (3-0). **Credit 3. I** Nuclear plant systems; conventional and advanced generation power reactors, nuclear simulators, transient analysis using available software for reactor simulators; nuclear engineering design methodology; problem formulation, criteria, trade-off decisions and design optimization; case studies. Prerequisites: NUEN 304.
410. **The Design of Nuclear Reactors.** (4-0). **Credit 4. II** Application of reactor theory and other engineering disciplines in fundamental and practical design of nuclear reactor systems for power applications; use of computer in design operations. Prerequisites: NUEN 304 and 406; MEEN 461.
417. **Introduction to Fusion Engineering.** (3-0). **Credit 3. II** Fusion reactor requirements and fundamentals; basic plasma properties and confinement techniques; reactor design and engineering problems. Prerequisite: Senior classification in nuclear engineering or approval of instructor.
430. **Computer Applications in Nuclear Engineering.** (3-0). **Credit 3. I** Applications of digital computers to solve nuclear engineering problems; nuclear data and cross-section libraries; deterministic and Monte Carlo methods; discretization methods, problems with multigroup neutron diffusion, depletion, and kinetics; transient heat transfer; analog and non-analog Monte Carlo methods; optimization; applied nuclear engineering codes. Prerequisite: NUEN 304, NUEN 329.
431. **Technical Communications Issues in the Nuclear Industries.** (1-0). **Credit 1.** Introduction to a variety of topics that present communication challenges; opportunities to learn from a variety of visiting experts concerning the nuances and challenges of, as well as successful methods for, communicating with concerned audiences about technically challenging topics. Prerequisite: Junior or senior classification or approval of instructor.
475. **Environmental Nuclear Engineering.** (3-0). **Credit 3. I** Environmental aspects of nuclear power; natural radiation environment and the distribution of radioactivity added to the environment by human activities; evaluation of effects of radiation and radioactivity on the environment and on humans. Prerequisite: NUEN 309.
479. **Radiation Protection Engineering.** (2-3). **Credit 3. II** Analysis of radiation hazard situations and design of nuclear facilities from a safety standpoint. Prerequisite: NUEN 475.
481. **Seminar.** (1-0). **Credit 1. II** Designed to broaden the student's capability, performance and perspective in nuclear engineering through faculty, student and guest presentations. Prerequisite: NUEN 410 or registration therein or NUEN 479 or registration therein.
485. **Directed Studies.** **Credit 1 to 6. I, II, S** Problems of limited scope approved on an individual basis intended to promote independent study; program enrichment for capable students; results presented in writing to staff. Prerequisites: Junior or senior classification and approval of department head.
489. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of nuclear engineering. May be repeated for credit. Prerequisite: Approval of instructor.
491. **Research.** **Credit 1 to 4.** Research conducted under the direction of a faculty member in Nuclear Engineering. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor.

(See page 767 for the nuclear engineering course in applied mechanics.)

Nutritional Sciences

(faculty, see page 703)

(NUTR)

202. (BIOL 1322, HECO 1322) **Fundamentals of Human Nutrition.** (3-0). **Credit 3. I, II, S** Principles of nutrition with application to the physiologic needs of individuals; food sources and selection of an adequate diet; formulation of Recommended Dietary Allowances; nutritional surveillance; for non-nutrition majors only.
203. **Scientific Principles of Human Nutrition.** (3-0). **Credit 3. I, II** Chemistry and physiology of proteins, carbohydrates, lipids, vitamins and minerals; their ingestion, digestion, absorption, transport and metabolism. Prerequisite: CHEM 101. Majors only.
211. **Scientific Principles of Foods.** (2-3). **Credit 3. I, II** Basic principles underlying selection, preparation and preservation of food in relation to quality standards, acceptability and aesthetics. Introduction to composition, nutritive value, chemical and physical properties of foods; introduction to experimental study of foods. Prerequisites: CHEM 227 and 237.
285. **Directed Studies.** **Credit 1 to 4. I, II, S** Directed study of selected problems in the area of nutrition. Prerequisites: Approval of instructor; 2.0 GPR in major and overall.
289. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of nutrition. May be repeated for credit. Prerequisite: Approval of department head.
291. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in nutrition. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of department head.
303. **Principles of Animal Nutrition.** (3-0). **Credit 3. I, II, S** Scientific approach to nutritional roles of water, carbohydrates, proteins, lipids, minerals, vitamins, and other dietary components; emphasis on the comparative aspects of gastrointestinal tracts and on digestion, absorption, and metabolism of nutrients. Prerequisites: CHEM 222; CHEM 227 or equivalent. Cross-listed with ANSC 303.
304. **Food Service Systems Management.** (3-4). **Credit 5. I, II, S** Principles of food service management used in selecting, storing, preparing and serving food in quantity; emphasis on menu planning, quality control, purchasing, equipment and layout/design; application of basic food service systems management principles, including financial planning and personnel issues. Prerequisites: NUTR 211; MGMT 309; junior classification or approval of department head.
404. **Nutrition Assessment and Planning.** (2-2). **Credit 3. I, II** Methods of determining the nutritional status of individuals; dietary techniques; planning nutritional care including diet modification and/or nutrition support; nutrition counseling. Prerequisites: NUTR 203; junior classification or approval of department head.
405. **Nutritional Treatment of Disease.** (3-2). **Credit 4. I** Nutritional intervention in pathological conditions, based on biochemical, physiological and psychological effects of disease state; current research in clinical nutrition. Prerequisites: NUTR 203, 444; BIOL 319; or approval of instructor.
430. **Community Nutrition.** (3-0). **Credit 3. I, II, S** Health and nutrition programs, food labeling, cultural food practices, consumer education and marketing. Prerequisite: NUTR 203.
444. **Nutrition Through Life.** (3-0). **Credit 3. I, II** Analysis of nutrition with emphasis on human biological needs through stages of the life cycle; biochemical, physiological and anthropometric aspects of nutrition. Prerequisites: NUTR 203; junior classification or approval of department head.
470. **Nutrition and Physiological Chemistry.** (3-0). **Credit 3. I, II** Fundamentals of physiology, biochemistry and nutrition and their relationship to the organismic and cellular metabolism of animals; biochemical basis of hormonal action. Prerequisites: NUTR 203; BICH 410.
481. **Seminar.** (1-0). **Credit 1. I, II, S** Review of current literature and research in nutrition; oral presentations and critical discussions. Prerequisite: Senior classification in nutritional sciences.
485. **Directed Studies.** **Credit 1 to 4. I, II, S** Directed study on selected problems in the area of nutrition. Prerequisites: Junior or senior classification in scientific nutrition or allied area; approval of instructor; 2.0 GPR in major and overall.

489. **Special Topics in...** Credit 1 to 4. I, II, S Selected topics in an identified area of nutrition. May be repeated for credit. Prerequisite: Junior or senior classification.
491. **Research.** Credit 1 to 4. I, II, S Research conducted under the direction of faculty member in nutrition. May be repeated 3 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded.

Ocean Engineering

(faculty, see page 650)

(OCEN)

201. **Introduction to Ocean Engineering.** (2-0). Credit 2. II Survey of ocean engineering; concepts and theories of wave-structure interaction; sources of technical information; coastal and ocean structures, moorings, laboratory models, underwater systems; naval architecture; recent developments in ocean engineering. Prerequisites: CVEN 221 or registration therein.
300. **Ocean Engineering Wave Mechanics.** (3-0). Credit 3. II Physical and mathematical fundamentals of ocean wave behavior; mechanics of wave motion; use of statistics and probability to develop design wave criteria. Prerequisite: CVEN 311, OCEN 201 or registration therein.
301. **Dynamics of Offshore Structures.** (3-0). Credit 3. I Prediction of loads due to wind, current and waves; introduction to concepts of linear structural dynamics and to the design of ocean structures; mooring and towing analysis; fluid-structure interactions; vibration of submerged structures. Prerequisites: OCEN 300 or approval of instructor; CVEN 345, CVEN 363 or registration therein.
400. **Basic Coastal Engineering.** (3-0). Credit 3. I Mechanics of wave motion; wave refraction, diffraction and reflection; wave forecasting; shore processes; planning of coastal engineering projects; design of seawalls, breakwaters and fixed offshore installations; offshore pipelines; dredging; control of oil spills in estuaries and at sea. Prerequisites: OCEN 300 or approval of instructor; CVEN 311.
401. **Underwater Acoustics for Ocean Engineers.** (3-0). Credit 3. I Fundamentals of underwater acoustics, SONAR equations, propagation of underwater sound, acoustic transducers and arrays, noise in the ocean environment, design and prediction of SONAR systems, ocean engineering applications of underwater sound. Prerequisite: CVEN 311.
402. **Principles of Naval Architecture.** (3-0). Credit 3. I Elementary principles of naval architecture; ship geometry and hydrostatics; load line and classification regulations; concept of intact and damaged stability; resistance and propulsion of water-borne vehicles; applications to the design consideration of semi-submersibles, catamarans and drilling rigs. Prerequisite: CVEN 311.
407. **Design of Ocean Engineering Facilities.** (1-6). Credit 4. II Design of structures, equipment and systems for the ocean; environmental, logistical and reliability requirements; complete design process followed through group design project; delineation of alternatives, constraints, economics and environmental consequences included to strengthen real-life problem solving skills. Prerequisites: OCEN 301, 400, 402 or approval of instructor.
408. **Underwater and Moored System Design.** (3-0). Credit 3. II Basic principles of thermodynamics, fluid dynamics and human respiration physiology applied to design of underwater habitats, submersibles and diving bells; breathing gas supply for diving systems; heat transfer for underwater systems; pressure vessel design; remotely operated vehicles; and design for towed and moored systems. Prerequisites: CVEN 311; MEEN 315 or approval of instructor.
410. **Ocean Engineering Laboratory.** (0-3). Credit 1. II Fundamental techniques and instrumentation for field and laboratory measurements pertaining to ocean engineering (such as temperature, depth, force, currents, wave height, sound velocity) experiment planning; data analysis and data presentation; written reports describing planning, analysis and results of experiments. Prerequisites: OCEN 301, 400, 402.
462. **Hydromechanics.** (3-0). Credit 3. II Kinematics of fluids; incompressible, irrotational and turbulent flow; Navier-Stokes equations; flow of viscous fluids. Prerequisites: CVEN 311; MATH 308.
481. **Seminar.** (1-0). Credit 1. I Responsibilities and obligations of new ocean engineers; professional ethics, membership in professional societies and professional registrations; case studies and lectures presented by staff and practicing engineers. Prerequisite: OCEN 300.

485. **Directed Studies. Credit 1 to 6. I, II, S** Special problems in various areas of ocean engineering assigned to individual students or to groups; readings and assignments given and frequent consultations held. Prerequisite: Approval of program head.
489. **Special Topics in... Credit 1 to 4. I, II, S** Selected topics in an identified field of ocean engineering. May be repeated for credit. Prerequisite: Approval of instructor.
491. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in ocean engineering. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor.

Department of Oceanography

Professors J. G. Baldauf, T. S. Bianchi, D. C. Biggs, D. A. Brooks, W. R. Bryant, L. Campbell, P. Chang, P. Chapman (Head), L. A. Cifuentes, P. J. Fox, W. D. Gardner, G. A. Jackson, M. C. Kennicutt II, B. Kjerfve, M. W. Lyle, J. W. Morse, G. R. North, P. D. Rabinowitz, M. J. Richardson, G. T. Rowe, W. W. Sager, P. H. Santschi, N. C. Slowey, R. H. Stewart, R. R. Stickney, A. C. Vastano, J. H. Wormuth; **Associate Professors** S. F. DiMarco, B. S. Giese, R. D. Hetland, P. Louchouart, M. R. Scott, A. Stoessel; **Assistant Professors** R. Amon, A. Anis, T. M. Dellapenna, H. J. Mills, A. Quigg, M. Schmidt, A. Schulze, D. J. Thomas, D. C. Thornton, S. Yvon-Lewis

Oceanography (OCNG)

205. **Topics in Oceanography. (1-0). Credit 1. I, II** Selected topics in oceanography to provide students with a broad conception of the world's oceans; evaluation of its potential contributions to solution of problems presently confronting mankind. A nontechnical course open to all university students.
251. **Oceanography. (3-0). Credit 3. I, II** Overview of the ocean environment; interrelation of the subdisciplines of ocean sciences; importance of the oceans to human beings; human impact on the oceans. Honors sections are also available. Prerequisite: Concurrent registration in OCNG 252 if necessary for meeting the 8 credit hour science core curriculum requirement.
252. **Oceanography Laboratory. (0-2). Credit 1. I, II** Practical laboratory experiments and exercises demonstrating principles of ocean sciences. Honors sections are also available. A weekend field trip for the Honors sections only is required for which a fee is assessed. Prerequisite: OCNG 251 or concurrent registration.
291. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in oceanography. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Freshman or sophomore classification and approval of instructor.
401. **Interdisciplinary Oceanography. (3-0). Credit 3. I, II** Quantitative survey of interdisciplinary relationships between biological, chemical, geological/geophysical and physical aspects of the ocean. Prerequisites: CHEM 101; MATH 131; junior or senior classification; or approval of instructor. Honors section also available.
410. **Introduction to Physical Oceanography. (3-0). Credit 3. I, II** Elements of the physics of the sea; descriptive aspects as well as cause and effect relations in respect to currents, thermal structure and waves. Intended for majors in the physical sciences or engineering. Prerequisites: MATH 308; PHYS 219; junior or senior classification.
420. **Introduction to Biological Oceanography. (3-0). Credit 3. I** Biological aspects of the marine environment; marine organisms; productivity of the sea; marine pollution and fouling; use of the sea. Prerequisites: BIOL 114 or OCNG 251; junior or senior classification.
430. **Introduction to Geological Oceanography. (3-0). Credit 3.** History of Oceanography; physiographic provinces of the oceans, their origins and sediments; geological sampling techniques and geophysical methods; coasts and beaches, paleoceanography; global tectonics. Prerequisite: OCNG 251 or 401 or GEOL 101 or 104 or GEOG 203; junior or senior classification.
440. **Introduction to Chemical Oceanography. (3-0). Credit 3.** Chemical aspects of the marine environment; biogeochemical cycles of organic and inorganic constituents; primary productivity, the carbon dioxide system, nutrient cycles, stable and radioactive isotopes in the sea. Prerequisites: CHEM 102 or 104; junior or senior classification; sophomore with approval of instructor.

451. **Mathematical Modeling of Ocean Climate.** (3-2). **Credit 4. I** Problem-based course in theoretical and computer techniques applied to mathematical solutions of ocean climate, including ocean circulation, climate variability, El Niño. Prerequisite: MATH 308 or 451.
485. **Directed Studies.** **Credit 1 to 4. I, II, S** Special reading assignments, problems and discussion on oceanographic topics of mutual interest to student and instructor. Prerequisite: OCNG 251 or 401 or approval of instructor. An honors section is also available.
489. **Special Topics in...** **Credit 1 to 4. I, II** Selected topics in an identified area of oceanography. May be taken two times for credit. Prerequisite: OCNG 251 or 401 or approval of instructor. An honors section is also available.
491. **Research.** **Credit 1 or more. I, II, S** Research conducted under the direction of faculty member in oceanography. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor. An honors section is also available.

Department of Performance Studies

Performance Studies: Professor J. A. Hamera (Head); Associate Professors H. M. Berger, D. Dox.; Assistant Professor K. Pullen, K. Woodward

Music: Professor P. E. Lieuwen; Associate Professors H. M. Berger, H. A. Houtchens, D. F. Wilborn; Assistant Professor M. Regan; Senior Lecturer L. E. Marlow; Lecturers N. Cherry, M. Henry, A. Imhoff, D. Lawrence, P. McDaniel; Assistant Lecturers M. Bussiki, A. Carney, K. Etheredge, B. Harris-Reynolds, J. M. Morris

Theatre Arts: Professors M. L. Greenwald, R. H. Schultz; Associate Professors D. Dox, S. L. Kelly; Lecturers B. Bailey, B. Shevelenko, R. Wolf

Performance Studies (PERF)

301. **Performance in World Cultures.** (3-0) **Credit 3.** In music or dance, clothing or drama, the people of every society express themselves in performance. This course will familiarize students with the field of performance studies and explore the enactment of the arts in world cultures. Units on music, theater, verbal art, and dress examine different genres of performance. Prerequisite: Junior or senior classification or approval of instructor.
325. **Dance and World Cultures.** (3-0). **Credit 3.** Examination of international relationships between dance, culture, identity, gender, youth and politics; relationships between dancing, gender and politics in northern Greece; variety of dance practices across the globe. Prerequisite: Junior or senior classification. Cross-listed with MUSC 325.
326. **Dance and Identity in the United States.** (3-0). **Credit 3.** Analysis of dance events as complex sites for social action; examines dances performed by diverse groups of people; considers such issues as identity, community, diversity, gender and representation in the United States. Prerequisite: Junior or senior classification. Cross-listed with MUSC 326.
327. **Popular Musics in the African Diaspora.** (3-0). **Credit 3.** Examines a range of popular musics from the twentieth century that have emerged in conjunction with the historical global spread of peoples and cultures from the African continent; technical knowledge about music is not required; focuses on social and cultural contexts for popular music. Prerequisite: MUSC 324 or approval of instructor. Cross-listed with MUSC 327.
489. **Special Topics in...** **Credit 1 to 4.** Selected topics in performance studies. May be repeated for credit. Prerequisite: Approval of instructor.
491. **Research.** **Credit 1 to 3.** Research conducted under the direction of faculty member in performance studies. May be repeated 1 time for credit. Prerequisites: Junior or senior classification and approval of instructor.

Harold Vance Department of Petroleum Engineering

Professors M. A. Barrufet, T. A. Blasingame, A. Datta-Gupta, C. A. Ehlig-Economides, A. D. Hill, S. A. Holditch (Head), H. C. Juvkam-Wold, R. H. Lane, W. J. Lee, D. D. Mamora, H. A. Nasr-El-Din, P. P. Valko, R. A. Wattenbarger; **Associate Professors** A. Ghassemi, D. A. McVay, D. S. Schechter, S. L. Scott, D. Zhu; **Assistant Professors** G. Falcone, Y. B. Jafarpour, J. J. Schubert, C. Teodoriu; **Senior Lecturers** J. B. Maggard, L. D. Piper, G. W. Voneiff; **Lecturer** D.-J. Weatherford

Petroleum Engineering (PETE)

201. **Introduction to Petroleum Engineering.** (1-0). **Credit 1. I** Overview of petroleum industry and petroleum engineering, including nature of oil and gas reservoirs, petroleum exploration and drilling, formation evaluation, well completions and production, surface facilities, reservoir mechanics, and improved oil recovery. Prerequisites: Approval of department head.
211. **Petroleum Engineering Systems.** (1-0). **Credit 1. I** Introduction to petroleum engineering reservoir, drilling, formation evaluation, and production systems, including fundamental petroleum engineering concepts, quantities and unit systems. Prerequisites: ENGR 112; MATH 152; PHYS 218.
225. **Petroleum Drilling Systems.** (1-3). **Credit 2. I,II** Introduction to Petroleum Drilling Systems, including fundamental petroleum engineering concepts, quantities and unit systems, drilling rig components, drilling fluids, pressure loss calculations, casing, well cementing, and directional drilling. Prerequisites: ENGR 112, MATH 152, PHYS 218.
285. **Directed Studies.** **Credit 1 to 4.** Special problems in various areas of petroleum engineering assigned to individual students or to groups. Prerequisites: Completion of engineering Common Body of Knowledge courses; approval of department head.
289. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of petroleum engineering. May be repeated for credit. Prerequisite: Approval of instructor.
300. **Summer Practice.** **Required. No Credit.** Industry practice to familiarize the petroleum engineering student with practices and equipment of the petroleum industry. Approval of advisor required.
301. **Petroleum Engineering Numerical Methods.** (2-3). **Credit 3. I** Use of numerical methods in a variety of petroleum engineering problems; numerical differentiation and integration; root finding; numerical solution of differential equations; curve fitting and interpolation; computer applications; introduction to the principles of numerical simulation methods. Prerequisites: PETE 311; CVEN 305; MEEN 315; MATH 308.
310. **Reservoir Fluids.** (3-3). **Credit 4. I** Thermodynamic behavior of naturally occurring hydrocarbon mixtures; evaluation and correlation of physical properties of petroleum reservoir fluids including laboratory and empirical methods. Prerequisites: PETE 311; CHEM 107; CVEN 305; MEEN 315; MATH 308.
311. **Reservoir Petrophysics.** (3-3). **Credit 4. I,II** Systematic theoretical and laboratory study of physical properties of petroleum reservoir rocks; lithology, porosity, relative and effective permeability; fluid saturations, capillary characteristics, compressibility, rock stress, and fluid-rock interaction. Prerequisites: PETE 225; MEEN 221; GEOL 104; MATH 308 or registration therein.
314. **Transport Processes in Petroleum Production.** (3-0). **Credit 3. I** Fluid mechanics: fluid statics; mass, energy, momentum balances; friction losses, turbulent flow, Reynolds Number (Moody diagram); Newtonian/Non-Newtonian fluids; flow in porous media (Darcy's law and Non-Darcy flow); heat transfer: heat conduction (steady-state/transient flow: flux components, slabs/cylinders, thermal conductivity, analogs, applications); heat convection (heat transfer/pressure drop, heat exchangers, applications). Prerequisites: PETE 311, CVEN 305, MEEN 315, MATH 308.
320. **Drilling and Production Systems.** (2-3). **Credit 3. II** Introduction to drilling systems: components, drilling fluids, pressure loss calculations, well cementing, and directional drilling; theoretical and laboratory prediction of flowrates and pressure drops through conventional petroleum production networks; calculation of static and flowing bottomhole pressures in oil and gas wells; well deliverability via inflow (IPR)/outflow (VLP) methods; gas lift; pump lift; gas compression. Prerequisites: PETE 301 and 310; GEOL 404.
321. **Formation Evaluation.** (3-3). **Credit 4. II** Introduction to modern well logging methods, engineering, core-log integration. Prerequisites: PETE 301 and 310; GEOL 404; or approval of instructor.

322. **Geostatistics.** (3-0). **Credit 3. II** Introduction to geostatistics; basic statistics concepts; univariate distributions and estimators; measures of heterogeneity; hypothesis testing, correlation, and regression; analysis of spatial relationships, modeling geological media and use of statistics in reservoir modeling. Prerequisites: PETE 401; GEOL 404; or approval of instructor.
323. **Reservoir Models.** (3-0). **Credit 3. II** Determination of reserves; material balance methods; aquifer models; fractional flow and frontal advance; displacement, pattern, and vertical sweep efficiencies in waterfloods; enhanced oil recovery processes; design of optimal recovery processes. Prerequisites: PETE 301 and 310; GEOL 404.
324. **Well Performance.** (3-0). **Credit 3. II** Steady-state, pseudosteady-state, and transient well testing methods to determine well and reservoir parameters used in formation evaluation; applications to wells that produce gas and liquid petroleum, rate forecasting, deliverability testing. Prerequisites: PETE 301 and 310; GEOL 404.
325. **Petroleum Production Systems.** (1-3). **Credit 2. II** Introduction to production operations and oil field equipment, multiphase flow in pipes, bottomhole pressure prediction, inflow/outflow performance, production systems and backpressure analysis, hydraulic fracturing fluids and equipment; downhole and artificial lift equipment, tubulars, workover/completion nomenclature and procedures; produced fluids, fluid separation and metering, safety systems, pressure boosting and monitoring. Prerequisites: PETE 301, 310, 314; GEOL 404.
335. **Technical Presentations I.** (1-0). **Credit 1. I** Preparation of a written technical paper on a subject related to petroleum technology and an oral presentation of the paper in a formal technical conference format; oral presentations judged by petroleum industry professionals at the departmental student paper contest held during the same academic year. Prerequisites: COMM 205; junior classification in petroleum engineering.
400. **Reservoir Description.** (2-3). **Credit 3. II** An integrated reservoir description experience for senior students in petroleum engineering, geology and geophysics; includes using geophysical, geological, petrophysical and engineering data; emphasis on reservoir description (reservoir and well data analysis and interpretation), reservoir modeling (simulation), reservoir management (production optimization) and economic analysis (property evaluation). Prerequisite: Approval of instructor. Cross-listed with GEOL 400.
401. **Reservoir Development.** (2-3). **Credit 3. I** An integrated reservoir development experience for senior students in petroleum engineering; emphasis on reservoir description (reservoir and well evaluation), reservoir modeling (simulation), production optimization (nodal analysis, stimulation, artificial lift, facilities), reservoir management (surveillance and reservoir optimization) and economic analysis (property evaluation and risk analysis). Prerequisites: PETE 321, 323, 324, 325, 403.
403. **Petroleum Project Evaluation.** (3-0). **Credit 3. II** Analysis of investments in petroleum and mineral extraction industries; depletion, petroleum taxation regulations, and projects of the type found in the industry; mineral project evaluation case studies. Prerequisites: PETE 301, 310, 314.
405. **Drilling Engineering.** (3-0). **Credit 3. I** The design and evaluation of well drilling systems; identification and solution of drilling problems; wellbore hydraulics, well control, casing design; well cementing, wellbore surveying. Prerequisites: PETE 321, 323, 324, 325, 403.
406. **Advanced Drilling Engineering.** (3-0). **Credit 3. II** Well control; underbalanced drilling; offshore drilling; horizontal, extended reach, multi-lateral drilling; fishing operations. Prerequisite: PETE 405.
410. **Production Engineering.** (3-0). **Credit 3. I** Fundamental production engineering design, evaluation and optimization for oil and gas wells, including well deliverability, formation damage and skin analysis, completion performance, and technologies that improve oil and gas well performance (artificial lift and well stimulation). Prerequisites: PETE 321, 323, 324, 325, 403.
411. **Well Drilling.** (3-0). **Credit 3. I** The design and evaluation of well drilling systems; identification and solution of drilling problems; wellbore hydraulics; casing design; well cementing; drilling of directional and horizontal wells; wellbore surveying. Prerequisites: PETE 320, 321, 322, 323, 324.
416. **Production Enhancement.** (3-0). **Credit 3. II** Design, problem diagnosis and solving, and performance optimization of the technologies that increase oil and gas well production, including artificial lift, acid stimulation and hydraulic fracturing. Prerequisite: PETE 410.
435. **Technical Presentations II.** (1-0). **Credit 1. I** Preparation of a written technical paper on a subject related to petroleum technology and an oral presentation of the paper in a formal technical conference format; oral presentations are judged by petroleum industry professionals at the departmental student paper contest held during the same academic year. Prerequisites: PETE 335; senior classification in petroleum engineering.

485. **Directed Studies.** Credit 1 to 5. Special problems in various phases of petroleum engineering assigned to individual students or to groups. Prerequisites: Junior or senior classification and approval of department head.
489. **Special Topics in...** Credit 1 to 4. Selected topics in an identified field of petroleum engineering. Approval of instructor. May be repeated for credit.

Department of Philosophy and Humanities

Professors R. W. Burch, D. W. Conway (Head), S. H. Daniel, M. R. Hand, C. E. Harris, Jr., H. J. McCann, J. J. McDermott, D. J. Self, R. A. Smith; **Associate Professors** S. W. Austin, D. L. Darby, T. D. George, C. E. Katz, C. P. Menzel, G. Pappas, L. Radzik, R. Sansom, R. W. Stadelmann, G. E. Varner; **Assistant Professors** M. L. LeBuffe, C. S. Longstreet, C. Murphy, K. Sweet

Philosophy (PHIL)

111. (PHIL 2306) **Contemporary Moral Issues.** (3-0). Credit 3. Representative ethical positions and their application to contemporary social problems.
205. **Technology and Human Values.** (3-0). Credit 3. Interaction of personal and societal values with technology and man's self-image, the future and value change.
208. **Philosophy of Education.** (3-0). Credit 3. Basic social ideas and concepts of human nature in Western civilization; their implications for theories of education.
210. **Concepts of Love.** (3-0). Credit 3. Philosophical and ethical implications of various concepts of love. Writings of philosophers such as Plato, Aristotle, Augustine, Sartre and Buber.
240. (PHIL 2303) **Introduction to Logic.** (3-0). Credit 3. Methods and principles used to distinguish between correct and incorrect reasoning; uses of language, informal and formal fallacies, Venn diagrams, truth-tables, symbolic notation, formal deductive proof, induction.
251. (PHIL 1301) **Introduction to Philosophy.** (3-0). Credit 3. Perennial problems of philosophy such as the existence of God, the mind/body relationship, the limits of knowledge, the foundations of moral judgment, man and the state.
283. **Latin American Philosophy.** (3-0). Credit 3. Major philosophers in the history of Latin American philosophy, such as Unamuno, Ortega y Gasset, Vasconcelos, Caso and Gutiérrez.
285. **Directed Studies.** Credit 1 to 4. Directed studies in specific problem areas of philosophy. Prerequisite: Approval of department head.
289. **Special Topics in...** Credit 1 to 4. Selected topics in an identified area of philosophy. May be repeated for credit. Prerequisite: Approval of instructor.
291. **Research.** Credit 3. Research conducted under the direction of faculty member in the department of philosophy and humanities. May be repeated for credit. Prerequisites: Freshman or sophomore classification and approval of department head.
305. **Philosophy of the Natural Sciences.** (3-0). Credit 3. Critical analysis of scientific methods and achievements; the nature and types of explanation, discovery and confirmation, models and theories. Prerequisite: 3 hours of philosophy other than PHIL 240.
307. **Philosophy of the Social Sciences.** (3-0). Credit 3. Nature and objectivity of the social sciences, their paradigms and patterns of explanation. Prerequisite: 3 hours of philosophy other than PHIL 240.
314. **Environmental Ethics.** (3-0). Credit 3. Moral basis of duties to preserve or protect plants, animals and environmental systems; foundations of environmental law and policy; the idea of nature in philosophy; critique of social and economic analyses of environmental values. Prerequisite: Sophomore classification or approval of instructor.
315. **Military Ethics.** (3-0). Credit 3. Major ethical issues in modern military practice: ethics of leadership, just war theory, killing of the innocent and the moral status of the rules of war.
320. **Philosophy of Mind.** (3-0). Credit 3. Relation of mind to body, nature of thought and knowing, the free will problem, death and immortality. Prerequisite: 3 hours of philosophy other than PHIL 240.
330. **Philosophy of Art.** (3-0). Credit 3. Theories of artistic creation and aesthetic response as exemplified in art forms such as painting, music, poetry, architecture, dance, theater, sculpture and motion pictures.

331. **Philosophy of Religion.** (3-0). **Credit 3.** Philosophical problems of Western religion such as the existence of God, the problem of evil, types of theism, rational, empirical and mystical approaches to God. Cross-listed with RELS 331.
332. **Social and Political Philosophy.** (3-0). **Credit 3.** Metaphysical commitments and political theory, the nature and proper ends of the state, freedom, equality, authority, and justice, considering such writers as Plato, Aristotle, Machiavelli, Locke, Rousseau, Marx, Dewey. Prerequisite: 3 hours of philosophy other than PHIL 240.
334. **Philosophy of Law.** (3-0). **Credit 3.** Traditional legal issues such as definitions of law, relationship between law and morality, and punishment considered from a legal perspective. Prerequisite: Junior or senior classification.
341. **Symbolic Logic.** (3-0). **Credit 3.** Elementary symbolic logic beginning with propositional calculus and first order predicate logic, and their applications. Prerequisite: PHIL 240.
342. **Symbolic Logic II.** (3-0). **Credit 3.** Advanced topics in logic such as the theory of identity, higher order logics, logic of sets, elements of modal logic. Prerequisite: PHIL 341 or approval of department head.
351. **Theory of Knowledge.** (3-0). **Credit 3.** Major topics in epistemology such as the problem of induction, perception theory, memory and the problem of other minds. Prerequisites: PHIL 413 and 3 hours of philosophy.
361. **Metaphysics.** (3-0). **Credit 3.** Topics concerning the fundamental nature of reality such as what exists, the mental and the physical, universals and individuals, space and time, God. Prerequisites: PHIL 240 and 3 hours of philosophy.
371. **Philosophy of Literature.** (3-0). **Credit 3.** Philosophical analysis of the major recurrent themes in world literature including fate, the meaning of tragedy, death, odyssey, good and evil, time and eternity, hope and salvation; works selected from a variety of cultures and historical periods.
375. **Philosophy of the Visual Media.** (2-2). **Credit 3.** Aesthetic, ethical and epistemological issues of photography, cinema and video.
381. **Ethical Theory.** (3-0). **Credit 3.** Values and conduct such as moral relativism, self-interest, utilitarianism, rules, nature of valuation, ethical language and argumentation. Prerequisite: 3 hours of philosophy other than PHIL 240.
410. **Classical Philosophy.** (3-0). **Credit 3.** Major philosophers from 600 B.C. to the end of the third century A.D. including the Pre-Socratics, Socrates, Plato, Aristotle, Hellenistic and Roman philosophy and the Neo-Platonists.
411. **Medieval Philosophy.** (3-0). **Credit 3.** Major philosophers from the early Christian centuries through the 14th century, emphasizing such writers as Augustine, Aquinas, Duns Scotus and William of Ockham.
413. **Modern Philosophy.** (3-0). **Credit 3.** Major developments from the Renaissance through the 18th century emphasizing such philosophers as Descartes, Spinoza, Leibniz, Locke, Berkeley, Hume and Kant.
414. **Nineteenth Century Philosophy.** (3-0). **Credit 3.** Contributions of such philosophers as Hegel, Marx, Kierkegaard, Nietzsche, Husserl, Mill and Bradley. Prerequisite: PHIL 413.
415. **American Philosophy.** (3-0). **Credit 3.** The thought of philosophers such as Peirce, James, Royce, Santayana, Mead, Dewey and Whitehead. Prerequisite: 3 hours of philosophy other than PHIL 240.
416. **Recent British and American Philosophy.** (3-0). **Credit 3.** Major philosophers in contemporary Anglo-American thought such as Moore, Russell, Wittgenstein, Ayer, Quine, Austin and Ryle. Prerequisites: PHIL 240 and 413.
418. **Phenomenology and Existentialism.** (3-0). **Credit 3.** Major recent philosophers such as Sartre, Heidegger, Merleau-Ponty, Marcel, Ricoeur. Prerequisite: PHIL 413.
419. **Current Continental Philosophy.** (3-0). **Credit 3.** Major thinkers concerned with "postmodern" topics in hermeneutics, poststructuralism, critical theory, deconstructionism, contemporary Marxist strategies, semiotics and feminist theory. Prerequisite: Junior classification or approval of instructor.
424. **Philosophy of Language.** (3-0). **Credit 3.** The nature of language; the various uses of language and their philosophical import; the nature of meaning, truth, reference and issues surrounding formal representations of natural languages. Prerequisite: Junior classification or approval of instructor. Prerequisite: 3 hours of philosophy other than PHIL 240.

480. **Medical Ethics. (3-0). Credit 3.** Critical analysis of major ethical issues in medicine including truth-telling, confidentiality, paternalism, genetics, abortion, infanticide, euthanasia and social justice in health care.
482. **Ethics and Engineering. (2-2). Credit 3.** Development of techniques of moral analysis and their application to ethical problems encountered by engineers, such as professional employee rights and whistle blowing; environmental issues; ethical aspects of safety, risk and liability; conflicts of interest; emphasis on developing the capacity for independent ethical analysis of real and hypothetical cases. Prerequisite: Junior classification. Cross-listed with ENGR 482.
483. **Professional Ethics. (3-0). Credit 3.** Major ethical theories as applied to problems of professional ethics and decision-making in the biological, physical and social sciences, business, education, engineering, law and medicine.
484. **Professional Internship. Credit 1 to 6.** Practical experience in an institutional or organizational setting appropriate to analysis and understanding of issues in some area of applied philosophy. Prerequisite: Approval of instructor and department head.
485. **Directed Studies. Credit 1 to 6.** Directed studies in specific problem areas of philosophy. Prerequisite: Approval of department head.
489. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of philosophy. May be repeated for credit.
491. **Research. Credit 3.** Research conducted under the direction of faculty member in the department of philosophy and humanities. May be repeated for credit. Prerequisites: Junior or senior classification and approval of department head.
495. **Philosophical Writing. (1-0). Credit 1.** Writing, analysis and criticism of philosophical arguments; writing philosophical prose; methods for research in philosophy. Prerequisite: Junior or senior classification. Co-requisite: Enrollment in one of the following: PHIL 305, 307, 314, 315, 320, 331, 332, 351, 361, 371, 375, 381, 410, 411, 413, 414, 415, 416, 418, 419, or 424.
497. **Independent Honors Studies. Credit 1 to 3.** Directed independent studies in specific philosophical problems. Prerequisites: Junior or senior classification either as Honors students or with overall GPR of 3.25; letter of approval from head of student's major department.

Department of Physics

Professors T. W. Adair III, G. Agnolet, R. E. Allen, W. H. Bassichis, K. Becker, M. Becker, R. A. Bryan, S. Chin, D. A. Church, N. M. Duller, A. M. Finkel'stein, A. L. Ford, E. S. Fry (Head), S. A. Fulling, C. A. Gagliardi, J. C. Hardy, D. R. Herschbach, C. R. Hu, T. Kamon, G. W. Kattawar, L. V. Keldysk, C. M. Ko, O. Kocharovskaya, V. Kocharovsky, P. M. McIntyre, D. V. Nanopoulos, D. G. Naugle, V. L. Pokrovsky, C. N. Pope, J. F. Reading, J. H. Ross, Jr., W. M. Saslow, H. A. Schuessler, M. O. Scully, E. Sezgin, N. B. Suntzeff, R. E. Tribble, R. C. Webb, Sr., M. B. Weimer, G. R. Welch, J. T. White, D. H. Youngblood, M. S. Zubairy; **Associate Professors** A. A. Belyanin, B. Dutta, I. F. Lyuksyutov, G. G. Paulus, R. F. Rapp, J. Sinova, A. V. Sokolov, W. Teizer, D. Toback, L. Wang, W. Wu; **Assistant Professors** A. G. Abanov, R. J. Fries, D. G. Melconian, S. Mioduszewski, A. N. Safonov; **Lecturers** T. L. Erukhimova, K. L. Krisciunas

Physics (PHYS)

101. **Freshman Physics Orientation. (1-0). Credit 1. I** Critical thinking skills and problem solving in physics: time management and teaming skills. May be taken twice for credit. For physics majors. Registration by non-majors requires approval of physics department head. Prerequisite: Registration in PHYS 218 or 208.
109. **Big Bang and Black Holes. (3-2). Credit 4.** Designed to give an intuitive understanding of the Big Bang and Black Holes, without mathematics, and de-mystify it for the non-scientist.
201. **(PHYS 1301 and 1101, 1401) College Physics. (3-3). Credit 4. I, II, S** Fundamentals of classical mechanics, heat, and sound. Primarily for architecture, education, premedical, pre dental, and preveterinary medical students. Prerequisite: MATH 103 or equivalent.
202. **(PHYS 1302 and 1102, 1402) College Physics. (3-3). Credit 4. I, II, S** Continuation of PHYS 201. Fundamentals of classical electricity and light; introduction to contemporary physics. Prerequisite: PHYS 201.

205. **Concepts of Physics.** (3-3). **Credit 4.** General survey physics course for K–8 preservice teachers integrating physics content and laboratory activities relevant to physics-related subject matter included in the current Texas and national standards for elementary school science; includes aspects of mechanics, waves, electricity, magnetism and modern physics. Prerequisite: Major in interdisciplinary studies or interdisciplinary technology or approval of instructor.
208. **Electricity and Optics.** (3-3). **Credit 4. I, II, S** Continuation of PHYS 218. Electricity, magnetism and optics. Primarily for engineering students. Prerequisites: PHYS 218; MATH 152 or 172 or registration therein.
218. **(PHYS 2325 and 2125, 2425) Mechanics.** (3-3). **Credit 4. I, II, S** Mechanics for students in science and engineering. Prerequisite: MATH 151 or 171 or registration therein.
219. **(PHYS 2326 and 2126, 2426) Electricity.** (3-3). **Credit 4. I, II** Continuation of PHYS 218; electricity, magnetism and introduction to optics; PHYS 219 is the second semester of a three-semester sequence in general physics: the first course of the sequence is PHYS 218 and the third course is PHYS 221. Prerequisites: PHYS 218; MATH 152 or 172 or registration therein.
221. **Optics and Thermal Physics.** (3-0). **Credit 3. I, II** Wave motion and sound, geometrical and physical optics, kinetic theory of gases, laws of thermodynamics. Prerequisites: PHYS 208 or 219; MATH 152 or 172; registration in MATH 221; 308.
222. **Modern Physics for Engineers.** (3-0). **Credit 3. I, II, S** Atomic, quantum, relativity and solid state physics. Prerequisites: PHYS 208 or 219; MATH 308 or registration therein.
225. **Electronic Circuits and Applications.** (3-3). **Credit 4. II** Linear circuit theory and applications of solid-state diodes, bipolar and field-effect transistors, operational amplifiers and digital systems. Prerequisites: PHYS 208 or 219; MATH 308.
285. **Directed Studies.** **Credit 1 to 4.** Special work in laboratory or theory to meet individual requirements in cases not covered by regular curriculum; intended for use as lower-level credit. Prerequisite: Approval of department head.
289. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of physics. May be repeated for credit. Prerequisite: Approval of instructor.
291. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in physics. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
302. **Advanced Mechanics.** (4-0). **Credit 4. I** Motion of a particle in various force fields, systems of particles; rigid body motion, coupled oscillators and accelerated frames of reference. Prerequisites: PHYS 221; MATH 308; registration in MATH 311.
304. **Advanced Electricity and Magnetism I.** (3-0). **Credit 3. I** Electrostatics; dielectrics; electrical current and circuits; magnetic fields and materials; induction; Maxwell's equations. Prerequisites: PHYS 221; MATH 311; registration in MATH 412.
305. **Advanced Electricity and Magnetism II.** (3-0). **Credit 3. II** Radiation and optics. Electromagnetic waves; radiation; reflection and refraction; interference; diffraction; special relativity applied to electrodynamics. Prerequisite: PHYS 304.
309. **Modern Physics.** (3-0). **Credit 3. II** Special relativity; concepts of waves and particles; introductory quantum mechanics. Prerequisites: PHYS 221; MATH 221; MATH 308.
327. **Experimental Physics.** (2-3). **Credit 3. II** Laboratory experiments in modern physics and physical optics with an introduction to current, state-of-the-art recording techniques. Prerequisites: PHYS 225; PHYS 309.
401. **Computational Physics.** (3-0). **Credit 3. II** Introduction to computational and simulational techniques widely used in physics applications and research, including trajectory integration, wave motion analysis, molecular dynamics, Monte Carlo methods, statistical mechanics of spin systems, phase transitions, quantum evolution, bound state problems, and variational methods. Prerequisites: MATH 311; MATH 412; PHYS 302; PHYS 309; knowledge of a high level language such as FORTRAN or C. This prerequisite can be obtained by taking CPSC 206 or the equivalent.
408. **Thermodynamics and Statistical Mechanics.** (4-0). **Credit 4. I** Statistical method, macroscopic thermodynamics, kinetic theory, black body radiation, Maxwell-Boltzmann, Bose-Einstein, and Fermi-Dirac statistics. Prerequisites: PHYS 412; MATH 311 or equivalent.

412. **Quantum Mechanics I. (3-0). Credit 3. II** Postulates of wave mechanics; wave packets; harmonic oscillator; central field problem; hydrogen atom; approximation methods. Prerequisites: PHYS 302 and 309; MATH 412.
414. **Quantum Mechanics II. (3-0). Credit 3. I** Continuation of PHYS 412. Electron spin; addition of angular momenta; atomic structure; time dependent perturbations; collision theory; application of quantum mechanics to atomic, solid state, nuclear or high energy physics. Prerequisite: PHYS 412.
415. **Nuclear and Particle Physics. (3-0). Credit 3.** Properties, decays, and reactions of nuclei and elementary particles; nuclear models and equation of state; quantum chromodynamics and electroweak interactions; applications to astrophysics: big bang model, cosmic microwave background radiation, nucleosynthesis, neutron star, and supernovae. Prerequisite: PHYS 412.
420. **Concepts, Connections, and Communication. (1-0). Credit 1.** Stars and atoms; new physics; post-Newtonian universe. Prerequisite: Junior or senior classification.
425. **Physics Laboratory. (0-6). Credit 2. II** Experiments in nuclear, atomic, and molecular physics using modern instrumentation and equipment of current research. Prerequisite: PHYS 327 or equivalent.
426. **Physics Laboratory. (0-6). Credit 2. I** Experiments in solid state and nuclear physics. Modern instrumentation and current research equipment are employed. Prerequisite: PHYS 327 or equivalent.
485. **Directed Studies. Credit 1 or more. I, II, S** Special work in laboratory or theory to meet individual requirements in cases not covered by regular curriculum. Prerequisite: Approval of department head.
489. **Special Topics in... Credit 1 to 4. I, II, S** Selected topics in an identified field of physics. May be repeated for credit. Prerequisite: Approval of instructor.
491. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in physics. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor.

Department of Plant Pathology and Microbiology

Professors D. N. Appel, M. Dickman, D. J. Ebbole, C. F. Gonzalez, D. C. Gross (Head), C. M. Kenerley, C. W. Magill, H. B. Scholthof, K.-B. G. Scholthof, J. L. Starr; Associate Professors T. S. Isakeit, M. V. Kolomiets, H. H. Wilkinson; Assistant Professors P. de Figueiredo, Y. Jo, B. D. Shaw, W. Shim, J. E. Woodward

Plant Pathology (PLPA)

291. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in plant pathology. May be repeated 3 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
301. **Plant Pathology. (3-0). Credit 3. I, II** Introduction to fundamental principles of plant pathology; diagnosis, cause and control of plant diseases. Prerequisites: BIOL 113 or BIOL 101; concurrent registration in PLPA 303.
303. **Plant Pathology Laboratory. (0-2). Credit 1. I, II** Isolation, identification of plant pathogens and clinical diagnosis and control of plant diseases. Prerequisite: PLPA 301 or registration therein.*
485. **Directed Studies. Credit 1 to 4 each semester. I, II, S** Special problems for advanced undergraduates to permit study of subject matter not available in existing courses. Prerequisites: PLPA 301 and prior approval of instructor or department head.
489. **Special Topics in... Credit 1 to 4. I, II** Selected topics in an identified area of plant pathology. May be repeated for credit. Prerequisite: PLPA 301 or approval of instructor.
491. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in plant pathology. May be repeated 3 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor.

*Field trip required for which departmental fee may be assessed to cover costs.

Department of Political Science

Professors J. E. Anderson, J. A. Baer, J. R. Bond, G. C. Edwards, R. B. Flemming, G. M. Halter, R. E. Harmel, C. F. Hermann, K. Q. Hill, P. A. Hurley (Head), C. A. Johnson, N. R. Luttbeg, K. J. Meier, C. J. Nederman, E. B. Portis, M. F. Rice, J. D. Robertson, H. J. Tucker, P. P. Van Riper, A. Vedlitz, W. F. West, C. W. Wiggins, B. D. Wood; **Associate Professors** J. A. Dyer, E. H. Ellis, M. C. Escobar-Lemmon, N. Geva, P. M. Kellstedt, A. C. Pacek, D. A. M. Peterson, J. R. Rogers, A. Tarar, M. Taylor-Robinson, G. D. Whitten; **Assistant Professors** W. A. Dixon, S. A. Fulton, H. Jo, M. A. Kellam, M. T. Koch, S. Kurizaki, C. Lipsmeyer, S. Manzano, E. McLean, B. D. Mc Kenzie, E. Parker-Stephen, C. M. Sprecher, J. B. Ura, D. A. von Vacano, T. Whang; **Senior Lecturer** N. Van Hightower; **Lecturers** B. Bragg, R. Heath, S. Karasipahi, P. S. Lim, S. Whalen

Political Science (POLS)

206. (GOVT 2305) **American National Government.** (3-0). **Credit 3. I, II, S** Survey of American national government, politics, and constitutional development.
207. (GOVT 2306) **State and Local Government.** (3-0). **Credit 3. I, II, S** Survey of state and local government and politics with special reference to the constitution and politics of Texas.
209. (GOVT 2304) **Introduction to Political Science Research.** (3-0). **Credit 3.** Introduction to the philosophy and practice of social science and to modes of research in major subfields of political science. Prerequisite: Political science majors must have completed POLS 209 before they enroll in their last 18 hours of 300- and 400-level POLS courses. This means a student may take no more than 6 hours of upper division (300- and 400-level courses) before completing POLS 209. Enrollment is restricted to political science majors.
300. **Foundations of Political Science.** (3-0). **Credit 3.** Survey of the scholarly discipline of political science, the subfields of the discipline, the major research questions and the modes of scholarship in the latter subfields, and the character of the discipline as a profession. Prerequisites: POLS 206, 207, 209; junior classification.
302. **The Mass Media and Politics.** (3-0). **Credit 3. II** Examination of mass media impact on politics and political behavior, and governmental impact on the mass media. Prerequisite: POLS 206 or approval of department head.
303. **Introduction to Political Theory.** (3-0). **Credit 3.** Introduction to the study of political theory, with attention to major themes in the history of political thought; discussion of the nature of politics; examination of method in political theory and its relation to the discipline of political science. Prerequisite: Junior or senior classification.
304. **Latino Politics in the United States.** (3-0). **Credit 3.** Survey of historical and contemporary issues in Latino politics in the U.S.; race and ethnicity in the context of U.S. politics; comparisons of racial and ethnic group experiences in the U.S. with those experienced by racial and ethnic groups elsewhere; Latino access to the political system through political participation. Prerequisite: Junior or senior classification.
306. **Contemporary Political Problems and Issues.** (3-0). **Credit 3. I, II, S** Major contemporary political problems and issues with primary emphasis on the U.S. Each term one to three problems or issues will be examined in some depth. Students may register in up to but no more than two different sections of this course. May be repeated for credit. Prerequisite: POLS 206 or approval of department head. NOTE: POLS 306 courses taken in a study abroad program may not count toward this limit; please consult with the undergraduate advisor
307. **The Texas Legislature.** (3-0). **Credit 3.** Examination of contemporary political problems and issues in the Texas Legislature. Prerequisites: POLS 206 and 207; junior or senior classification.
309. **Polimetrics.** (3-0). **Credit 3.** Theory, techniques, and application of quantitative analysis in political science; focus on quantitative techniques commonly used to evaluate empirical theories of politics. Prerequisites: POLS 209 or equivalent; 9 additional hours of political science; STAT 307 and 301 or 303 or equivalents or approval of instructor.
310. **Legal Research.** (2-0). **Credit 2.** Basic legal research techniques and resources with emphasis on technological trends in research; an overview of the structuring of the legal system and the interplay between state and federal jurisdictions. Prerequisites: POLS 206 and 207; junior or senior classification.
311. **China, Japan and the United States.** (3-0). **Credit 3.** International relations among China, Japan and the United States; primary attention to the domestic political system and international political and economic interaction. Prerequisite: POLS 206 or approval of department head.

312. **Ethnic Conflict.** (3-0). **Credit 3.** Examination of government institutions designed to structure ethnic relations; source of ethnic conflict; mechanisms to facilitate the peaceful resolution of ethnic conflict. Prerequisite: Junior or senior classification.
313. **Public Opinion.** (3-0). **Credit 3. I, S** Role of public opinion in a democratic political system—its formation, properties and patterns, with special attention to problems of linking public opinion to public policy. Prerequisite: POLS 206 or approval of department head.
314. **Interest Groups.** (3-0). **Credit 3.** Role of interest groups in politics; types of groups and resources; internal dynamics; group strategies/tactics (including PACs); forms of indirect and direct lobbying; influence of groups in political arena. Prerequisite: POLS 206 or approval of department head.
315. **Political Parties.** (3-0). **Credit 3. I** Organization, history, and activities of political parties and functions they serve in national, state and local politics in the United States and elsewhere. Prerequisite: POLS 206 or approval of department head.
316. **Urban Politics.** (3-0). **Credit 3. I** Politics at the community level; urban and metropolitan political systems. Prerequisites: POLS 206 and 207 or approval of department head.
317. **Women in Politics.** (3-0). **Credit 3.** Role of women in the political system; treatment of women in political theory; effect of law on women's status; women as political leaders; current policy issues of concern to women. Prerequisite: POLS 206. Cross-listed with WMST 317.
319. **The American Presidency.** (3-0). **Credit 3. I, S** The American Presidency and the primary relationships and responsibilities of the office, dealing with the public, decision making, influencing Congress, and implementing policy. Prerequisite: POLS 206 or approval of department head.
320. **Race and Politics in the United States.** (3-0). **Credit 3.** The politics of race in the United States: contrast of the political experiences of racial groups with the ideals and realities of democratic political systems. Prerequisites: POLS 206 and 207 and junior or senior classification.
322. **Western European Government and Politics.** (3-0). **Credit 3. II** Political institutions and ideas of major European countries. Prospects for political integration. Prerequisite: POLS 206 or approval of department head.
323. **Political Systems of Latin America.** (3-0). **Credit 3. I** Survey of the major features of the political process in Latin America; key political groups and sources and characteristics of their political power; studies of selected countries. Prerequisite: POLS 206 or approval of department head.
324. **Politics of Global Inequality.** (3-0). **Credit 3.** Examination of the causes and consequences of economic inequality between rich and poor states; evaluation of competing explanations for poverty of less-developed countries; development strategies employed by poor states; and structure of global economic relations. Prerequisite: Junior or senior classification.
326. **Government and Politics of Eastern Europe.** (3-0). **Credit 3.** Political, social and economic transformations in the post-Communist Eastern and Southern European countries; examination of the interrelations between political, economic and social issues that impact the building of new governments and institutions in these countries. Prerequisites: POLS 206 and 207; junior or senior classification.
327. **Congressional Politics.** (3-0). **Credit 3. I, S** Congressional elections, decision-making structure and processes in Congress, and their implications for representation and public policy in the United States. Prerequisite: POLS 206 or approval of department head.
328. **Globalization and Democracy.** (3-0). **Credit 3.** Examination of the political and economic origins of globalization; effects of globalization on advanced industrial democracies; effect on less developed nations; evaluation of the economic, social, cultural and political consequences of globalization. Prerequisite: Junior or senior classification.
329. **Introduction to Comparative Politics.** (3-0). **Credit 3. I** A comparison of political institutions, processes and issues across a wide variety of political systems. Prerequisite: POLS 206 or approval of department head.
331. **Introduction to World Politics.** (3-0). **Credit 3. I, S** Analysis of contemporary world from point of view of nation-state; political problems, factors involved in foreign policies and relations of nations. Prerequisite: POLS 206 or approval of department head.
338. **Government and Politics of the Former Soviet Union.** (3-0). **Credit 3. I** Major political issues of the post-communist transition in the former Soviet Union. Prerequisite: POLS 206 or approval of department head.

340. **Introduction to Public Administration.** (3-0). **Credit 3. I, II** American public administration; development of the public service; the political and constitutional context; organization theory; leadership and decision-making; personnel and resource staff functions; administrative law and regulation; ethics and administrative accountability. Prerequisite: POLS 206 or approval of department head.
341. **Urban Administration.** (3-0). **Credit 3. II, S** Practices and problems of city government. Organization, administration, and planning and their relation to political processes and structure. Prerequisites: POLS 206 and 207 or approval of department head.
342. **Politics and Bureaucracy.** (3-0). **Credit 3. II, S** Public bureaucracy in the context of a political environment; role of experts, the use of political power and problems of bureaucratic accountability and responsibility. Prerequisite: POLS 206 or approval of department head.
347. **Politics of Energy and the Environment.** (3-0). **Credit 3. I** U.S. energy and environmental problems and policies and the political, legal and institutional factors influencing their development and implementation. Prerequisite: POLS 206 or approval of department head.
349. **Early Political Thought.** (3-0). **Credit 3. I, S** Political thought from Greek antiquity to Renaissance. Prerequisite: POLS 206 or approval of department head.
350. **Modern Political Thought.** (3-0). **Credit 3. II, S** Political thought from Machiavelli to Marx. Prerequisite: POLS 206 or approval of department head.
351. **Law and Legislation.** (3-0). **Credit 3.** Legal, political and institutional factors that influence the passage of legislation in American legislative bodies. Prerequisites: POLS 206 and 207; junior or senior classification.
352. **Empirical Democratic Theory.** (3-0). **Credit 3.** Examination of empirical political science theory about the nature and consequences of democratic government in the modern era; study of scientific theory that accounts for the rise, characteristics and behavior of democratic political systems. Prerequisites: POLS 206 and 207; junior or senior classification.
353. **Constitutional Rights and Liberties.** (3-0). **Credit 3. I** Legal issues, controversies and significant developments in constitutional rights and liberties, and the impact of these developments upon American politics, culture and social institutions. Prerequisite: POLS 206 or approval of department head.
355. **United States Constitutional Development.** (3-0). **Credit 3. II** Leading decisions of the Supreme Court. Trends in our constitutional development since 1789; expansion through judicial interpretation of powers delegated to national government. Prerequisites: POLS 206 and HIST 105 or approval of department head.
356. **Law, Politics and Policy.** (3-0). **Credit 3. II** An introduction to the American legal system, its development and structure: the role of lawyers, law enforcement agencies, and interest groups in its operation; the dynamics of civil litigation and criminal processes of courts; the impact of legal policies on society, politics and the economy. Prerequisite: POLS 206 or approval of department head.
357. **National Judicial Politics.** (3-0). **Credit 3. II, S** Political factors that influence judicial selection; decision-making and policy-making roles and impact of the U.S. Supreme Court and Federal Court System.
358. **Comparative Judicial Politics.** (3-0). **Credit 3.** Survey of the major features of court systems of the world; examination of the role played by courts in the politics of selected nations of the world; comparison of judicial decision making in selected countries; the impact of courts in developing democracies. Prerequisites: POLS 206 and 207; junior or senior classification.
359. **American Political Thought.** (3-0). **Credit 3. I, S** American political thought from colonial times to the present. Prerequisite: POLS 206 or approval of department head.
360. **American State Politics.** (3-0). **Credit 3. I, II, S** American state governments; comparative state policies and politics. Prerequisite: POLS 207 or approval of department head.
362. **Latin American Political Thought.** (3-0). **Credit 3.** Survey of various traditions in the history of Latin American political thought; key texts in the history of political theory in the Spanish-American continent. Prerequisites: POLS 206; junior or senior classification or approval of instructor.
364. **Global Political Thought.** (3-0). **Credit 3.** Global perspective on the history of political ideas and contemporary political philosophy; confrontation and conversion of East Asia and Middle Eastern concepts of political problems and Western perspectives; impact of culture on the shaping of political ideas. Prerequisite: Junior or senior classification.
365. **Asian Governments and Politics.** (3-0). **Credit 3. I, S** Contemporary political systems of Asia, political institutions, actors and processes. Prerequisite: POLS 206 or approval of department head.

369. **Theories of Democracy.** (3-0). **Credit 3. II** Definitions and justifications of democratic political systems; criticisms of democratic legitimacy, difficulties encountered by actual democratic regimes; methodological problems of assessing the fulfillment of democratic goals. Prerequisite: POLS 206 or approval of instructor.
375. **Campaigns and Elections.** (3-0). **Credit 3. I, S** Theories of voter choice; effects of mass media and campaign finance regulations on the conduct and outcome of elections; effects of elections on policy; emphasis on U.S. national elections. Prerequisite: POLS 206 or approval of department head.
400. **Public Leadership Development.** (3-0). **Credit 3.** Major issues in the study of public leadership, development of leadership skills, and a field investigation done in conjunction with local public leaders. Prerequisites: Junior or senior classification and approval of instructor.
413. **American Foreign Policy.** (3-0). **Credit 3. II** Evolution of U.S. foreign policies since World War II. Policy process; role of executive, legislative, bureaucratic and private institutions; current foreign policy issues and problems. Prerequisite: POLS 206 or approval of department head.
415. **Contemporary Issues in American Foreign Policy.** (3-0). **Credit 3. II, S** Detailed analysis of a selected aspect of American foreign policy. Prerequisite: POLS 206 or approval of department head.
421. **Social Conflict and Political Change.** (3-0). **Credit 3. I** Comparative study of state-society relations, paying particular attention to political demands, conflict and accommodation. Prerequisite: POLS 206 or approval of department head.
423. **U.S.-Latin American Relations.** (3-0). **Credit 3.** Political, economic and social relations between the United States and Latin American nations from independence to the present. Prerequisites: POLS 206, 207, 323; junior or senior classification.
424. **Comparative Governmental Institutions.** (3-0). **Credit 3.** Study of the politics and structure of governmental institutions in a comparative venue; examination of the building blocks by which patterns of governments and institutions can be identified across various political systems of the world; role of institutions across different types of political systems and how they are affected by global economic factors. Prerequisites: POLS 322 and 323; POLS 326 or 365; junior or senior classification.
429. **Issues in World Politics.** (3-0). **Credit 3. II** Selected issues of importance in contemporary world politics. May be repeated for credit. Prerequisite: POLS 206 or approval of department head.
432. **The Politics of European Union.** (3-0). **Credit 3.** Examination of the institutional, economic and political forces that led to the development of the European Economic Union; impact of the European Union on world affairs. Prerequisites: POLS 206 and 207; junior or senior classification.
435. **Voting Behavior.** (3-0). **Credit 3. I, S** Voting decisions, electoral behavior and consequences for the political system. Prerequisite: POLS 206 or approval of department head.
440. **Public Policies and Policymaking.** (3-0). **Credit 3. I** Socio-economic, political, and institutional factors as they affect the development, implementation and impact of public policies. Strategies of choice by political regimes in the formation of public policies. Prerequisite: POLS 206 or approval of department head.
441. **State and Local Financial Administration.** (3-0). **Credit 3. I** Financial management practices in state and local governments including the impact of management practices and political factors on revenues, expenditures, budgeting and debt financing. Prerequisite: POLS 207.
442. **Social Welfare Policy.** (3-0). **Credit 3. II** Political and social issues involved in social welfare and income security policies; problems of poverty and public welfare in the United States. Prerequisite: POLS 206 or approval of department head.
447. **National Security Policy.** (3-0). **Credit 3. I, S** Need for national security policy, the factors involved in determining defense policy and the resulting problems; special attention to the United States. Prerequisite: POLS 206 or approval of department head.

454. **Contemporary Political Ideas.** (3-0). **Credit 3. I** Contemporary political ideas such as liberalism, socialism, communism and fascism; role of ideology in political change. Prerequisite: POLS 206 or approval of department head.
455. **Traditions of Political Theory.** (3-0). **Credit 3.** Survey of particular schools or historical periods of normative political theory. May be taken three times. Prerequisites: POLS 206 and 207; junior or senior classification.
456. **Environmental Political Theory.** (3-0). **Credit 3.** Examination of classical and contemporary theories of politics and the environment, overview of main lines of thought on how human beings should interact with and manage the physical environment, with attention to the particular problems raised by these issues for political theory. Prerequisites: POLS 206; junior or senior classification.
461. **Jurisprudence.** (3-0). **Credit 3.** History of legal philosophy from the ancient Greeks to the present; exploration of recurring themes such as natural law, legal positivism, legal realism, sociological jurisprudence and Marxist jurisprudence; exposure to various issues, such as liberty, privacy, obedience, responsibility and punishment. Prerequisite: POLS 206 or approval of department head.
462. **Women and the Law.** (3-0). **Credit 3.** The legal status of American women from the adoption of the Constitution to the present: constitutional developments; the 19th Amendment and the proposed Equal Rights Amendment; employment; family law; reproductive rights; education; sexual equality in context of other claims to equality; law and social norms. Prerequisite: POLS 206 or approval of department head. Cross-listed with WMST 462.
475. **Government and the Economy.** (3-0). **Credit 3. II** Constitutional and legal framework of governmental involvement in economy; governmental budget in management of business cycle; regulation of business activities; governmental economic planning in democratic societies. Prerequisite: POLS 206 or approval of department head.
481. **Senior Research Seminar.** (3-0). **Credit 3.** In-depth study of topics associated with particular sub-field of political science; experience designing and implementing major, original research project. Prerequisite: POLS 206, 207, 209, 12 credits in POLS at or above 300-level; senior political science majors or approval of instructor.
484. **Internship.** **Credit 1 to 6. I, II, S** Directed internship in a public organization to provide students with on-the-job training and applied research experience with professionals in settings appropriate to the student's degree plan and career objectives. Prerequisite: Approval of department head. Must be taken on a satisfactory/unsatisfactory basis.
485. **Directed Studies.** **Credit 1 to 6 each semester. I, II, S** Individual instruction in selected aspects of political science not adequately covered by other courses. Prerequisite: Approval of department head.
489. **Special Topics in...** **Credit 1 to 4. I, II, S** Selected topics in an identified area of political science and public policy. May be repeated for credit. Prerequisite: POLS 206 or approval of department head.
491. **Research.** **Credit 1.** Research conducted under the direction of faculty member in political science. Prerequisites: Concurrent enrollment or completion of POLS 481 and senior classification, or approval of department head.
497. **Independent Honors Studies.** **Credit 1 to 4. I, II, S** Directed independent studies for upper division Honors students, regardless of academic major, in selected aspects of political science. Prerequisites: Junior or senior classification either as Honors student or with overall GPR of 3.25; letter of approval from head of student's major department.

Portuguese

(faculty, see page 814)

(PORT)

101. **Beginning Portuguese I. (4-1). Credit 4.** Elementary language study with aural, oral, written, and reading practice; preparation for conversation; part of class preparation done in language laboratory. Students with prior knowledge of or instruction in Portuguese are required to take a placement test before enrolling for the first time in a college Portuguese course.
102. **Beginning Portuguese II. (4-1). Credit 4.** Continuation of PORT 101; part of class preparation done in language laboratory. Students with prior knowledge of or instruction in Portuguese are required to take a placement test before enrolling for the first time in a college Portuguese course. Prerequisite: PORT 101 with a grade of C or better.
201. **Intermediate Portuguese I. (3-0). Credit 3.** Readings of average difficulty; review of grammar, practice in conversation and composition. Students with prior knowledge of or instruction in Portuguese are required to take a placement test before enrolling for the first time in a college Portuguese course. Prerequisite: PORT 102 with a grade of C or better.
202. **Intermediate Portuguese II. (3-0). Credit 3.** Continuation of PORT 201 with more advanced material. Students with prior knowledge of or instruction in Portuguese are required to take a placement test before enrolling for the first time in a college Portuguese course. Prerequisite: PORT 201 with a grade of C or better.

Department of Poultry Science

Professors C. A. Bailey, J. B. Carey (Head), C. R. Creger, S. D. Pillai; Associate Professors L. R. Berghman, D. J. Caldwell, A. L. Cartwright, S. M. Reddy, R. L. Walzem; Assistant Professors M. J. Bailey, M. A. Davis, M. B. Farnell, J. T. Lee, B. Lupiani, C. A. Ruiz-Feria, M. Sanchez-Plata, H. Zhou

Poultry Science

(POSC)

201. (AGRI 1327) **General Avian Science. (3-0). Credit 3. I, II, S** Introduction to the poultry industry to include past, present and future industry dynamics; avian anatomy/physiology as they impact commercial production; management principles and practices of breeding, incubation, brooding, nutrition, disease control and marketing technology.
285. **Directed Studies. Credit 1 to 4. I, II, S** Directed studies in specific problem areas of poultry science. Prerequisite: Approval of department head.
289. **Special Topics in... Credit 1 to 4. I, II, S** Selected topics in an identified area of poultry science. May be repeated for credit. Prerequisite: Approval of instructor.
291. **Research. Credit 1 to 2. I, II, S** Research conducted under the direction of faculty member in poultry science. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor and department head.
302. **Avian Science Laboratory. (0-2). Credit 1. I, II, S** Field trips and application of basic skills in production of poultry meat and eggs. Recommended supplement to POSC 201.*
304. **Judging. (0-6). Credit 3. I, II** Intensive, individualized training in selection standards for meat and egg strains of poultry, grading standards for egg and live and ready-to-cook poultry, and organizing and managing poultry shows. Practice requires visits to processing plants.*
308. **Avian Anatomy and Physiology. (2-3). Credit 3. I** Anatomy and physiology of the major body systems of the bird, including the cardiovascular, gastrointestinal, respiratory, endocrine and reproductive systems; influence of the environment on bird physiology, including effects of stress. Laboratory exercises include dissection and microscopic analysis of the major body system and assessment of environmental conditions. Prerequisites: BIOL 113 and 123; POSC 201.
309. **Poultry Meat Production. (3-2). Credit 4. II** Modern integrated broiler and turkey production; breeding and selection, housing and equipment, incubation, nutrition, flock health, marketing and financial management. Lab involves hatchery management, blood testing, semen evaluation, artificial insemination, growth trials, processing and observation of a local integrated operation.*

313. **Game Birds and Ornamental Fowl.** (3-0). **Credit 3. I** Commercial game bird production; nutrition, incubation, rearing, breeder care, diseases, marketing, housing requirements and economic considerations; management of rare and ornamental fowl.
326. **Commercial Egg Industry.** (3-0). **Credit 3. I** Production, management, economics and integration of commercial laying hen and broiler breeder operations.
333. **Instincts and Behavior.** (3-0). **Credit 3. II** Investigation of the reasoning behind evolved reproductive strategies with integration of veterinary and avian science perspectives; examination of individual differences in behavior and their development in particular environments.
381. **Investigation of Professional Development in Poultry Science.** (2-0). **Credit 2. I, II** An investigation of career options and the research process as applied to poultry science.
402. **Skills in Poultry Evaluation.** (0-2). **Credit 1. I, II** Practical application of judging and husbandry skills used in poultry exhibition and production. Primarily designed for preservice vocational agriculture teachers.
406. **Poultry Processing and Products.** (3-2). **Credit 4. I** The science and practice of the processing and products of poultry and eggs; physical, chemical, microbiological and functional characteristics of value-added poultry products as they affect consumer acceptance, efficiency of production, and regulatory approval. Prerequisites: POSC 309; CHEM 222; FSTC 326. Cross-listed with FSTC 406.
411. **Poultry Nutrition.** (3-0). **Credit 3. I** Principles of poultry nutrition with emphasis on all major nutrient classes and their relationships with the avian digestive system. Prerequisite: CHEM 222 or equivalent.
412. **Poultry Feed Formulation.** (1-0). **Credit 1. II** Practical feeding of poultry with emphasis on specific nutrient requirements of various species and computer least cost diet formulations. Prerequisite: POSC 411.
414. **Avian Genetics and Breeding.** (2-2). **Credit 3. II** Basic concepts of avian genetics and breeding principles, inheritance of economically important qualitative and quantitative traits; statistical analysis of breeding results; application of molecular genetics, mating systems analyses, breeder management; and incubation of hatching eggs. Prerequisite: GENE 310.
427. **Animal Waste Management.** (3-0). **Credit 3. I** An applied approach to current and emerging issues relating to responsible management of animal waste; the role of biological aspects of production management decisions evaluated in an examination of regulatory and environmental requirements; current case studies and exposure to field situations. Field trips will be required for which departmental fees may be assessed.
429. **Advanced Food Bacteriology.** (3-2). **Credit 4. II** Microbiology of foodborne human pathogens of food animals, raw and processed food, and human disease; methods to control incidence of pre- and post-harvest contamination. Prerequisite: FSTC 326.
481. **Poultry Science Systems.** (1-2). **Credit 2. I, II** Individual and team approaches for the collection, interpretation, synthesis and presentation of information on integration of all aspects of the poultry industry to address issues facing it; emphasis on oral and written communication. Prerequisite: Senior classification.
484. **Internship.** **Credit 1 to 5. I, II, S** A supervised internship in the poultry industry to provide practical experience in a real world setting that is consistent with the student's professional interests. Prerequisite: Approval of department head.
485. **Directed Studies.** **Credit 1 to 4 each semester. I, II, S** Directed study of selected problems not covered by other courses in the department. Content of course will be adapted to interest and needs of students. Prerequisite: Approval of department head.
489. **Special Topics in...** **Credit 1 to 4. I, II, S** Selected topics in an identified area of poultry science. May be repeated for credit. Prerequisite: Approval of instructor.
491. **Research.** **Credit 1 to 4. I, II, S** Research conducted under the direction of faculty member in poultry science. May be repeated 3 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor and department head.

* Field trips may be required.

Department of Psychology

Professors W. E. Arthur, Jr., L. T. Benjamin, Jr., A. Cepeda-Benito, J. W. Grau, E. Harmon-Jones, A. D. LeUnes, M. W. Meagher, L. C. Morey (Head), J. R. Nation, M. G. Packard, W. S. Rholes, D. H. Rosen, S. M. Smith, D. K. Snyder, L. G. Tassinari, J. Vaid, P. J. Wellman; **Associate Professors** G. M. Alexander, H. Blanton, H. Bortfeld, A. E. Bourgeois, E. S. Davidson, J. F. Edens, S. C. Payne, C. D. Samuelson, T. G. Wilcox, T. Yamauchi; **Assistant Professors** S. Balsis, M. Bergman, J. L. Bizon, A. J. Doss, B. D. Doss, S. Eitan, L. Geraci, H. C. Lench, D. A. Newman, M. Perez, B. J. Schmeichel, B. Setlow; **Clinical Associate Professors** R. W. Heffer, B. H. Stagner; **Assistant Research Scientists** M. A. Hook; **Instructional Assistant Professors** T. M. Barnhardt, R. Hull

Psychology (PSYC)

107. **(PSYC 2301) Introduction to Psychology. (3-0). Credit 3.** Introductory course dealing with elementary principles of human behavior.
203. **Elementary Statistics for Psychology. (2-3). Credit 3.** Practical knowledge of statistics up through analysis of variance. Practice sessions devoted to numerical problems. Will not satisfy mathematics requirement in College of Liberal Arts curricula. Prerequisites: PSYC 107; MATH 166 or equivalent; major in psychology.
204. **Experimental Psychology. (2-3). Credit 3.** Research techniques in psychology with emphasis on the experimental method. Laboratory exercises applied to specific problems in psychology. Prerequisites: PSYC 107 and 203; major in psychology.
300. **Psychology of Women. (3-0). Credit 3.** Theoretical and research literature relevant to psychological assumptions about the female personality. How these assumptions are being questioned or verified by recent experimental studies. Prerequisite: PSYC 107. Cross-listed with WMST 300.
304. **Psychology of Sport and Physical Activity. (3-0). Credit 3.** The relationship of psychology to sport; topics include history, application of learning principles, social psychology, personality variables, psychological assessment, youth sport, women in sport, the psychology of coaching, sports law and ethics. Prerequisite: Junior classification. Cross-listed with KINE 304.
305. **Psychology of Adjustment. (3-0). Credit 3.** Adjustment problems of normal people; application of psychological principles to family, school and community life.
306. **Abnormal Psychology. (3-0). Credit 3.** Survey of behavior pathology; functional and organic psychoses, psychoneurosis, character disorders, psychophysiological disorders, alcohol and drug addiction and mental retardation; therapeutic and diagnostic methods. Prerequisites: PSYC 107; PSYC 203 and 204 or junior classification.
307. **Developmental Psychology. (3-0). Credit 3.** Growth and development of normal child from infancy to adolescence with emphasis on elementary school years. Prerequisites: PSYC 107; PSYC 203 and 204 or junior classification.
311. **Comparative Psychology. (3-0). Credit 3.** Survey of problems, principles, and methods of animal psychology; animal learning, motivation, discriminative processes and abnormal, social and instinctual behaviors. Prerequisites: PSYC 107; PSYC 203 and 204 or junior classification. Cross-listed with NRSC 311.
315. **Social Psychology. (3-0). Credit 3.** Social psychological variables operating on the individual; results of experimental laboratory findings; interaction of personality and social behavior. Prerequisites: PSYC 107; PSYC 203 and 204 or junior classification.
319. **History and Systems of Psychology. (3-0). Credit 3.** Historical analysis of pre-scientific psychology in philosophy and physiology through the period of the psychological "schools." Prerequisites: PSYC 107.
320. **Sensation-Perception. (3-0). Credit 3.** Review of sensory physiology, sensory and perceptual phenomena and the major perceptual theories; current research in the field. Prerequisites: PSYC 107; PSYC 203 and 204 or junior classification. Cross-listed with NRSC 320.
323. **Psychology of Adolescence. (3-0). Credit 3.** Psychological problems of normal teenage individual; ways and means of aiding youth to meet these problems constructively. Prerequisites: PSYC 107; PSYC 203 and 204 or junior classification.
330. **Personality. (3-0). Credit 3.** Review of personality theories, techniques of assessment and research relevant to understanding individual differences. Prerequisites: PSYC 107; PSYC 203 and 204 or junior classification.

331. **Social Neuroscience.** (3-0). **Credit 3.** Integration of biological and psychological explanations of social behavior; recent research and theories in social neuroscience; emotion, motivation, aggression, face processing, empathy, social cognition, and social relationships. Prerequisites: PSYC 107 or approval of instructor; junior or senior classification. Cross-listed with NRSC 331.
332. **Neuroscience of Learning and Memory.** (3-0). **Credit 3.** Brain mechanisms of learning and memory from molecular to behavioral levels; synaptic plasticity, model systems, multiple memory systems, diseases of learning and memory. Prerequisites: PSYC 107 or approval of instructor; junior or senior classification. Cross-listed with NRSC 332.
333. **Biology of Psychological Disorders.** (3-0). **Credit 3.** Neurobiology and clinical explanation of molecular mechanisms underlying psychiatric disorders and their drug treatments; depression and bipolar, anxiety disorders, mood disorders, psychosis and schizophrenia. Prerequisites: PSYC 107, PSYC 335 or one year of biology; junior or senior classification. Cross-listed with NRSC 333.
335. **Physiological Psychology.** (3-0). **Credit 3.** Physiological bases of sensation, motor functions, emotion, motivation and complex psychological processes. Prerequisites: 6 hours of biology; PSYC 203 and 204 or junior classification. Cross-listed with NRSC 335.
340. **Psychology of Learning.** (3-0). **Credit 3.** Survey of significant concepts, experimental methods and principles of learning. Prerequisites: PSYC 107 or INST 301; PSYC 203 and 204 or junior classification. Cross-listed with NRSC 340.
345. **Human Cognitive Processes.** (3-0). **Credit 3.** Human cognition and information processing: perception, attention, memory, reasoning and problem solving; experimental methods and data, and contemporary theories of human cognition. Prerequisites: PSYC 107; PSYC 203 and 204; or junior classification.
346. **Psychology of Language.** (3-0). **Credit 3.** Examines theories of how language is acquired, comprehended, produced, stored and used in normal and brain-impaired individuals. Prerequisites: PSYC 107; junior or senior classification.
351. **Survey of Industrial/Organizational Psychology.** (3-0). **Credit 3.** Literature and research in the basic theories and practices of I/O psychology including selection testing, job analysis, performance appraisal training, employee motivation, job satisfaction, leadership and group processes within organizations. Prerequisites: PSYC 203 and 204 or junior classification.
352. **Organizational Psychology.** (3-0). **Credit 3.** Literature and research in basic theories and practices of organizational psychology including employee motivation, leadership, job satisfaction, counterproductive work behaviors, organizational commitment, culture, climate, communication, and group processes within organizations. Prerequisites: PSYC 203 and 204 or junior or senior classification.
353. **Personnel Psychology.** (3-0). **Credit 3.** Literature and research in basic theories and practices of personnel psychology including job analysis, testing and validation, selection, performance appraisal, training, and legal issues in employment decision making. Prerequisites: PSYC 203 and 204 or junior or senior classification.
360. **Health Psychology and Behavioral Medicine.** (3-0). **Credit 3.** Survey of health psychology emphasizing behavioral and lifestyle factors in health and illness, prevention and modification of health-compromising behaviors, health care utilization, and psychological management of chronic disorders and psychological management of chronic disorders and terminal illnesses. Prerequisite: PSYC 107. Cross-listed with NRSC 360.
365. **Psychology of Aging.** (3-0). **Credit 3.** Examination of the psychological aspects of the aging process including physiology and health, memory and intellectual functioning, personality and social relationships, emotional health and late life transition. Prerequisite: PSYC 107.
405. **Psychology of Religion.** (3-0). **Credit 3.** Review of world's religions and the psychological study of the religious experience; religion within the context of personality; religious development through social interactions; religion in psychological research and therapy. Prerequisites: PSYC 306 and 330 or approval of instructor. Cross-listed with RELS 405.
407. **Behavioral Disorders of Children.** (3-0). **Credit 3.** Behavior problems related to childhood; psychological aspects of mental retardation, emotional disturbance, physical handicaps and other disorders; causative factors, preventative and therapeutic methods explored; where feasible, practical experience included as requirement. Prerequisites: PSYC 306; PSYC 307 or equivalent.
411. **Psychology of Self.** (3-0). **Credit 3.** Brief review of Freud's psychology and an in-depth coverage of Jung's psychology. Prerequisite: PSYC 306 or 330 or approval of instructor.

414. **Behavior Principles.** (3-0). **Credit 3.** Behavioral analysis of humans' complex interactions with their environments: how behavioral repertoires are constructed during maturation process; how existent behaviors are strengthened, weakened or eliminated; and how features of environment exercise control over behavioral components within a repertoire. Prerequisites: 9 hours of psychology; PSYC 203 and 204 or junior classification.
484. **Field Experiences.** (1-6). **Credit 3.** Participation in an approved mental health, mental retardation, school, industrial or experimental setting; field experiences supervised by an appropriate professor within an area of student interest; course requirements vary with the setting, the supervising professor and the needs of the individual student. Prerequisites: PSYC 203 and 204; 12 hours of psychology; GPR of 2.5 or better in all psychology courses; approval of instructor; major in psychology.
485. **Directed Studies.** **Credit 1 to 3.** Directed readings or research problems in selected areas designed to supplement existing course offerings. Individual report required. Prerequisites: 12 hours of psychology including completion of PSYC 204; GPR of 2.5 or better in all psychology courses; approval of instructor; major in psychology.
489. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of psychology. Prerequisites: PSYC 107 and approval of instructor.
491. **Research.** (3-0). **Credit 1 to 3.** Research conducted under the supervision of a chosen faculty member in the department of psychology; involves discussion and weekly presentation of student research projects. Prerequisites: PSYC 484 or 485; junior or senior classification.

Rangeland Ecology and Management

(faculty, see page 706)

(RLEM)

102. **Introduction to Rangeland Systems.** (1-0). **Credit 1. I, II** Introduction to rangeland resources and the systems approach to rangeland management; survey of the field of range management and related industries.
103. **Introduction to Ecological Restoration.** (1-0). **Credit 1.** Introduction and overview of ecological restoration that addresses what ecological restoration is, why it is relevant, how it is applied and when it can be most effectively used; course readings and discussions will relate ecological restoration to a wide-range of potential applications, from small-scale disturbances to significant global environmental problems.
291. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in rangeland ecology and management. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
301. **Range and Forest Watershed Management.** (2-2). **Credit 3. II** Elements of watershed management and principles and practices of range and forest land management for protection, maintenance and improvement of water resource values.*
302. **Rangeland Plants of North America.** (2-2). **Credit 3. I** Familiarize students with the distribution and economic value of important rangeland plants in Texas and Western North America and teach fundamentals of sight identification of these plants. Plant collection required. Prerequisite: Junior or senior classification or approval of instructor.*
303. **Agrostology.** (1-6). **Credit 3. I** Classification and identification of grasses based on macro- and micromorphological variations of spikelets; interpretation of spikelet variation and use of diagnostic keys to identify important species of North America; a grass collection required. Prerequisites: RLEM 314 and BIOL 101 or approval of instructor.*
304. **Rangeland Plant Taxonomy.** (2-6). **Credit 4. II** Interpretation of plant morphology for keying and identification of important flowering rangeland plants; vegetative and floral characters for important plant families including toxic compounds affecting domestic livestock. Plant collection required. Prerequisites: RLEM 314 and BIOL 101 or approval of instructor.*
305. **Watershed Analysis and Planning.** (3-0). **Credit 3. I** Provide an integrated framework for watershed planning that addresses the related biophysical, social and economic issues; comprehensive in scope and approach giving students the tools and techniques for developing sound watershed management policy and practice; water issues, problems and regulations for Texas. Prerequisite: Junior or senior classification.*

314. **Principles of Rangeland Management Around the World.** (3-0). **Credit 3. I, II** Basic knowledge of world rangeland ecosystems, how these systems are managed in diverse cultural settings; principles of underlying ecological processes influenced by various land management practices; foster understanding of the values that people in different countries place on rangeland resources; use of these values to enhance geologically sustainable and socially acceptable rangeland management practices.* Prerequisite: Junior or senior classification or approval of instructor.
315. **Vegetation Inventory and Analysis.** (2-2). **Credit 3. I** Range inventory techniques and vegetation sampling methods related to range site, range condition and trend, and degree of use; statistical analysis applied to sample data. Prerequisites: RLEM 303 or 304; RLEM 314.*
316. **Rangeland Communities and Ecosystems.** (2-2). **Credit 3. II** Organization and distribution of rangeland ecosystems of the world, with emphasis on North America; community dynamics and functions stressed including biotic history, succession, disturbance regimes, competitive interactions, herbivory, energy flow and nutrient cycling; conservation of rangeland resources. Prerequisites: RLEM 303 or 304; RLEM 314; RENR 205 and 215.*
317. **Rangeland Vegetation Manipulation.** (2-0). **Credit 2. II, S** Range improvement practices such as grazing management, brush and weed control and structural developments as they apply to effective development and maintenance of range vegetation composition for wildlife and livestock habitat objectives; theory, application and economics of treatment scenarios related to rangeland resources management. Prerequisite: RLEM 314 or approval of instructor.*
320. **Landscape Restoration.** (2-0). **Credit 2. II** Ecological restoration of wildland landscapes; synthesis of traditional and ecological philosophies toward repair of degraded landscapes; introduction of concepts and technologies useful in the development of natural areas, biological diversity and sustainable wildland ecosystems; includes both lecture and case study components. Prerequisite: BIOL 101 or RENR 205.*
321. **Field Studies in Ecological Restoration.** (0-2). **Credit 1.** Field trip course that provides examples, visits and field experiences in ecological restoration; reinforces conceptual basis for ecological restoration principles developed in RLEM 320, alternative strategies for succession management, plant materials selection, seed-bed preparation, planting technologies and planning ecological restoration programs. Prerequisites: RLEM 320 or concurrent enrollment; junior or senior classification.*
324. **Application of Rangeland Management Principles.** (0-2). **Credit 1. I, II** An opportunity to experience and visualize rangeland management practices under field conditions and to develop a practical understanding of rangeland planning and principles in an integrated fashion. Prerequisite: Junior or senior classification or approval of instructor.
401. **Plant-Herbivore Dynamics.** (3-0). **Credit 3. I** Evaluates the effects of herbivory at the plant population and community levels; developmental plant morphology and plant resistance to grazing; foraging strategies of herbivores relating to landscape/plant attributes along with animal nutritional needs; manipulation of the grazing process to meet management objectives. Prerequisite: RLEM 314.*
415. **Range Analysis and Management Planning.** (3-2). **Credit 4. I** Basic concepts and theories of range management systems. Resource inventory, analysis and management planning. Prerequisite: RLEM 314.*
416. **Fire and Natural Resources Management.** (2-3). **Credit 3.** Behavior and use of fire in the management of natural resources; principles underlying the role of weather, fuel characteristics and physical features of the environment related to the development and implementation of fire management plans. Prerequisite: Junior or senior classification or approval of instructor.
420. **Ecological Restoration of Wetland and Riparian Systems.** (2-2). **Credit 3.** How wetland and riparian areas link terrestrial and aquatic systems and function hydrologically and ecologically within watersheds; integrated approaches for restoration of degraded wetland and riparian systems; improving water resources through vegetation management with a special interest in rangelands. Prerequisites: RENR 205 and WFSC 428 or approval of instructor.
421. **Field Studies in Range Management.** **Credit 2. S** or between sessions Two-week field course, including visits to private ranches, public lands and experiment stations. Practical applications, problems and new advances in areas of range management, range improvement practices and range ecology. Prerequisite: RLEM 314 or approval of instructor.*
430. **Advanced Restoration Ecology: Current Concepts and Emerging Issues.** (3-0). **Credit 3.** A dynamic discipline on fundamentals of ecology; translating and communicating key ecological concepts to advanced case studies in ecological restoration. Prerequisites: RENR 205 and RLEM 320 or 420; junior or senior classification.

440. **Wetland Delineation.** (2-2). **Credit 3. II, S** Covers the application of the 1987 Wetland Delineation Manual in use by the Army Corps of Engineers (CORPS); field indicators of hydrophytic vegetation; hydric soils, wetland hydrology, methods for making jurisdictional determinations in non-disturbed and disturbed areas, recognition of problem wetlands and technical guidelines for wetlands. Prerequisite: Junior or senior classification.*
481. **Seminar.** (1-0). **Credit 1. I, II** Study, research and discussion of recent advances in rangeland ecology and management. Prerequisite: Senior classification.*
484. **Internship.** **Credit 1 to 4. I, II, S** Supervised experience program conducted in the student's area of specialization. Prerequisite: Approval of student's advisor.
485. **Directed Studies.** **Credit 1 to 3 each semester. I, II, S** Individual study and research upon a selected range problem. Prerequisite: Approval of student's advisor.
489. **Special Topics in...** **Credit 1 to 4. I, II, S** Selected topics in an identified area of rangeland ecology and management. May be repeated for credit. Prerequisite: Approval of instructor.*
491. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in rangeland ecology and management. May be repeated 3 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor.

*Field trips required for which departmental fees may be assessed to cover costs.

Reading

(faculty, see page 668)

(RDNG)

291. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in reading. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
301. **Reading Acquisition in Early Childhood Education.** (3-0). **Credit 3.** Focuses on competencies considered essential for effective Early Childhood reading instruction; studies recent research and instructional trends; reviews materials, procedures, and strategies deemed to be essential for effective teaching of reading. Prerequisite: Junior classification; Corequisite: RDNG 312.
302. **Teaching Reading through Children's Literature.** (3-0). **Credit 3.** Prepares teachers in Early Childhood Education to teach critical reading and language arts while using children's literature in heterogeneous classroom; interrelates the teaching of four language processes: listening/viewing, speaking, reading and writing. Prerequisite: Junior classification.
312. **Assessment in Reading Instruction in Early Childhood Education.** (3-0). **Credit 3.** Focuses on concepts underlying assessment and evaluation; appropriate procedures for studying and understanding the possible courses of literacy development in young readers; develops teacher's diagnostic skills and abilities to determine each student's literacy related skills, abilities and performance levels. Prerequisite: Junior classification; Corequisite: RDNG 301.
351. **Reading in the Elementary School.** (3-0). **Credit 3. I, II, S** Recent trends, issues, materials and procedures considered essential for effective teaching of reading, such as comprehension, word analysis, study skills, motivation, grouping, etc. Prerequisites: Concurrent enrollment in RDNG 361; junior classification or approval of department head.
360. **Principles and Practices of Reading Instruction.** (3-0). **Credit 3. I, II, S** Study and evaluation of the theories and research bases of the techniques, strategies and procedures associated with effective reading instruction in the elementary grades. Prerequisites: RDNG 351, 361, 460, 461. Must be taken concurrently with RDNG 362. Must be completed before taking RDNG 467.
361. **Assessment in Reading Instruction.** (3-0). **Credit 3. I, II, S** Evaluation and use of commonly used achievement tests, development of criterion referenced tests and interpretation and construction of informal measures for assessing reading skills. Prerequisites: Concurrent enrollment in RDNG 351; junior classification or approval of department head.
362. **Reading Practicum.** (2-3). **Credit 3. I, II** Knowledge and application of the theory, research and instructional strategies related to effective teaching of reading in the elementary grades; requires working in the elementary school reading program with teachers and students. Prerequisites: RDNG 351, 361, 460, 461. Must be taken concurrently with RDNG 360. Must be completed before taking RDNG 467.

371. **Multicultural and Interdisciplinary Literature for Middle Grades.** (3-0). **Credit 3.** Focuses on multicultural and interdisciplinary literature appropriate for middle grades students; implements and evaluates effective multicultural, interdisciplinary instruction through selection, use and development of literature in middle grades classroom. Prerequisite: Junior classification; Corequisite: INST 322 recommended.
372. **Reading and Writing across the Middle Grades Curriculum.** (3-0). **Credit 3.** Acquaints middle-grade educators to reading and writing instruction in content area education; focuses on development of grade-appropriate reading/writing competencies and educational techniques appropriate to student development in various subjects. Prerequisite: Junior classification.
381. **Language and Reading in Middle Grades.** (3-0). **Credit 3.** Focuses on current views of the relationship between linguistics, psychology, sociolinguistics, and the development of reading and literacy; critical analysis of instructional and assessment practices. Prerequisite: Junior classification; Corequisite: MEFB 352.
411. **Language and Reading.** (3-0). **Credit 3.** Relationship between language, dialect, reading and linguistics; role of the child, community, school through stages of language and literacy development; relationship of linguistic, cultural and conceptual processes to second language learning. Prerequisite: RDNG 301.
440. **Reading/Language Arts Methods in Early Childhood Education.** (2-6). **Credit 3.** Investigate contemporary trends and issues in teaching listening, oral language, process writing, spelling, grammar and handwriting; explores relationships among the development of the language arts and the development of young children's reading development; implementation of best instructional practices informed by research. Prerequisites: ECHE 332 and 342; admission to teacher education; senior classification; Corequisites: ECFB 400, 420, 440.
460. **Language and Reading.** (3-0). **Credit 3. I, II, S** Relationship between language and reading, dialect and reading, and linguistics.
461. **Teaching Reading Through Children's Literature.** (3-0). **Credit 3. I, II** Use of past and contemporary literature for the motivation of wide leisure reading in the elementary grades. Prerequisites: RDNG 351 and 361. Should be taken concurrently with RDNG 460.
465. **Reading in the Middle and Secondary Grades.** (3-0). **Credit 3. I, II, S** Reading needs of middle and secondary school students with emphasis upon curriculum organization for reading development and assessment of student progress in content area reading.
467. **Reading and the Language Arts.** (2-3). **Credit 3. I, II** Recent trends, issues and research on the impact of listening, oral language, process writing, grammar, spelling and handwriting on the development of reading strategies and communicative competence. Application of research in field settings. Prerequisites: RDNG 351 and 361; admission to teacher education. Must be taken concurrently with TEFB 410, 412 and 413.
468. **Acquisition of Literacy by Culturally Diverse Learners.** (3-0). **Credit 3.** Diverse learner reading processes; development of English and second language reading; integration of linguistic proficient reading transfer skills and evaluation issues; communicative competence.
470. **Reading/Language Arts Methods in Middle Grades Education.** (2-6). **Credit 3.** Investigate current trends and issues in teaching listening, oral language, process writing, spelling, grammar and handwriting; explores relationships among the development of various language arts and the development of reading strategies and communicational competencies of middle school learners; application of best instructional practices informed by research. Prerequisites: MEFB 352; admission to teacher education; senior classification; Corequisites: RDNG 490; MEFB 450.
490. **Assessment in Reading Instruction in Middle Grades.** (2-6). **Credit 3.** Evaluation of middle grades students reading performance; selection, understanding, and implementation of formal and informal evaluation procedures in classroom reading assessment, diagnosis, and instruction. Prerequisites: MEFB 352; admission to teacher education; senior classification; Corequisites: RDNG 470; MEFB 450.
491. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in reading. May be repeated 2 times for credit. Prerequisites: Junior or senior classification and approval of instructor.

Department of Recreation, Park and Tourism Sciences

Professors J. L. Crompton, G. D. Ellis (Head), J. H. Gramann, R. A. Kaiser, W. A. McIntosh, D. Scott, W. D. Shaw, J. K. Thomas, P. A. Witt; Associate Professors L. Hodges, J. S. Jacob, T. B. Jamal, G. T. Kyle, S. K. Nepal, J. E. Petrick, M. Schuett, C. S. Shafer; Assistant Professors U. Gretzel, C. D. Outley, A. Stronza, C. E. Watts; Assistant Lecturer S. G. Scott

Recreation, Park and Tourism Sciences (RPTS)

101. **Introduction to Recreation and Parks.** (1-0). Credit 1. I, II Development of recreation movement with broad treatment of the role of parks and recreation in modern society; interlinkages of recreation with other uses of natural resources; basic concepts of recreation.
201. **(PHED 1336) Foundations of Recreation and Parks.** (3-0). Credit 3. I, II Development of theoretical foundations of recreation and leisure; professional philosophy, present status, prospects for the future and the role of parks and recreation in modern society.
202. **Foundations of Tourism.** (3-0). Credit 3. An introduction to travel and tourism from local to international levels; overview of the scale, scope and organization of the industry; emphasis on development of natural, cultural and heritage resources of tourism; identification of issues related to the economic, technological and political aspects of tourism.
209. **Park and Tourism Operations.** (2-2). Credit 3. I, II Planning, execution and supervision of field maintenance and operations.
291. **Research.** Credit 1 to 3. Research conducted under the direction of faculty member in recreation park and tourism sciences. Prerequisites: Freshman or sophomore classification and approval of instructor.
300. **Supervised Field Studies.** Credit 3. I, II, S Survey and application of principles of recreation and parks; selected aspects of park and recreation management in an operational setting under the supervision of an approved agency; preparation and presentation of a comprehensive analysis of a specific problem; offered on an individual basis. May be repeated for credit. Prerequisites: RPTS 307; 12 hours of credit in recreation and parks.
301. **Leisure and Outdoor Recreation.** (3-0). Credit 3. I, II, S Development and administration of recreational facilities in natural and indoor settings; development of community, land and water resources to provide recreational opportunities in which environmental factors play major roles; fundamental concepts of recreation and leisure and their roles in modern American culture.
304. **Administration of Recreation Resource Agencies.** (3-0). Credit 3. I, II Contemporary issues and related administrative practices associated with the provision of recreation services and settings; addresses principles associated with recreation resource agency administration; personnel and customer-related administrative issues in recreation resource agencies; concepts and principles relevant to commercial and non-profit recreation resource agencies. Prerequisites: RPTS 201 and 209; RENR 201.
307. **Methods of Environmental Interpretation.** (2-2). Credit 3. I, II Communication processes and practices between resource managers and publics using or affected by natural, cultural and tourism resource places; principles and techniques of gathering, analyzing and disseminating information through various media, such as exhibits, presentations, publications and programs.*
308. **Principles of Community Assessment.** (3-0). Credit 3. Examines the many facets of community assessment process: types of developments and sources of change, assessment strategies and methods, resource identification and mobilization, and outcome implications for policy making. Prerequisite: Junior or senior classification.
311. **Recreation and Tourism Programs.** (3-0). Credit 3. I, II, S Program planning, operations, administration and evaluation; includes development of special events; service quality, hospitality training and participant satisfaction. Prerequisite: RPTS 201 or 202.*
316. **Recreational Management of Wildlands.** (3-0). Credit 3. I, II Management and recreational use of wild and wilderness areas and multiple use management areas; systems and techniques for dealing with management problems in outdoor recreation. Prerequisite: RPTS 307 or approval of instructor.*

331. **Tourism Marketing.** (3-0). **Credit 3.** **II** Application of basic tourism marketing principles and concepts in government, business, and social-cause contexts; situation analysis and operational evaluation; decision making in terms of product, place, price, and channel of distribution mixes for tourism attractions and services. Prerequisite: RPTS 202 or approval of instructor.
336. **Recreation Research and Analysis.** (3-0). **Credit 3.** **I, II** Introduction to current recreation research emphasizing specialized research methodology, adaptive techniques and methods of research review useful to the recreation professional; analysis of the methods of problems identification, formulation and solution. Prerequisites: RENR 201 and STAT 201 or equivalents; all mathematics requirements satisfied.*
340. **Recreation, Parks and Diverse Populations.** (3-0). **Credit 3.** **I, II, S** Review of major judicial decisions and civil rights laws on the provision and distribution of recreation and park services in society; the influence of age, disability, ethnicity, national origin, race, religion and gender on individual's preferences for particular recreation opportunities and experiences; implications of individual differences for the provision of recreation services.*
401. **Tourism and Recreation Enterprises.** (3-0). **Credit 3.** **II** Market and financial feasibility analysis; resource characteristics, location and market aspects of tourism and recreation enterprises. Prerequisites: 3 hours economics and 3 hours management.*
402. **Park Planning and Design.** (3-2). **Credit 4.** **I, II** Classification of areas according to primary function, location and clientele served; basic park planning principles involving scale, circulation, function and spatial relationships; methodology for establishing planning goals, objectives and planning strategies. Prerequisites: RPTS 201 and RENR 201 or equivalents; junior classification.*
403. **Financing and Marketing Recreation, Park and Tourism Resources.** (3-2). **Credit 4.** **I, II** Public sources of funding for facility development and of approaches to marketing recreation, park, and tourism services; applying knowledge to case study situations. Prerequisites: RPTS 311; junior or senior classification.
408. **Community Development and the Landgrant System.** (3-0). **Credit 3.** Introduces students to the scope, function and mission of the landgrant system in higher education and its relationship to community development. Prerequisite: Junior or senior classification.
420. **Natural Resource Law.** (3-0). **Credit 3.** Basic legal relationships and issues involved in the management, development and allocation of natural resources; includes federal, state and local statutes, administrative rules and judicial decisions; alternative dispute resolution theories and techniques. Cross-listed with RENR 420.
423. **Tourist and Resort Development.** (3-0). **Credit 3.** **I, II** Tourism and recreational travel; nature of resort development and its effect on generating tourist flow to and within regions; relationship of resource characteristics and resource ownership and control to the characteristics and economic importance of state and national resort industries. Prerequisite: RPTS 202.*
426. **Tourism Impacts.** (3-0). **Credit 3.** **I** Consequences and impacts of various kinds of tourism development for host communities and regions; read and evaluate case studies from Texas, other areas in the United States and internationally; economic, environmental, social, cultural and political impacts associated with tourism proposals, project development, tourist activity, industry expansion and industry decline. Prerequisite: RPTS 202 or approval of instructor.
460. **Development and Management of Protected Areas.** (3-0). **Credit 3.** **I, II** Case studies illustrating social, political, and legal influences on the development and management of parks, refuges, wilderness and other protected areas; interaction between protected-area management and tourism development in neighboring communities and regions; interpretation of social contexts. Prerequisite: RPTS 307 or 316, or 9 hours of credit in natural resource courses. Cross-listed with RENR 460.*
470. **Youth Development Organizations and Services.** (3-0). **Credit 3.** Changing views of adolescence and youth culture in the United States; developmental assets and principles of developing positive youth development supports, opportunities and services; mentoring and staff development for youth serving agencies; goals, program emphases, administrative methods and membership of major youth serving organizations.
481. **Seminar.** (1-0). **Credit 1.** **I, II** Preparation and presentation by students of papers reviewing recreation literature or reporting on current recreation developments. Required of all recreation and park majors. Prerequisite: Senior classification in recreation and parks.
484. **Internship.** **Credit 1 to 6.** Practical experience working in a professional recreation, park or tourism setting. Offered on an individual basis. May be repeated for credit. Prerequisite: Approval of department head.

485. **Directed Studies. Credit 1 to 4 each semester. I, II, S** For individual research by advanced undergraduates upon a broad range of subjects not included in established courses. Prerequisite: Junior classification or approval of department head.
489. **Special Topics in... Credit 1 to 4. I, II, S** Selected topics in an identified field of recreation and parks. May be repeated for credit.*
491. **Research. Credit 1 to 3.** Research conducted under the direction of faculty member in recreation park and tourism sciences. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor.

*Field trips required for which departmental fees may be assessed to cover costs.

Religious Studies (RELS)

211. **Hebrew Scriptures. (3-0). Credit 3.** Philosophical concepts of the Hebrew Scriptures as they relate to the development of religious and ethical ideas. Cross-listed with HUMA 211.
213. **New Testament. (3-0). Credit 3.** The origin and development of the religious and philosophical concepts of the New Testament. Cross-listed with HUMA 213.
220. **History of Christianity: Origins to the Reformation. (3-0). Credit 3.** History of Christian doctrine, ecclesiastical organization, and religious practice, origins through Reformation, with emphasis on religion and society; life and teachings of Jesus; apostolic church; patristic period; Christianization of Roman Empire and northern Europe; monasticism; medieval church; Gregorian reform; heresy; papal monarchy; schism and conciliarism; reformations of the sixteenth century. Cross-listed with HIST 220.
221. **History of Islam. (3-0). Credit 3.** Introduction to the history of Islam, from the origins of the religion to the present; development of Islamic law; gender issues; expansion of Islam to Sub-Saharan Africa and South Asia; globalized Islam. Cross-listed with HIST 221.
289. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of religious studies. May be repeated for credit. Prerequisite: Approval of instructor.
302. **Women and Religion. (3-0). Credit 3.** Investigation of women's position in religious institutions historically and/or currently, religion's influence on women's roles and status, and women's attempts to define their own religious perspectives; draws on sociological and philosophical insights and methods. Prerequisites: Junior or senior classification or approval of instructor. Cross-listed with SOCI 302 and WMST 302.
303. **Near Eastern Religions. (3-0). Credit 3.** Beliefs and practices of Judaism, Zoroastrianism, Christianity, and Islam with particular attention to their philosophical presuppositions. Cross-listed with HUMA 303.
304. **Indian and Oriental Religions. (3-0). Credit 3.** Beliefs and practices of Hinduism, Jainism, Sikhism, Buddhism, Confucianism, Taoism, and Shinto with particular attention to their philosophical presuppositions. Cross-listed with HUMA 304.
317. **Introduction to Biblical Archaeology. (3-0). Credit 3.** Application of archaeology in biblical research; basic overview of the material cultures that are the setting for the biblical narratives. Cross-listed with ANTH 317.
326. **Sociology of Religion. (3-0). Credit 3.** Institution of religion and religious-related behavior; relationship between dynamic and structural religion and contemporary society. Prerequisite: SOCI 205. Cross-listed with SOCI 326.
331. **Philosophy of Religion. (3-0). Credit 3.** Philosophical problems of western religion such as the existence of God, the problem of evil, types of theism, rational, empirical, and mystical approaches to God. Cross-listed with PHIL 331.
347. **Rise of Islam, 600-1258. (3-0). Credit 3.** Introduction to Islamic civilization from the rise of Islam to the Mongol conquests; examination of pre-Islamic poetry, the Qur'an, early Islamic laws on prayer, the ethical conventions of jihad, the lives of Muslim women, and the relation of Islam to Judaism and Christianity. Prerequisite: Junior or senior classification. Cross-listed with HIST 347.
351. **Classical Mythology. (3-0). Credit 3.** Introduction to the most important myths of Greeks and Romans; ancient and modern methods of interpreting myths; the role of myths in ancient literature; readings in English. Cross-listed with CLAS 351.

360. **The Bible as Literature.** (3-0). **Credit 3.** Narrative, structural, and thematic study of the Hebrew and Christian Scriptures in English translation. Prerequisite: 3 credits of literature at 200-level or above. Cross-listed with ENGL 365.
365. **History of Religion in America to 1860.** (3-0). **Credit 3.** Religion in America from European origins through New England Puritanism, U. S. Constitutional issues, immigration, revivalism, and the Civil War; relationship between dissenters, utopians, and visionaries versus mainstream counterparts. Cross-listed with HIST 365.
392. **Studies in Literature, Religion, and Culture.** (3-0). **Credit 3.** Exploration of literature treating significant religious topics in the context of cultural setting. Prerequisites: 3 credits of literature at 200-level or above; junior or senior classification. Cross-listed with ENGL 392.
403. **Anthropology of Religion.** (3-0). **Credit 3.** Anthropological theories of the relationship of religious behavior to social structure and cultural change, with particular reference to non-Western, pre-industrial societies. Cross-listed with ANTH 403.
405. **Psychology of Religion.** (3-0). **Credit 3.** Review of world's religions and the psychological study of the religious experience; religion within the context of personality; religious development through social interactions; religion in psychological research and therapy. Prerequisites: PSYC 306 and 330 or approval of instructor. Cross-listed with PSYC 405.
434. **Martin Luther and the Reformation in Germany.** (3-0). **Credit 3.** Introduction to the life and thought of Martin Luther; study of the Protestant Reformation in Germany from theological, political, and social perspective; taught in English. Prerequisite: Junior or senior classification. Cross-listed with EURO 434 and GERM 434.
485. **Directed Studies.** **Credit 1 to 6.** Readings and/or assigned projects for specific needs of students minor-ing in religious studies; directed independent or individual study in an identified area of religious studies. Prerequisite: Approval of coordinator of religious studies.
489. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of religious studies. May be repeated for credit. Prerequisite: Approval of instructor.

Institute of Renewable Natural Resources
Renewable Natural Resources
(RENR)

201. **Computer Applications in Agriculture.** (2-2). **Credit 3. I, II, S** Fundamentals of computer use and the application of agricultural software; computer use in decision making and problem solving in agriculture. Prerequisite: MATH 102. Cross-listed with AGLS 201.
205. **Fundamentals of Ecology.** (3-0). **Credit 3. I, II** Principles of ecology using a holistic approach treating plants, animals and humans as one integrated whole; composition, structure, nutrient cycles and energetics of biotic communities; adaptations to environmental factors; biotic relationships; and problems of environmental quality and resource use.
215. **Fundamentals of Ecology—Laboratory.** (0-3). **Credit 1. I, II, S** Sampling and estimating plant-animal populations, measuring environmental factors and recognizing and studying morphological, physiological and behavioral adaptations of plants and animals to biotic or abiotic influences.*
375. **Conservation of Natural Resources.** (3-0). **Credit 3. I, II, S** Principles and philosophies associated with the development, management and use of natural resources; ecological and social implications inherent in management alternatives involving the natural environment and use of renewable natural resources.
400. **Study Abroad in Natural Resources.** **Credit 2 to 12.** Provides students with an opportunity to gain first-hand experience in natural resource management in foreign countries; focus on the interaction of public, communal and private land tenure systems with the ecological and human dimensions of rangeland management, wildlife conservation and nature-based tourism. May be taken two times for credit. Prerequisite: Junior or senior classification.
405. **GIS for Environmental Problem Solving.** (2-2). **Credit 3.** Interdisciplinary approach to train students to integrate GIS and relevant technologies for environmental problem solving; helps students relate learning to real world situations; students conceptualize, develop and manage projects using real data; one term project required. Prerequisite: RENR 201 or equivalent or approval of instructor.

410. **Ecosystem Management.** (3-3). **Credit 4.** Concepts and practices relevant to the development of landscape/regional level ecosystem management plans; an ecosystem management plan will be developed utilizing a strategic management/coordinated resources approach to establish resource goals, ecosystem resource analysis and impact evaluation, and implementation compatible with societal and individual concerns. Prerequisite: Senior classification or approval of instructor.*
420. **Natural Resource Law.** (3-0). **Credit 3.** Basic legal relationships and issues involved in the management, development and allocation of natural resources; includes federal, state and local statutes, administrative rules and judicial decisions; alternative dispute resolution theories and techniques. Cross-listed with RPTS 420.
444. **Remote Sensing in Renewable Natural Resources.** (2-3). **Credit 3. II** Application of fundamental photogrammetry and photo interpretation and the use of other sensors in remote detection and analysis of natural resources; interpretation of natural vegetation as it applies to ecosystem analysis for range, forest and wildlife management; natural resource planning for rural, urban and recreational development. Prerequisite: Junior classification.
460. **Development and Management of Protected Areas.** (3-0). **Credit 3.** Case studies illustrating social, political, and legal influences on the development and management of parks, refuges, wilderness, and other protected areas; interaction between protected-area management and tourism development in neighboring communities and regions; interpretation of social contexts. Prerequisite: RPTS 307 or 316, or 9 hours of credit in natural resource courses. Cross-listed with RPTS 460.
470. **Environmental Impact Assessment.** (3-0). **Credit 3.** The evolution of natural resources regulatory policies and how this influences current procedures for environmental/natural resources assessment and management; demonstration of the environmental impact assessment procedures and policy issues associated with environmental impacts. Prerequisite: Senior classification or approval of instructor.
489. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified field of renewable natural resources. May be repeated for credit. Prerequisite: Approval of instructor.*

*Field trips required for which departmental fees may be assessed to cover costs.

Russian

(faculty, see page 698)

(RUSS)

101. (RUSS 1411) **Beginning Russian I.** (3-2). **Credit 4.** Elementary language study with oral, written and reading practice. Attention given to background for conversation. Part of class preparation will be done in language laboratory.
102. (RUSS 1412) **Beginning Russian II.** (3-2). **Credit 4.** Continuation of RUSS 101. Part of class preparation will be done in language laboratory. Prerequisite: RUSS 101.
201. (RUSS 2311) **Intermediate Russian I.** (3-0). **Credit 3. I** Continuation and review of grammar, selected readings; material to develop conversational and reading ability. Prerequisite: RUSS 102.
202. (RUSS 2312) **Intermediate Russian II.** (3-0). **Credit 3. II** Continuation of RUSS 201. Readings taken from standard works. Prerequisite: RUSS 201.
221. **Field Studies I.** **Credit 3.** Russian language and culture, taught in the former Soviet Union; supervised travel of cultural interest; participation in courses and activities at a Russian university or institute; exams, written and oral reports; to be taken concurrently with RUSS 222. Prerequisite: RUSS 102 with a grade of B or higher.
222. **Field Studies II.** **Credit 3.** Russian language and literature taught in the former Soviet Union in cooperation with a Russian university or institute; exams, written and oral reports; to be taken concurrently with RUSS 221. Prerequisite: RUSS 102 with a grade of B or higher.
241. **Conversation I.** (2-0). **Credit 2.** Development of conversational skills in Russian; building of active vocabulary; phonetic exercises with emphasis on correct diction; oral reports, skits, assigned dialogues; not for native speakers of Russian; conducted in Russian. Prerequisite: RUSS 102 or equivalent.

242. **Conversation II. (2-0). Credit 2.** Continuation of RUSS 241; discussion of texts on current events; improvised debates; emphasis on vocabulary building and correct expression; not for native speakers of Russian; conducted in Russian. Prerequisite: RUSS 102 or equivalent.
285. **Directed Studies. Credit 1 to 4.** Individual supervision of readings or assigned projects in Russian, selected for each student individually. Prerequisite: Approval of instructor and department head.
289. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of Russian. May be repeated for credit. Prerequisite: Approval of instructor.
301. **Advanced Grammar and Composition I. (3-0). Credit 3.** Review of grammar at an advanced level; readings of literary texts for analysis and emulation; development of oral and written skills; required for modern languages majors in Russian; conducted in Russian. Prerequisite: RUSS 202 or 222 or registration therein.
302. **Advanced Grammar and Composition II. (3-0). Credit 3.** Continuation of RUSS 301; literary interpretation of longer works; particular emphasis on the short stories of Chekhov and other major authors; required for modern languages majors in Russian; conducted in Russian. Prerequisite: RUSS 202 or 222 or registration therein.
322. **Masterpieces of Russian Literature. (3-0). Credit 3.** Selected works of Russian literature, representative of its major authors and most important literary movements; literary analysis and evaluation of each work's cultural background; conducted in Russian. Prerequisite: RUSS 202 or 222 or registration therein. May be retaken with approval of department head.
410. **Seminar in Russian Studies. (3-0). Credit 3.** Exploration of a significant topic, event, or period in Russian literature and culture; taught in Russian. Prerequisite: RUSS 202 or 222.
441. **The Russian Novel I: Tolstoy and Dostoevsky. (3-0). Credit 3.** Study of the major works of Tolstoy and Dostoevsky; discussion of the literary nature and purpose of novels, especially in the context of Russian culture; taught in English. Prerequisite: RUSS 201 or registration therein, or approval of instructor. Cross-listed with EURO 441.
442. **The Russian Novel II: The Twentieth Century. (3-0). Credit 3.** Study of major Russian novels from ca. 1900 to the end of Stalinism; exploration of topics relevant to Russia's experience in the 20th century; taught in English. Prerequisite: RUSS 201 or registration therein, or approval of instructor. Cross-listed with EURO 442.
443. **Contemporary Russian Prose. (3-0). Credit 3.** Study of Russian and Soviet 20th century prose literature, with emphasis on post-Stalinist and post-glasnost writers. Prerequisites: RUSS 201 or registration therein, or approval of instructor. Cross-listed with EURO 443.
444. **Russian Drama. (3-0). Credit 3.** Introduction to the masterpieces of Russian drama from the 19th century to the present; includes such authors as Pushkin, Chekhov, Gorky, Arbuzov, Rozov and Petrushevskaya; taught in English. Prerequisites: RUSS 201 or registration therein, or approval of instructor. Cross-listed with EURO 444.
446. **Russian Artistic Culture I: Beginnings to 1900. (3-0). Credit 3.** Masterpieces of Russian art, including architecture, dance, theater, music, and literature, from its beginnings until ca. 1900; taught in English. Prerequisite: RUSS 201 or registration therein, or approval of instructor. Cross-listed with EURO 446.
447. **Russian Artistic Culture II: 1890 to Present. (3-0). Credit 3.** Masterpieces of Russian art, including architecture, dance, theater, music, film, and literature, from ca. 1890 to the present; taught in English. Prerequisite: RUSS 201 or registration therein, or approval of instructor. Cross-listed with EURO 447.
485. **Directed Studies. Credit 1 to 4.** Individual supervision of readings or assigned projects, selected for each student individually; written and oral reports. Prerequisites: Approval of instructor and department head.
489. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of Russian language, literature and civilization. Prerequisite: Approval of instructor.
491. **Research. Credit 1 to 3.** Research conducted under the direction of faculty member in Russian. Prerequisites: 24 hours of Russian with at least 9 at 300-level or above; approval of department head.

Safety Education

(faculty, see page 721)

(SAED)

- 201. **Promoting Safety by Preventing Alcohol and Drug Abuse.** (1-0). **Credit 1.** Safety aspects of use of alcohol and other drugs; means of preventing and dealing with such problems.
- 301. **Introduction: Nature and Scope of Safety Education.** (3-0). **Credit 3.** Philosophy and history of safety education including the scope of safety needs related to social control in American society. Credit will not be given for both HLTH 221 and SAED 301.
- 427. **Driver Education.** (1-6). **Credit 3.** Practicum study of content, methods and materials for instruction in multi-phase driver education programs; clinical classroom and simulation practice in local high school driver education programs and laboratory sessions in simulation, multiple car and emergency procedures.
- 428. **Teaching Driver and Traffic Safety Education I.** (1-6). **Credit 3.** Practicum study and clinical application of methods and techniques of teaching classroom, simulation, multiple-car and on-street instruction to local high school driver education students. Prerequisite: SAED 427.
- 485. **Directed Studies.** **Credit 1 to 3.** Directed readings or research problems in safety education. Term report required.

Safety Engineering

(SENG)

- 309. **Radiological Safety.** (3-0). **Credit 3.** Interactions of nuclear radiations with matter and biological systems; theory and practice of radiation dosimetry as applied to radiation protection; design and application of radiation dosimetry systems for personnel monitoring, area radiation monitoring and accident situation; includes external and internal dosimetry as well as long-term risk analysis. Prerequisite: NUEN 302. Cross-listed with NUEN 309.
- 310. **Industrial Hygiene Engineering.** (3-0). **Credit 3. II** Application of scientific and engineering principles in the selection and design of control systems related to chemical, physical and ergonomic exposures in the process and manufacturing industries; relationships of criteria, analysis and specifications for the assessment and control of occupational related illnesses. Prerequisites: CHEM 107; MATH 308; PHYS 208; or approval of instructor.
- 312. **System Safety Engineering.** (3-0). **Credit 3. II** Application of system safety analytical techniques to the design process; emphasis on the management of a system safety or product safety program; relationship with other disciplines such as reliability, maintainability, human factors and product liability applications. Prerequisite: Junior classification.
- 313. **Product Safety Engineering.** (3-0). **Credit 3. I** Application of engineering principles to control hazards affecting the safety of manufactured products; statistical concepts applied to analysis and prediction of product failure; responsibilities of designer, manufacturer, distributor and user; design criteria for system modification; case studies. Prerequisite: Junior classification.
- 321. **Industrial Safety Engineering.** (3-0). **Credit 3. I** Concepts of designing, operating and maintaining optimally safe systems, risk management, economic impact, legislation, performance measurement and accident investigation/analysis; principles and practices in industrial hygiene engineering, fire protection engineering and introduction to systems safety engineering. Prerequisite: Junior classification.
- 424. **System Safety Analysis and Design.** (1-6). **Credit 3. II** Individual or group system safety engineering analysis and design project including statement of problem, systems analysis, alternate solutions and systems design; formal technical reports required. Prerequisites: SENG 310, 312, 321.
- 430. **Risk Analysis in Safety Engineering.** (3-0). **Credit 3.** Concepts of risk and risk assessment, which uses all available information to provide a foundation for risk-informed and cost-effective engineering practices; examples and exercises are drawn from a variety of engineering areas. Prerequisite: Junior or senior classification. Cross-listed with CHEN 430.
- 439. **Ergonomics Design.** (1-6). **Credit 3.** Capstone design course emphasizing the analysis and design of job requirements, workplace arrangements, material handling devices/systems and machine controls which improve the human workplace; integrates knowledge gained from all required industrial engineering courses in a system design project; for students in their final semester of undergraduate studies. Prerequisites: ISEN 404 and 430.

455. **Process Safety Engineering.** (3-0). **Credit 3. I, II** Applications of engineering principles to process safety and hazards analysis, mitigation, and prevention, with special emphasis on the chemical process industries; includes source modeling for leakage rates, dispersion, analysis, relief valve sizing, fire and explosion damage analysis, hazards identification, risk analysis, accident investigations. Prerequisite: Senior classification in any engineering major. Cross-listed with CHEN 455.
460. **Quantitative Risk Analysis in Safety Engineering.** (3-0). **Credit 3.** Fundamental concepts, techniques, and applications of risk analysis and risk-informed decision making for engineering students; practical uses of probabilistic methods are demonstrated in exercises and case studies from diverse engineering areas. Prerequisite: Senior or graduate classification. Cross-listed with CHEN 460.
477. **Air Pollution Engineering.** (3-0). **Credit 3. I** Design of air pollution abatement equipment and systems to include cyclones, bag filters and scrubbers; air pollution regulations; permitting; dispersion modeling; National Ambient Air Quality Standards. Prerequisite: ENGR 214 or equivalent. Cross-listed with BAEN 477 and MEEN 477.
485. **Directed Studies.** **Credit 1 to 4. I, II, S** Permits students to develop special projects in industrial hygiene engineering, safety engineering or fire protection engineering. Project must be approved by department head.
489. **Special Topics in...** **Credit 1 to 4.** Selected topics in industrial hygiene engineering, safety engineering or fire protection engineering of specific student interest. May be repeated for credit. Prerequisite: Approval of instructor.

School of Military Sciences

Commandant and Head Lt. Gen. (Ret.) J. A. Van Alstyne; Deputy Commandant and Instructor G. R. Betty; Instructors W. B. Byrne, III., A. W. Groves

(SOMS)

289. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of leadership theory and practice. May be repeated for credit. Prerequisite: Freshman or sophomore classification; approval of instructor.
380. **Workshop in Leadership Education.** (1-0). **Credit 1.** The study of leadership theory, intra group relationships, assessment tools for skills development, and techniques for achieving group goals. Prerequisite: Junior classification or approval of instructor.
381. **Workshop in Leadership Education II.** (1-0). **Credit 1.** Continuation of SOMS 380. Fundamentals of small group dynamics; interpersonal communication; application of selected leadership theories; interpretation of individual assessments to include personality traits, values, and signature strengths. Prerequisites: SOMS 380; junior or senior classification.
481. **Seminar in Executive Leadership.** (1-0). **Credit 1.** The study of contemporary leadership issues, organizational effectiveness, problem solving, and decision making. Prerequisite: Senior classification or approval of instructor.
482. **Seminar in Executive Leadership II.** (1-0). **Credit 1.** Continuation of SOMS 481. Discussion of ethical dilemmas in leadership roles; ethical decision-making; personal accountability in organizational settings. Prerequisite: SOMS 481 or approval of instructor.
485. **Directed Studies.** **Credit 1 to 4.** Individual supervision of special readings or assigned projects to promote independent study; program enrichment for capable students; written and oral reports required. Prerequisite: Approval of instructor.
489. **Special Topics in...** **Credit 1 to 4.** Selected topics in an identified area of leadership theory and practice. May be repeated for credit. Prerequisite: Junior or senior classification; approval of instructor.

In addition to the normal military science requirements listed above, any cadet seeking a commission as a second lieutenant must complete one approved course in military history.

College of Science (SCEN)

292. **Cooperative Education in Science. Credit 2. I, II, S** Educational work assignment by a student in the field of his or her career interest and course of study. Supervision of the student will be by the cooperating employer and the instructor. A technical report, approved by the instructor, on a related subject area will be required. Prerequisite: Approval of the college coordinator of cooperative education.
301. **College of Science Study Abroad. Credit 1 to 18.** For student in approved programs abroad. May be repeated for credit. Prerequisites: Admission to approved program and approval of academic dean.
392. **Cooperative Education in Science. Credit 2. I, II, S** Educational work assignment by a student in the field of his or her career interest and course of study. Supervision of the student will be by the cooperating employer and the instructor. A technical report, approved by the instructor, on a related subject area will be required. Prerequisite: Approval of the college coordinator of cooperative education.
492. **Cooperative Education in Science. Credit 2. I, II, S** Educational work assignment by a student in the field of his or her career interest and course of study. Supervision of the student will be by the cooperating employer and the instructor. A technical report, approved by the instructor, on a related subject area will be required. Prerequisite: Approval of the college coordinator of cooperative education.

Department of Sociology

Professors J. S. Burk, S. R. Cohn, B. M. Crouch, J. R. Feagin, B. A. Finlay, M. A. Fossett (Head), H. B. Kaplan, W. A. McIntosh, S. G. Mestrovic, E. Murguia, D. L. Poston, Jr., H. N. Prechel, R. Saenz, D. Sciulli, J. A. Sell, J. K. Thomas; Associate Professors P. D. Almeida, S. N. Gatson, K. Henderson, J. O. Jewell, R. A. B. May; Assistant Professors J. M. Ackerman, A. Currier, N. Y. Flores, H. Foster, S. J. Hysom, D. Liu, R. S. Mackin, W. L. Moore, H. Ono, N. Plankey Videla, Z. Valdez, W. Zhang, L. Zheng; Senior Lecturers C. M. Albrecht, K. T. Dietrich, J. Linneman; Lecturer K. Suzuki

Sociology (SOCI)

205. (SOCI 1301) **Introduction to Sociology. (3-0). Credit 3. I, II, S** Sociological perspectives including concepts and methods; social class and social status, the family, minorities, crime, religion, power, urbanization and population.
206. **Global Social Trends. (3-0). Credit 3.** Long-term trends in world societies from ancient times to the present and to the foreseeable future; emphasis on contemporary international issues and problems, techniques of analysis and future projections.
207. **Introduction to Gender and Society. (3-0). Credit 3.** Similarities and differences between females and males in a number of cultures throughout the world; sociological analysis of gender in relation to social structure. Cross-listed with WMST 207.
210. **Sociology of Technology and Science. (3-0). Credit 3.** Examination of technology and science from a variety of theoretical perspectives; process by which engineered products are influenced by social factors as well as how they in turn, impact society; exploration and critique of classic and contemporary theories of technological development.
211. **Sociology of Deviance. (3-0). Credit 3.** Perspectives on non-normative behavior; theories of deviance.
220. **Methods of Social Research. (2-2). Credit 3. I, II** Relationships between sociological theory, research, qualitative evaluation of data; construction and use of analytical procedures and research techniques, and participant observation.
229. **Qualitative Methods. (3-0). Credit 3.** Methodologies in social research with emphasis on qualitative dimensions of inquiry; topics include in-depth interviewing, observation, unobtrusive measures, analysis of documents, fieldwork issues, ethics, note-taking, preliminary data analysis, and an overview of writing research reports based on qualitative research.
230. **Classical Sociological Theory. (3-0). Credit 3. I, II** Role of theory in sociological study; the development of classical theoretical perspectives providing the foundation for contemporary theory.

302. **Women and Religion.** (3-0). **Credit 3.** Investigation of women's position in religious institutions historically and/or currently, religion's influence on women's roles and status, and women's attempts to define their own religious perspectives; draws on sociological and philosophical insights and methods. Prerequisites: Junior or senior classification or approval of instructor. Cross-listed with RELS 302 and WMST 302.
304. **Criminology.** (3-0). **Credit 3. I, II** Criminal law and crime rates; explanations of criminal behavior; criminal careers, police, adult courts and prisons. Prerequisite: Junior classification.
305. **Juvenile Delinquency.** (3-0). **Credit 3.** Social scientific aspects of juvenile delinquency including social construction, theoretical explanations, social structural determinants, prevention and societal responses. Prerequisite: Junior or senior classification with approval of instructor.
306. **Society and Population of Modern China.** (3-0). **Credit 3.** Major trends and current topics in social and demographic aspects of the society of modern China, including Taiwan. Prerequisite: Junior or senior classification. Cross-listed with ASIA 306.
310. **Motherhood in Society.** (3-0). **Credit 3.** Examines expectations and/or practices relating to motherhood, with consideration of their cultural impact; taught from a social science perspective. Prerequisites: Junior or senior classification or approval of instructor. Cross-listed with WMST 310.
312. **Population and Society.** (3-0). **Credit 3. I** The causes and implications of major population trends.
313. **Military, War and Society.** (3-0). **Credit 3.** Major trends and current topics in military organization; the experience and conduct of war; civil-military relations.
314. **Social Problems.** (3-0). **Credit 3. I, II, S** Survey and exploration of causes and consequences of major social problems in American society such as poverty, unemployment, energy, alcohol, other drugs and sexual abuse.
315. **The Marriage Institution.** (3-0). **Credit 3. I, II, S** Courtship, engagement, marriage, family formation, personal adjustment, conflict, financing and child rearing.
316. **Sociology of Gender.** (3-0). **Credit 3. I** Sociological explanations of status differences between men and women; cross-cultural comparisons; gender role socialization, cultural stereotypes, discrimination; gender roles and status in the family, economy, religion, science, other social institutions; deviance, victimization and gender; recent social changes. Cross-listed with WMST 316.
317. **Racial and Ethnic Relations.** (3-0). **Credit 3. I, II, S** Status of racial and ethnic groups such as Native Americans, African Americans, Latino Americans, Asian Americans, and other groups in the political, economic, legal and social systems of the United States.
319. **Sociology of Sport.** (3-0). **Credit 3. II** Social institution of sport and its consequences for American society social organization from play to professional sport; violence, discrimination, women in sport; socialization implications from participation in sports. Cross-listed with KINE 319.
320. **Demographic Methods.** (3-0). **Credit 3.** Procedures and techniques of demographic analysis; examination of demographic data; calculation of rates; construction of life tables; population estimates and projections. Prerequisite: Junior or senior classification; or approval of instructor.
321. **Urban Sociology.** (3-0). **Credit 3. I, II** The social structure of cities and the adjustments people make to urban conditions.
322. **Industrial Sociology.** (3-0). **Credit 3. I, II** Work relations in jobs; social relations of groups and occupations and the social organization of small work groups, bureaucracies and modern large corporations.
323. **Sociology of African Americans.** (3-0). **Credit 3. I** Major elements of the Afro-American subculture in relation to white American society and its major social institutions. Prerequisite: SOCI 205.
324. **Social Change.** (3-0). **Credit 3. II** Survey of major changes in American and Western society, the forces underlying change and tensions caused by social change.
325. **International Business Behavior.** (3-0). **Credit 3.** Theoretical models and practical protocols/behavior demands to conduct business and to work in France, Germany, Japan, China, Mexico and other countries; discussion of national character, managerial and negotiating styles.
326. **Sociology of Religion.** (3-0). **Credit 3. II** Institution of religion and religious-related behavior; relationship between dynamic and structural religion and contemporary society. Prerequisite: SOCI 205. Cross-listed with RELS 326.
327. **Morality and Society.** (3-0). **Credit 3.** Examination of how moral beliefs arise, how they change, how the moral order is maintained, and how that order affects the social structure; use of case-study method.

328. **Environmental Sociology.** (3-0). **Credit 3.** A comprehensive overview of environmental sociology, including major sociological theories, concepts and policy issues affecting our understanding of environmental changes; emphasizes social factors that impact environmental quality. Prerequisite: SOCI 205 or approval of instructor.
329. **Pacific Rim Business Behavior.** (3-0). **Credit 3.** Theoretical models of Asian cultures and practical protocol/etiquette related to business and work in China, Thailand, South Korea, Japan, Australia, and other Pacific Rim nations; discussions of national character, managerial behavior and values. Cross-listed with ASIA 329.
330. **Sociology of Nutrition.** (3-0). **Credit 3. I** Social factors affecting the kind and amount of food consumed around the world; social consequences of nutritional status for family functioning and for international development.
332. **Alternative Genders.** (3-0). **Credit 3.** Examination of theories and case studies involving alternative genders and sexualities, studies in their cultural contexts and including the role of factors such as race, class, ethnicity, age, and physical characteristics. Prerequisites: 3 credits in SOCI or WMST; junior or senior classification. Cross-listed with WMST 332.
335. **Sociology of Organizations.** (3-0). **Credit 3. II** How people act in organizations; structures in organizations; the relationship between organizations and their environments.
337. **International Migration.** (3-0). **Credit 3.** Survey of theories and trends in international migration. Prerequisite: Junior or senior classification, or approval of instructor.
340. **Post-Soviet Societies.** (3-0). **Credit 3. I** Changing demography, culture, social structure and major social institutions of the successor states of the former Soviet Union. Prerequisite: Junior or senior classification or approval of instructor.
350. **Sociology of Islamic Societies.** (3-0). **Credit 3.** Survey of the religion, culture, and social organization of societies in which the dominant religion is Islam; contribution of Islam to Western civilization; current problems of economic and social development in Islamic societies.
403. **Sociology of Latinos.** (3-0). **Credit 3.** Exploration of social characteristics and acculturation problems of Mexican Americans in the United States; styles of life and cultural variability, social mobility, the struggle for advancement and identity through social movements.
404. **Sociology of the Community.** (3-0). **Credit 3. II** Organization of American communities examining the bases of community, types of communities and the changes faced by communities. Prerequisite: SOCI 205 or 407.
407. **Rural Sociology.** (3-0). **Credit 3. II** Adaptation of families to rural environments; farming and other occupations; rural lifestyles; organizations, agencies and institutions serving rural people; problems in delivering services to the country; rural development and change.
411. **Social Psychology.** (3-0). **Credit 3. I, II** Effects of social experience and groups on the development of personality, attitudes, values and behavior. Prerequisite: 3 hours of sociology or psychology.
412. **Political Sociology.** (3-0). **Credit 3.** Survey of social bases of power; state formation in advanced industrial societies; origins of welfare state; interrelation of nationalism; culture and class formation. Prerequisite: Junior or senior classification; or approval of instructor.
413. **Social Movements.** (3-0). **Credit 3.** Survey of social movements; emphasis on social movement participation, emergence and outcomes; analysis of revolutions and movements in the developing world; theory and methods of social movement research. Prerequisite: Junior or senior classification or approval of instructor.
415. **Sociology of Education.** (3-0). **Credit 3.** Relationship of social structure and change to education; social background and student performance; teachers and their careers; bureaucracy and change in education. Prerequisite: SOCI 205.

419. **Social Class in Contemporary Society.** (3-0). **Credit 3.** I Composition and consequences of social class structure; social class explanations for lifestyle patterns, educational and occupational achievements. Prerequisite: SOCI 205.
420. **Advanced Methods of Social Research.** (2-2). **Credit 3.** I, II Philosophy and methods of social research, including research design; methods of observation; questionnaires, interviews and other sources of social data; qualitative and quantitative techniques of inference, analysis and research report writing. Prerequisite: SOCI 220
423. **Globalization and Social Change.** (3-0). **Credit 3.** Examines the effects of globalization on social structure including politics, governments, corporations, work and inequality. Prerequisite: Junior or senior classification or approval of instructor.
424. **Women and Work in Society.** (3-0). **Credit 3.** II Social context of women's work; work patterns, labor force participation, occupational destinations and occupational mobility; alternatives to the conventional division of labor by sex in society. Cross-listed with WMST 424.
425. **Medical Sociology.** (3-0). **Credit 3.** I Organization, value systems and practice of medicine and the provision of health care in the U.S.; role of physicians, health occupations and patients; marginal and folk medicine. Prerequisite: SOCI 205.
426. **Sociology of Work.** (3-0). **Credit 3.** Overview of classical and contemporary theories of work, changes in labor market structure; contemporary work place organization; occupational stratification by race, class, and gender. Prerequisite: Junior or senior classification or approval of instructor.
430. **Contemporary Sociological Theory.** (3-0). **Credit 3.** I, II Basic ideas of contemporary sociological theory: structuralism, functionalism, conflict, symbolic interaction, exchange and their application to current research. Prerequisite: SOCI 230.
445. **Sociology of Law.** (3-0). **Credit 3.** Introduction to the sociology of law; the relation of law to general social control and to organizational dynamics.
460. **Sociology of Professions.** (3-0). **Credit 3.** Relationship of social change to professions: relations of professions and professional practice to historical antecedents and organizational context. Prerequisites: SOCI 205 and junior or senior classification.
463. **Gender in Asia.** (3-0). **Credit 3.** Gender dynamics in Asia; changes in gender roles; women's movements; women and the economy; women and politics; men's and women's private lives. Prerequisite: Junior or senior classification or approval of instructor. Cross-listed with ASIA 463 and WMST 463.
484. **Field Practicum.** **Credit 1 to 4 each semester.** I, II, S Participation in an approved agency. Field experience will be supervised by selected agency personnel and appropriate faculty. Experiences and requirements will vary slightly according to placement and student interests. Prerequisites: Major in sociology; 12 hours of sociology; approval of undergraduate advisor.
485. **Directed Studies.** **Credit 1 to 3 each semester.** I, II, S Special problems not covered by other courses. Course depends upon needs and interest of the student and upon the number of credit hours. Prerequisite: Senior classification in sociology.
489. **Special Topics in...** **Credit 1 to 4.** I, II, S Selected topics in an identified area of sociology. May be repeated for credit. Prerequisite: Approval of instructor.

Department of Hispanic Studies

Professors V. Arizpe (Head), N. J. Dyer, E. Espina, S. J. Miller, T. J. Mitchell, E. Urbina; **Associate Professors** R. K. Curry, B. J. Imhoff, H. A. Kallendorf, A. Luiselli, J. P. Villalobos; **Assistant Professors** J. C. Galdo, S. M. Misemer, M. I. Moyna, M. E. Quintana; **Senior Lecturers** N. L. Arizpe, J. A. Caraballo, F. M. Miller; **Lecturers** N. Carrero, B. Ortega Aguilar, P. Timmons

Incoming students who intend to enroll for the first time in a Spanish course at Texas A&M University, who have previous knowledge, however acquired, of the language in which they plan to enroll, and who have no college credit in the language, must take a placement test to determine the appropriate course for their level of ability. The foreign language placement test also serves as a basis for credit by examination.

Students will be expected to complete the 201 and 202 language courses in sequence before taking upper-division courses. Those who already have a high level of proficiency may either request an examination for credit in the courses or begin with a higher level course with approval of instructor. Once, however, students register for a higher-level language course, they are no longer eligible to receive credit for prerequisite courses.

International students whose native language is not English are exempted from satisfying the University foreign language requirement. These students are not allowed to register for courses in their native language (101, 102) which are used to fulfill that requirement.

Spanish (SPAN)

101. (SPAN 1411) **Beginning Spanish I.** (3-2). **Credit 4. I, II, S** Elementary language study with oral, written and reading practice. Preparation for conversation. Part of class preparation will be done in language laboratory and online. Students with prior instruction in Spanish are required to take the Spanish Placement Test before enrolling for the first time in a college Spanish course.
102. (SPAN 1412) **Beginning Spanish II.** (3-2). **Credit 4. I, II, S** Continuation of SPAN 101. Part of class preparation will be done in language laboratory and online. Prerequisite: SPAN 101 with a grade of C or better. Students with prior instruction in Spanish are required to take the Spanish Placement Test before enrolling for the first time in a college Spanish course.
140. **Alternate Beginning Spanish.** (4-1). **Credit 4.** Accelerated review of grammatical structures covered in SPAN 101, followed by study of material covered in SPAN 102. Prerequisite: Placement by examination or transfer credit for SPAN 101 with a grade of C or better.
201. (SPAN 2311) **Intermediate Spanish I.** (3-0). **Credit 3. I, II, S** Readings of average difficulty. Review of grammar; practice in conversation and composition. Prerequisite: SPAN 102 or 140 with a grade of C or better. Students with prior instruction in Spanish are required to take the Spanish Placement Test before enrolling for the first time in a college Spanish course.
202. (SPAN 2312) **Intermediate Spanish II.** (3-0). **Credit 3. I, II, S** Continuation of SPAN 201 with more advanced material. Prerequisite: SPAN 201 with a grade of C or better. Students with prior instruction in Spanish are required to take the Spanish Placement Test before enrolling for the first time in a college Spanish course.
203. **Intermediate Spanish for Spanish Speakers.** (3-0). **Credit 3.** Continuation of SPAN 201 with more advanced material; emphasis on language problems peculiar to students of Hispanic background; introduction to aspects of Hispanic cultural heritage. Prerequisites: SPAN 201 with a grade of C or better; students with prior knowledge of Spanish are required to take the Spanish Placement Test before enrolling for the first time in a college Spanish course.
221. **Field Studies I.** **Credit 3.** Spanish language and culture taught in a Spanish-speaking country; supervised travel of cultural interest; living with local families; participation in activities and courses of a host university or institute; exams, written and oral reports; to be taken concurrently with SPAN 222. Prerequisite: SPAN 102 with a grade of B or higher.
222. **Field Studies II.** **Credit 3.** Spanish language and literature taught in a Spanish-speaking country in cooperation with a Spanish university or institute; exams, written and oral reports; to be taken concurrently with SPAN 221. Prerequisite: SPAN 102 with a grade of B or higher.

285. **Directed Studies.** Credit 1 to 4. Individual supervision of readings or assigned projects in Spanish, selected for each student individually. Prerequisite: Approval of instructor and department head.
289. **Special Topics in...** Credit 1 to 4. Selected topics in an identified area of Spanish. May be repeated for credit. Prerequisite: Approval of instructor.
302. **Contrastive Grammar.** (3-0). Credit 3. Comparison of grammatical structures of Spanish and English which define the linguistic perspective specific to Spanish; with special reference to practical application in spoken and written communication and in various sociocultural and literary contexts; conducted in Spanish. Prerequisites: SPAN 202, 203, 222 or equivalent.
303. **Composition and Conversation.** (3-0). Credit 3. Development of writing skills in Spanish with emphasis on grammatical constructions; structural analysis of representative texts and their imitation; organization of short compositions and term papers; required for majors in Spanish; conducted in Spanish. Prerequisite: SPAN 302 or approval of instructor.
304. **Grammar for Native Speakers.** (3-0). Credit 3. Consideration of grammatical structures which present challenges specific to native Spanish speakers; practical application in various contexts; attention to orthography and accentuation; conducted in Spanish. Prerequisites: SPAN 202, 203, 222 or equivalent.
306. **Business Spanish.** (3-0). Credit 3. Continuation of language skill acquisition with advanced material drawn from business and related fields; study of and practice with Spanish business language in the context of Hispanic economic and business systems; conducted in Spanish. Prerequisite: SPAN 302 or approval of instructor.
310. **Oral Expression.** (3-0). Credit 3. Development of oral skills in Spanish through pronunciation practice, discussion of current events, skits, interviews, conversations, role play, impromptu debates and public speaking; conducted in Spanish. Prerequisite: SPAN 202 or 203.
311. **Hispanic Culture and Civilization to the 18th Century.** (3-0). Credit 3. Survey of the Hispanic world with emphasis on its history and cultural patterns from pre-Roman times to the 18th century; description and analysis of artistic, historical, literary, political topics. Taught in Spanish. Prerequisite: SPAN 202, 203, 222 or approval of instructor.
312. **Hispanic Culture and Civilization: 18th Century to Present.** (3-0). Credit 3. Overview of the Hispanic world, including the United States, from independence in the Americas to present; description and analysis of artistic, historical, literary, political, sociolinguistic topics. Taught in Spanish. Prerequisite: SPAN 202, 203, 222 or approval of instructor.
320. **Introduction to Hispanic Literature.** (3-0). Credit 3. Readings in Spanish poetry and prose with emphasis on methods of analysis for imagery, prosody, rhetorical figures, thematic composition and narrative structure; application of those techniques in oral and written reports; required for modern languages majors in Spanish; conducted in Spanish. Prerequisite: SPAN 202 or 203 or approval of instructor.
331. **Spanish Literature to 1700.** (3-0). Credit 3. Origins and evolution of Spanish literature from the Medieval to the Golden Age traditions; epic, drama, novel, picaresque and satire as reflected in works by Berceo, Cervantes, Garcilaso de la Vega, Lope de Vega, Calderón de la Barca and others; conducted in Spanish. Prerequisites: SPAN 303 and 320 or approval of instructor.
332. **Spanish Literature from 1700 to 1936.** (3-0). Credit 3. Representative works of Spanish Neoclassicism, Romanticism, realism, naturalism, modernism, and Avant-Garde movements; overview of historical background, cultural and philosophical tendencies; socio-political movements in modern Spain until the Civil War; conducted in Spanish. Prerequisites: SPAN 303 and 320 or approval of instructor.
341. **Spanish-American Literature from 1492 to 1821.** (3-0). Credit 3. Themes, styles and authors from the meeting of Old and New Worlds through the final days of the Colony; overview of cultural and historical background; conducted in Spanish. Prerequisites: SPAN 303 and 320 or approval of instructor.
342. **Spanish-American Literature from 1821 to 1935.** (3-0). Credit 3. Themes, styles and authors from Independence to Modernity; overview of cultural and historical background; conducted in Spanish. Prerequisites: SPAN 303 and 320 or approval of instructor.
350. **Phonetics.** (3-0). Credit 3. Sound system of Spanish with special reference to pronunciation and contrast with sounds of American English; development and description of phonology of principal dialects of American and Peninsular Spanish. Especially for native speakers of English, future teachers of Spanish and bilingual education majors; conducted in Spanish. Prerequisite: SPAN 202, 203, 222 or equivalent.

410. **Hispanic Film.** (3-0). **Credit 3.** Examination of major works and directors of contemporary Hispanic film; interpretation of culture through film; relationship of literature and film; conducted in Spanish. Prerequisites: SPAN 311 or 312 and 303 or approval of instructor.
411. **Contemporary Hispanic Society and Culture.** (3-0). **Credit 3.** Cultural, economic, and political aspects of present-day Hispanic societies, and the treatment of these issues in the media; conducted in Spanish. Prerequisites: SPAN 311 or 312 and 303 or approval of instructor.
412. **Hispanic Writers in the U.S.** (3-0). **Credit 3.** Contemporary literature by monolingual/bilingual Hispanic authors in the United States; analysis of representative works from major Hispanic communities in the United States; conducted in Spanish. Prerequisites: SPAN 303 and 320 or approval of instructor.
413. **Hispanic Culture through Art.** (3-0). **Credit 3.** Examination of the works of a major artist and/or artistic movement as a vehicle for intensive analysis of elements of Hispanic culture; study of artists such as El Greco, Velazquez, Goya, Picasso, Dali, and Diego Rivera. Conducted in Spanish. Prerequisites: Junior or senior classification; SPAN 311 or 312 and SPAN 303 or approval of instructor.
421. **Spanish Language Poetry.** (3-0). **Credit 3.** Development of Spanish lyric poetry from the Jarchas to the present; analysis of metrics, imagery, language and style in the different periods; may include poems by Berceo, Garcilaso de la Vega, Góngora, Sor Juana, Bécquer, Rosalía, Darío, Machado, Lorca, Neruda, Vallejo, Paz and others; course conducted in Spanish. Prerequisites: SPAN 303 and 320 or approval of instructor.
445. **Cervantes.** (3-0). **Credit 3. I, II** Analysis of Cervantes' life, cultural milieu and works; emphasis on Don Quixote, its significance in Spanish literature and in the development of the modern novel; conducted in Spanish. Prerequisites: SPAN 303 and 320 or approval of instructor.
450. **Contemporary Spanish and Spanish-American Literature.** (3-0). **Credit 3.** Representative works of authors from both sides of the Atlantic; similarities and differences as regional literature give way to cosmopolitan styles, themes and movements; conducted in Spanish. Prerequisites: SPAN 303 and 320 or approval of instructor.
485. **Directed Studies.** **Credit 1 to 4.** Individual supervision of readings or assigned projects selected for each student individually; written and oral reports. Prerequisite: Approval of instructor and department head.
489. **Special Topics in...** **Credit 1 to 4. I, II, S** Selected topics in an identified area of Spanish. May be repeated for credit. Prerequisite: Approval of department head.
491. **Research.** **Credit 1 to 4.** Research conducted under the direction of faculty member in hispanic studies. May be repeated 2 times for credit. Prerequisites: Junior or senior classification and approval of instructor.

Spatial Sciences (SPSC)

102. **Introduction to Spatial Sciences.** (1-0). **Credit 1.** Provides students with an understanding of spatial sciences; how it is applied for problem solving in a wide variety of fields; and survey of the field and what opportunities are available to professionals in spatial sciences. Cross-listed with GEOG 102 and FRSC 102.
398. **Interpretation of Aerial Photographs.** (2-3). **Credit 3.** Identification and evaluation of natural and cultural features on aerial photographs; methods for extracting information concerning land use, vegetative cover, surface and structural features, urban/industrial patterns and archaeological sites. Prerequisites: Any mathematics course and one of the following: AGRO 301, BIOL 113, FRSC 101, GEOG 203, GEOL 101, RENR 205, WFSC 101. Cross-listed with FRSC 398 and GEOG 398.
444. **Remote Sensing in Renewable Natural Resources.** (2-3). **Credit 3.** Application of fundamental photogrammetry and photo interpretation and the use of other sensors in remote detection and analysis of natural resources; interpretation of natural vegetation as it applies to ecosystem analysis for range, forest and wildlife management; natural resource planning for rural, urban and recreational development. Prerequisite: Junior classification. Cross-listed with RENR 444.

461. **Geographic Information Systems for Resource Managers. (2-2). Credit 3.** Geographic Information System (GIS) approach to the integration of spatial and attribute data to study the capture, analysis, manipulation and portrayal of natural resource data; examination of data types/formats, as well as the integration of GIS with remote sensing and Global Positioning System; laboratory includes extensive use of GIS applications to conduct analyses of topics in natural resources. Prerequisite: Approval of instructor. Cross-listed with FRSC 461 and AGSM 461.
462. **Advanced GIS Analysis for Natural Resource Management. (2-2). Credit 3.** Advanced topics in Geographic Information Systems (GIS) to solve natural resource problems; manipulation of raster data types; three-dimensional modeling; emphasis on geo-processing as it relates to applied projects, particularly with habitat suitability models; field and lab use of Global Positioning Systems (GPS); internet-based GIS modeling. Prerequisites: FRSC 461 or SPSC 461 or approval of instructor; junior or senior classification. Cross-listed with AGSM 462, GEOG 462, and FRSC 462.

Special Education

(faculty, see page 675)

(SPED)

291. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in special education. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
302. **Instructional Design for Students with Disabilities. (3-0). Credit 3. II** Familiarizes pre-service teachers with methods for designing and implementing instruction for students with mild to moderated disabilities; designing and managing environments and materials. Prerequisite: INST 310; junior classification.
491. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in special education. May be repeated 2 times for credit. Prerequisites: Junior or senior classification and approval of instructor.

Special Education Field Based

(faculty, see page 675)

(SEFB)

310. **Instructional Strategies for Students with Disabilities. (2-3). Credit 3. II** Field-based course designed to provide pre-service teachers with strategies and techniques effective in teaching students with mild to moderate disabilities in a variety of general and special education settings; addresses teaching of academic, social and behavioral skills. Prerequisites: SPED 302; admission to the program; junior or senior classification..
311. **Assessment of Students with Disabilities. (2-3). Credit 3. II** Field-based course involving formal and informal assessment techniques used with students with disabilities, including progress monitoring; development of Individual Education Plans and the IEP process. Prerequisites: SPED 302; admission to teacher education.
312. **Effective Reading Instruction for Students with Disabilities. (2-3). Credit 3. II** Information and competencies through field-based instruction in effective reading instruction for students K-12 with academic learning problems and mild/moderate disabilities; reading assessment, effective instruction design and teaching techniques, error analysis, correction procedures, and analyses and adaptations of commercial reading materials. Prerequisites: SPED 302; admission to the program.
320. **Education and Employment Issues in Secondary Special Education. (2-3). Credit 3.** Field-based course involving psychological, social, physical and cognitive development of secondary-age students; career assessment; programmatic options within educational and employment settings; transition models from school to adult settings. Prerequisite: SPED 302; admission to the program.
414. **Methods and Issues in Low-Incidence Disabilities. (3-0). Credit 3.** Examination of how low-incidence disabilities affect academic and job performance; current methods for teaching and training individuals with low-incidence disabilities; includes 45-hour practicum with students with low-incidence disabilities. Prerequisites: SPED 302; admission to program; junior or senior classification.

425. **Student Teaching in Special Education. (0-12) Credit 3. I, II** Observation and participation in special education classroom activity; supervised student teaching in accredited school. Special education student teachers must complete experience in both regular and special education placements. Must be taken satisfactory/unsatisfactory. Prerequisites: 2.5 GPA in teaching fields and professional development.
426. **Effective Instruction of Students of Diverse Abilities. (2-3). Credit 3.** Field-based application of effective instructional strategies for teaching students of diverse abilities; analysis of teaching style and strategies for improving ability to work with diverse populations. To be taken concurrently with SEFB 425. Must be taken on a satisfactory/unsatisfactory basis. Prerequisite: Senior classification; 2.5 GPA in teaching field; approval of department head.
442. **Teaching Students with Emotional Disturbances and Behavior Disorders. (2-3). Credit 3.** Special techniques and materials used in the instruction of students who have emotional and behavioral disorders; field-based course that includes practica related to behavior and instructional interventions. Prerequisite: SPED 302; admission to the program.
471. **Classroom Management and Behavioral Interventions. (2-3). Credit 3.** Field-based course focusing on the effective management of classrooms: including research-based models of classroom discipline, proactive strategies that prevent misbehavior; interventions that decrease problem behaviors, and management systems appropriate for students with disabilities. Prerequisites: SPED 302; admission to the program.

Sport Management

(faculty, see page 721)

(SPMT)

217. **Foundations of Sport Management. (3-0). Credit 3.** History, principles, and objectives of the sport management profession; an overview of the structure of the sport industry; introduction to the scope and variety of career opportunities in sport.
285. **Directed Studies. Credit 1 to 4.** Work on a specified topic with the intent of promoting independent reading, research and study; supplement existing course offerings or subjects not presently covered. May be repeated for credit. Prerequisite: Freshman or sophomore classification; approval of instructor.
289. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of sport management. May be repeated for credit.
291. **Research. Credit 1 to 4.** Research conducted under the direction of a faculty member in sport management. May be repeated 4 times for credit. Prerequisites: Freshman or sophomore classification; approval of instructor.
333. **Sport Management. (3-0). Credit 3.** Introduction to techniques for proper management of programs in physical activities and athletics including the basic physical education instructional program, intercollegiate and interscholastic athletics, intramural and club programs, and alternative athletic programs such as health clubs, corporate fitness centers and YMCA/YWCAs. Prerequisites: Junior or senior classification; admission to professional phase of program.
336. **Diversity in Sport Organizations. (3-0). Credit 3.** Examine an encompassing perspective of diversity within North American and international sport organizations. Prerequisite: Junior or senior classification.

337. **International Sport Business. (3-0). Credit 3.** The magnitude of global expansion and development of sport familiarity with major firms and organizations on the global scene, major issues in global sports; emphasis on business opportunities available internationally; underlying thesis focuses on the contrasts from the U.S. sport industry to foreign markets. Prerequisite: Junior or senior classification.
402. **Pre-Internship Field Experiences. (0-2). Credit 1.** Orientation, observations and experiences in preparation for professional internships. Prerequisites: Senior classification; approved acceptance to field experience.
420. **Sports Facility Planning. (3-0). Credit 3.** Examination of the principles involved in planning and managing sports and recreational facilities. Prerequisites: Junior or senior classification; admission to professional phase of program or approval of instructor for non-sport management majors.
421. **Legal Aspects of Sport. (3-0). Credit 3.** Explores the relationship between sport and law, and the fundamentals of law used by sport managers, including contract law, tort law, Constitutional issues, employment and discrimination law, the effect of state and federal statutes on recreational activities and sport, and current legal issues in sports. Prerequisites: Junior or senior classification; admission to professional phase of program or approval of instructor for non-sport management majors.
422. **Financing Sport Operations. (3-0). Credit 3.** Study of financial theories and practical application as they impact sport revenues and expenditures; familiarization with current issues and trends in financing sport organizations. Prerequisites: Junior or senior classification; admission to professional phase of program.
423. **Marketing Aspects of Sport. (3-0). Credit 3.** Investigates the rapidly developing sports industry from a marketing perspective; familiarizes students with marketing terms and tools needed in the sports industry; introduction to the various aspects of marketing that make up the marketing plan. Prerequisites: Junior or senior classification; admission to professional phase of program.
482. **Seminar. (1-0). Credit 1.** Acquaint students with current research and the research process in their chosen field of study (sport management). May be taken 4 times for credit. Prerequisites: Admission to professional phase of program or approval of instructor; junior or senior classification.
483. **Practicum in Sport Management. (3-0). Credit 3.** Participation and study in sport management and administration; acquisition and practice of professional and/or clinical skills in sport management. Prerequisites: Admission to professional phase of program; approval of instructor; junior or senior classification.
484. **Internship in Sport Management. Credit 1 to 12.** Supervised internship with sport management organizations; acquisition and practice of professional and/or clinical skills in sport management. Prerequisite: SPMT 402; completion of all coursework.
485. **Directed Studies. Credit 1 to 4.** Special problems in sport management assigned to individual students or to groups. May be repeated for credit. Prerequisite: Junior or senior classification; approval of instructor.
489. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of sport management. May be repeated for credit.
491. **Research. Credit 1 to 4.** Research conducted under the direction of a faculty member in sport management. May be repeated 4 times for credit. Prerequisites: Junior or senior classification; approval of instructor.

Department of Statistics

Professors J. A. Calvin, R. J. Carroll, D. B. H. Cline, P. F. Dahm, J. D. Hart, J. Huang, S. Lahiri, M. T. Longnecker, J. F. McNamara, B. K. Mallick, H. J. Newton, E. Parzen, S. Sheather (Head), M. Sherman, F. M. Speed, C. H. Spiegelman, M. Vannucci, N. Wang, S. Wang, T. E. Wehrly, J. Zinn; **Associate Professors** W. Chen, R. Fan, M. Genton, F. Liang, W. West; **Assistant Professors** A. Dabney, D. Dahl, M. Jun, E. Li, Y. Ma, Y. Mu, U. Mueller-Harknett, S. Sinha, S. Subba Rao, L. Zhu; **Senior Lecturers** D. G. Akleman, M. Boggett, J. H. Carroll, H. Schmiediche, E. Toby; **Lecturers** K. Hatfield, J. Wickersham

Introductions to statistical methodology are provided by STAT 301, 302 and 303, each being tailored to the interests and needs of different groups of students. No student should be allowed to take more than one of these courses for credit. STAT 201 is a nonmathematical introduction to the concepts and uses of statistics. STAT 201 may not be taken for credit after any other course in statistics or INFO 303 has been taken. Students who have completed a year of calculus should take STAT 211 rather than any of the courses listed above.

Statistics (STAT)

201. (MATH 1342, 1442) **Elementary Statistical Inference.** (3-0). **Credit 3. I, II** Data collection, tabulation and presentation; elementary description of the tools of statistical inference; probability, sampling and hypothesis testing; applications of statistical techniques to practical problems. May not be taken for credit after any other course in statistics or INFO 303 has been taken.
211. **Principles of Statistics I.** (3-0). **Credit 3. I, II, S** Introduction to probability and probability distributions; sampling and descriptive measures; inference and hypothesis testing; linear regression, analysis of variance. Prerequisite: MATH 152 or 172.
212. **Principles of Statistics II.** (3-0). **Credit 3. I, II** Continuation of STAT 211. Design of experiments, model building, multiple regression, nonparametric techniques, contingency tables and short introductions to response surfaces, decision theory and time series data. Prerequisite: STAT 211.
225. **Mechanical Engineering Statistics.** (2-0) **Credit 2.** Introduction to statistical concepts crucial to design, development, production, and improvement of product, process or service; includes discrete and continuous probability models, statistical inference, design of experiments and statistical data analysis using graphical data summaries, model fitting and analysis of variance. Prerequisite: MATH 152 or 172.
301. **Introduction to Biometry.** (3-0). **Credit 3. I, II** Intended for students in animal sciences. Introduces fundamental concepts of biometry including measures of location and variation, probability, tests of significance, regression, correlation and analysis of variance which are used in advanced courses and are being widely applied to animal-oriented industry. Credit will not be allowed for more than one of STAT 301, 302 or 303. Prerequisite: MATH 141 or 166 or equivalent.
302. **Statistical Methods.** (3-0). **Credit 3. I, II, S** Intended for undergraduate students in the biological sciences and agriculture (except agricultural economics). Introduction to concepts of random sampling and statistical inference; estimation and testing hypotheses of means and variances; analysis of variance; regression analysis; chi-square tests. Credit will not be allowed for more than one of STAT 301, 302 or 303. Prerequisite: MATH 141 or 166 or equivalent.
303. **Statistical Methods.** (3-0). **Credit 3. I, II, S** Intended for undergraduate students in the social sciences. Introduction to concepts of random sampling and statistical inference, estimation and testing hypotheses of means and variances, analysis of variance, regression analysis, chi-square tests. Credit will not be allowed for more than one of STAT 301, 302 or 303. Prerequisite: MATH 141 or 166 or equivalent.
307. **Sample Survey Techniques.** (3-0). **Credit 3. I, II, S** Concepts of population and sample; the organization of a sample survey; questionnaire design. Basic survey designs and computation of estimates and variances. Prerequisites: STAT 301 or 302 or 303 or INFO 303.

407. **Principles of Sample Surveys. (3-0). Credit 3. I** Principles of sample surveys and survey design; techniques for variance reduction; simple, stratified and multi-stage sampling; ratio and regression estimates; post-stratification; equal and unequal probability sampling. Prerequisite: STAT 212.
408. **Introduction to Linear Models. (3-0). Credit 3. II** Introduction to the formulation of linear models and the estimation of the parameters of such models, with primary emphasis on least squares. Application to multiple regression and curve fitting. Prerequisites: STAT 212; MATH 304.
414. **Mathematical Statistics I. (3-0). Credit 3. I** Introduction to the mathematical theory of statistics, including random variables and their distributions, expectation and variance, point estimation, confidence intervals and hypothesis testing. Prerequisite: MATH 221, 251 or 253.
415. **Mathematical Statistics II. (3-0). Credit 3. II** Continuation of the mathematical theory of statistics, including sampling and limiting distributions, principles for statistical inference and inference for bivariate and categorical data. Prerequisite: STAT 414.
485. **Directed Studies. Credit 1 to 6. I, II, S** Special problems in statistics not covered by another course in the curriculum. Work may be in either theory or methodology. Prerequisite: Approval of instructor.

Student Learning Center

Lecturers M. L. Johnson, K. D. Speed; Assistant Lecturers B. L. Brookins, H. K. Caldwell, B. S. De Salvo, S. W. Haigler, J. A. Rose

Student Learning Center (STLC)

001. **Basic Mathematical Skills. Credit 1 to 3.** Developmental instruction in mathematics; includes the integers and rational numbers and applications, exponents, polynomials, solution of equations, graphing, elementary geometry and reasoning skills. May not be used for credit toward a degree.
002. **Basic Writing Skills. Credit 1 to 3.** Individualized instruction in English composition based on an analysis of the student's proofreading, revision and editing skills; a programmed sequence of study and practice designed for improvement of writing performance through mastery of basic skills at word, sentence, paragraph and multiparagraph levels. May not be used for credit toward a degree.
003. **Basic Reading Skills. Credit 1 to 3.** Individualized instruction in reading based on an analysis of the student's reading comprehension skills; study and practice of reading strategies designed to increase reading comprehension skills. May not be used for credit toward a degree.
101. **Application of Learning Theories to College Studies. (2-0). Credit 2.** The study of critical theories of learning with application to academic performance; designated as the university's learning framework course, this course is designed to help students understand learning theory and develop strategies for successful completion of college level studies.
102. **Career Awareness. (2-0). Credit 2.** Encourages planning career and life goals early in academic career for timely decision-making related to academics, acquiring marketable skills, pursuing relevant experiential education, and participating in student/professional organizations; acquaints students with realities of early career, emphasizes utilization of resources on a timely basis for competitiveness in job market.
289. **Special Topics in... Credit 1 to 4.** Selected topics in academic development and improvement. Prerequisite: Approval of coordinator.

Teacher Education

(faculty, see page 668)

(TEED)

For additional information regarding Teacher Education (TEED) courses, contact the Department of Teaching, Learning and Culture's Office of Undergraduate Advising, 107 Harrington Tower. Admission to Teacher Education is required for enrollment in all TEED courses.

302. **Teaching/Learning Processes: Psychological Perspectives on Education.** (2-3). **Credit 3.** I, II Psychological perspectives on instruction; examines learning processes, learner motivation, home and cultural influences, learning strategies; design and delivery of instruction; controversies regarding learning and instruction. Prerequisites: Junior classification; admission to teacher education.
425. **Supervised Student Teaching.** (0-36). **Credit 12.** I, II Culmination of secondary teacher education program taking place at school sites. Students begin with observation and move to full responsibility. Special emphasis is given to demonstrating an ability to organize and present concepts and skills in meaningful ways, to incorporate technology effectively, and to work with students from diverse backgrounds. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Completion of Phases I, II and III and Practicum I, Phase IV of the secondary program, admission to teacher education program and to student teaching.

Teacher Education Field Based

(faculty, see page 668)

(TEFB)

For additional information regarding Teacher Education Field Based (TEFB) courses, contact the Department of Teaching, Learning and Culture's Office of Undergraduate Advising, 107 Harrington Tower. Admission to Teacher Education is required for enrollment in all TEFB courses, except for TEFB 201, 271 and 322.

201. **Self-Directed Experiences with Adolescents.** (1-3). **Credit 1.** Study of adolescents in diverse school and community settings; issues in physical, mental, social and emotional development; issues relating to racism, sexism, and cultural diversity; development, presentation, and defense of portfolio required. Attendance at seminars required. Phase I of secondary program. Must be taken on a satisfactory/unsatisfactory basis.
271. **Children, Schools and Society.** (2-6). **Credit 3.** Field-based course that introduces the culture of schooling and classrooms for analysis within the lens of language, gender, racial, socio-economic, ethnic and academic diversity; family as a partner in education and educational equity addressed.
273. **Introduction to Culture, Community, Society and Schools.** (2-3). **Credit 3.** Field-based course that introduces the culture of schooling and classrooms for analysis within the lens of language, gender, racial, socio-economic, ethnic and academic diversity; the family as a partner in education and educational equality discussed.
322. **Teaching and Schooling in Modern Society.** (2-3). **Credit 3.** Development, structure, management and finance of secondary schools; historical, philosophical, ethical and moral dimensions of teaching; role of school in a democratic society; teaching as a profession. Prerequisite: Junior or senior classification.
323. **Teaching Skills I.** (2-3). **Credit 3.** Study and development of teaching skills necessary for reflective problem solving, managing classroom learning environments, motivating students to learn, and making ethical decisions; emphasis given to models and theories of human behavior, informal and formal data collection techniques, and diversity of learners. Phase III of the secondary program. Prerequisites: Successful completion of TEFB 201 and 322; admission to teacher education.
324. **Teaching Skills II.** (2-2). **Credit 3.** Study and development of teaching skills necessary for applying instructional strategies; teaching general strategies, assessing student learning, and analyzing and synthesizing multiple source data; emphasis given to adolescent development and cultures and to teacher and child cultures. Prerequisites: Successful completion or concurrent enrollment in TEFB 322; junior or senior classification.

401. **Language Arts in the Middle and Senior School. (2-6). Credit 3.** Methodology of teaching language arts-related content with specific reference to language, literature, journalism, drama and speech interactions among these areas; development of oral competence; coordination with other subjects. Phase IV, Practicum I. Prerequisites: Completion of Phases I, II and III of the secondary program; admission to teacher education; enrollment in language arts-related teaching field.
404. **Social Studies in the Middle and Senior High School. (2-6). Credit 3.** Features of social studies instruction in grades 6-12; approaches, methods and instructional materials. Phase IV, Practicum I. Prerequisites: Completion of Phases I, II and III of the secondary program; admission to teacher education; enrollment in history and/or social science teaching field.
406. **Science in the Middle and Secondary School. (2-6). Credit 3.** Methods course for the prospective secondary teacher in the physical and biological sciences; implementation of contemporary curricula. Phase IV, Practicum I. Prerequisites: Completion of Phases I, II and III of the secondary program; admission to teacher education; enrollment in science-related teaching field.
407. **Mathematics in the Middle and Senior School. (2-6). Credit 3. I, II** Design and teach selected topics from middle and secondary school mathematics. Content, materials and methodology. Phase IV, Practicum I. Prerequisites: Completion of Phases I, II and III secondary program; admission to teacher education; enrollment in mathematics teaching field.
410. **Social Studies and the Humanities in the Elementary School. (2-6). Credit 3. I, II** Recent trends, issues and procedures related to curriculum development and instruction in the social studies and humanities; integration of content, planning, design of appropriate teaching/learning experiences and evaluation; preparation of prototype materials. Prerequisites: TEFB 271; admission to teacher education; concurrent enrollment in RDNG 467, TEFB 412 and 413 required.
412. **Mathematics in the Elementary School. (2-6). Credit 3. I, II** Introduction to understanding of modern mathematics; integration of content, history and application of discovering techniques using problem solving approach; developing an understanding of four fundamental procedures—structure, measurement, sets, fractions—and communication of important mathematical concepts to elementary children. Prerequisites: TEFB 271; MATH 365 and 366; admission to teacher education; concurrent enrollment in RDNG 467, TEFB 410 and 413 required.
413. **Science in the Elementary School. (2-6). Credit 3. I, II** Designed to help elementary teachers understand basic concepts of science and scientific methods; content relates to natural phenomena involving physical, chemical and biological processes; elementary students appreciation and interest in science. Prerequisites: TEFB 271; admission to teacher education; concurrent enrollment in RDNG 467, TEFB 410 and 412 required.
423. **Supervised Student Teaching. (0-12). Credit 3. I, II** Observation and participation in an accredited public school classroom; techniques of teaching student's teaching fields, and appropriate instructional strategies for assigned student population in fulfillment of endorsement requirements. May be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Admission to teacher education program and to student teaching.
426. **Supervised Student Teaching. (0-24). Credit 6. I, II** Observation and participation in an accredited public school classroom; techniques of teaching student's teaching fields and appropriate instructional strategies for assigned student population. For students pursuing the baccalaureate option of the interdisciplinary studies program. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Admission to teacher education program and to student teaching.
471. **Dynamics and Management in Multicultural/Inclusionary Learning Environments. (2-4). Credit 3.** Field-based course focusing on communication, methodology and management perspectives that lead to democratic classrooms; organizational structures that focus on transformative, inclusionary learning; interventions for students with disabilities; analysis of systemic conditions placing children from diverse backgrounds and representing diverse abilities in positions of "risk" for incomplete success in school. Prerequisites: Senior classification; admission to teacher education; concurrent enrollment in TEFB 410, 412, 413 and RDNG 467.
483. **Internship. (0-40). Credit 4.** Directed internship in a public school classroom. Offered for the fall semester only. Prerequisites: TEFB 471; senior classification.
484. **Internship. (0-40). Credit 5.** Directed internship in a public school classroom. Prerequisites: Senior classification; TEFB 483.

Theatre Arts

(faculty, see page 781)

(THAR)

101. (DRAM 1310) **Introduction to Western Theatre and Drama.** (2-3). Credit 3. I, II, S Survey of the styles and genres of dramatic literature, theatrical production and tasks of the actor, director and designer.
102. **Script Analysis.** (3-0). Credit 3. I Introduction in analyzing dramatic structure as represented in European and American plays; focus on the art of the playwright. Majors and minors only.
110. (DRAM 1351) **Acting I: Fundamentals.** (2-4). Credit 3. I, II, S A Stanislavsky-based approach to the fundamentals of acting, which may include sensory exercises, relaxation, concentration, imagination, improvisation, character analysis and scene work.
115. (SPCH 1342) **Voice and Articulation.** (3-0). Credit 3. Voice mechanism and use of phonetic alphabet to determine sound placement and production for speech and voice improvement. Analysis and practice of relaxation, pitch, rate, resonance, quality, and volume through class exercise and performance.
135. (DRAM 1330) **Theatre Technology I.** (2-4). Credit 3. I, II Survey of theatre performance spaces, basic tools and set construction, basic scenic, lighting, sound and properties design and construction; participation on departmental production crews required.
145. **Basic Theatrical Design.** (3-0). Credit 3. I, II Elements and principles of design for the theatre; role of the designer within the production team, theoretical and practical applications in the visual interpretation of plays; participation in departmental productions.
155. **History of Western Dress.** (3-0). Credit 3. Evolution of dress in Western civilization; consideration of influences of politics, religion, economics, visual arts and social mores on choices of dress.
201. **Introduction to World Theatre.** (3-0). Credit 3. Non-Western theatre, its origins and continuing influence on society and Western theater; emphasis on the theaters of India, China, Japan, Africa, the Caribbean and Latin America.
210. (DRAM 1352) **Acting II: Characterization.** (2-4). Credit 3. Continuation of THAR 110; intermediate course which focuses on improvisation, voice, movement, scene study, ensemble, with emphasis on character development and analysis. Prerequisite: THAR 110. Majors and minors only or approval of instructor.
250. (DRAM 1341) **Stage Makeup.** (2-4). Credit 3. An analytical approach to the visualization of characters focusing on research and design, application techniques and media. Prerequisites: THAR 102, 110 or approval of instructor.
255. (DRAM 1342) **Costume Technology I.** (2-4). Credit 3. Survey of the costume process from concept to realization; basic hand and sewing machine techniques; basic patterning and fitting methods; and crafts techniques; participation on departmental production crews required.
280. (DRAM 2361) **History of the Theatre I.** (3-0). Credit 3. I Survey of the history of Western theatre from primitive times to the closing of the theatres in England in 1642. For non-theatre majors and minors only
281. (DRAM 2362) **History of the Theatre II.** (3-0). Credit 3. II Survey of the history of Western theatre from the closing of the theatres in England in 1642 to the present; brief introduction to the theatre of the East. For non-theatre majors and minors only.
282. **American Theatre.** (3-0). Credit 3. Surveys American theatrical production and drama from colonial times to the present; focus on various theatre artists and movements which have shaped, and been shaped by, American culture.
285. **Directed Studies.** (4-0). Credit 4. Individual study of identified topics in the theatre for specific needs of theatre arts majors; formal report required. Prerequisite: Six hours of theatre arts and approval of instructor and department head; THAR majors and minors only.
289. **Special Topics in...** Credit 1 to 4. Selected topics in an identified area of theatre production, technology, history or criticism. May be repeated for credit.
290. (DRAM 1120, 1121, 1220, 1221, 1320, 1321, 2120, 2121, 2220) **Theatre Practicum.** (0-4). Credit 1. I, II, S Participation in departmental program of theatre production under supervision of theatre arts faculty. May be taken six times.

302. **Dramaturgy. (3-0). Credit 3. I** Exploration of literary, production and theoretical dramaturgy in a classroom setting; script analysis, theatre criticism, theories of theatre, research techniques and dramaturgy in the production process, advancing thought about the art form in all its complexity; research methods for theatre. Prerequisites: THAR 102; majors and minors only or approval of instructor.
308. **Stage Management and Arts Administration. (3-0). Credit 3.** Planning and managing artistic events and performances; basic concepts of management theories, creating budgets, stage and production management, and grant applications; attendance of departmental events required. Prerequisite: Approval of instructor.
310. **Acting III: Period Styles. (2-4). Credit 3.** Exploration of acting techniques associated with various periods and non-realistic styles of theatre; scene work emphasized. Prerequisites: THAR 110 and 210 or approval of instructor.
320. **Directing I. (2-4). Credit 3. I** Theatre forms and styles; director's function and responsibility in producing plays; script analysis; directing laboratory scenes; participation in departmental productions. Prerequisites: THAR 102, 110, 145, 301, 382, or approval of instructor.
335. **Theatre Technology II. (2-4). Credit 3.** Planning, design and execution of scenic, lighting, sound and properties design construction; participation in departmental crews required. May be repeated once for credit. Prerequisites: THAR 135; participation in departmental productions.
345. **Scene Design. (2-4). Credit 3.** Drafting techniques as applied to scenic design; scenic construction techniques; design projects to include perspective rendering, ground plans, elevations, working drawings and models. Prerequisites: THAR 102, 135 and 145 or approval of the instructor.
355. **Costume Design. (2-4). Credit 3.** Role and responsibilities of costume designer; design projects to include rendering techniques, stylistic choices and alternative analytical approaches. Prerequisites: THAR 102, 145 or approval of instructor.
360. **Lighting Design. (2-4). Credit 3.** Basic electricity; theatre lighting instrumentation and maintenance; color theory and color media; stage lighting theory and technique; preparation of light plot, instrumentation schedule and cue sheets; operation of lighting equipment; laboratory practice and participation on departmental productions crews is required. Prerequisites: THAR 102, 135 and 145 or approval of instructor.
381. **Theatre History and Dramatic Literature I. (3-0). Credit 3.** Survey of the history of theatre and drama from ancient times to c. 1700; examination of the evolution of theatre and drama from primitive rituals to highly stylized writing and performance in Europe and Asia. Prerequisites: THAR 102; majors and minors only; junior or senior classification.
382. **Theatre History and Dramatic Literature II. (3-0). Credit 3.** Continuation of THAR 381. Survey of the history of theatre and drama from 1700 to the present; examines the evolution of theatre and drama in Africa, the Americas, Asia and Europe. Prerequisites: THAR 381; majors and minors only; junior or senior classification.
407. **Oral Interpretation. (3-0). Credit 3.** Instruction and practice in the art of oral interpretation of poetry, prose and drama. Includes readers theatre and chamber theatre. Prerequisite: 3 credits of literature at 200-level or above.
485. **Directed Studies. Credit 1 to 3. I, II, S** Advanced individual study of identified topics in theatre for specific needs of theatre arts majors; formal report required. May be repeated for credit up to 6 hours. Prerequisites: 24 hours of theatre arts; THAR majors and minors only or permission of instructor.
489. **Special Topics in... Credit 1 to 4. I, II, S** Selected topics in an identified area of theatre production, technology, history, or criticism. May be repeated for credit. Prerequisite: Approval of instructor.
497. **Senior Project. (3-0). Credit 3.** A culminating senior project in the student's primary focus in theatre; project may be creative or research/scholarly activity proposed by the student and approved by head of Performance Studies as well as project advisor. Prerequisite: Approval of instructor.

Urban and Regional Sciences

(faculty, see page 750)

(URSC)

305. **Urban Analytical Methods.** (3-0). **Credit 3.** Focuses on research conducted by planners, sociologists, anthropologists, political scientists and a variety of applied social scientists; examines variety of procedures employed when conducting research in urban areas; furthers understanding and knowledge of statistical methods employed in social research and elements of geographical analysis. Prerequisite: Upper division College of Architecture.
325. **Introduction to GIS in Urban and Regional Studies.** (2-3). **Credit 3.** Provides students an understanding of GIS fundamentals; basic concepts, principles and functions; essential skills for applying GIS in various fields such as urban planning, landscape architecture, land development, environmental studies, transportation and hazard management; based on learning through class projects. Prerequisite: Upper division College of Architecture.
336. **Public and Private Infrastructure Funding.** (3-0). **Credit 3.** An introduction to issues of financing public and public-private development project; exploring the difference between raising revenue, including the trade offs associated with establishing a sustainable tax base, and raising capital through capital markets; illustration of the range of decisions with financing public and public-private partnerships. Prerequisite: Upper division College of Architecture.
450. **Emergency Management Principles and Practices.** (3-0). **Credit 3.** Introduction to the fundamental principles of emergency management. Prerequisite: Upper division College of Architecture.
454. **Neighborhood Revitalization.** (3-0). **Credit 3.** Examination of the causes of decline of central cities, with the goal of developing a realistic view of who is affected, and why, so that a realistic foundation can be laid for successful redevelopment projects; topics and case studies on downtown decline and redevelopment, older city neighborhood problems and retrofitting. Prerequisite: Upper division College of Architecture.
458. **Policy Implementation.** (3-0). **Credit 3.** Techniques of implementing major urban development programs and plans; capital improvements programming and budgeting; overview of regulatory measures including zoning and subdivision regulations; public involvement process; and fiscal planning. Prerequisites: Upper division College of Architecture.
469. **Urban Infrastructure.** (3-0). **Credit 3.** Foundation of planning and managing infrastructure and public services; utilization of life-cycle method of infrastructure planning and delivery, research theory and tools to perform basic infrastructure planning. Prerequisite: Upper division College of Architecture.
493. **Urban and Regional Studies Capstone Course.** (3-0). **Credit 3.** Syntheses and application of skills and knowledge gained through course work applied to the development of creative solutions to real-world projects. Prerequisites: LAND 494; junior or senior classification.

Urban Planning

(faculty, see page 750)

(PLAN)

356. **Housing and Community.** (3-0). **Credit 3.** Housing, its development, planning, marketing, designing, financing and production; social and design history and contemporary issues of American housing development, urban renewal, neighborhood structure and community facilities. Prerequisite: Junior or senior classification.
360. **Introduction to the Urban Planning Function.** (3-0). **Credit 3. I, II, S** Past influences and current practice of planning in the United States; issues which impact on the comprehensive planning process; different approaches to planning and plan formulation in the context of private, governmental and institutional settings.
365. **Introduction to Planning.** (3-0). **Credit 3. I, II, S** Determinants of land use patterns; classification of uses; idealized conceptual alternatives; location and size criteria; mapping; comprehensive planning process, relationship to circulation planning.
370. **Introduction to Health Systems Planning.** (3-0). **Credit 3. I, II, S** Introduction to planning in the health care system at both institutional and community levels.

414. **Sustainable Communities. (3-0). Credit 3.** Focuses on sustainable community with applications in public policy/design including societal organization, disciplinary bound design and policy, and empowered approaches to design, social ecology and public policy; reading and review of relevant literature on sustainability, complemented with exercises to illustrate underlying principles. Prerequisite: Junior or senior classification or approval of instructor.
415. **Urban Issues. (3-0). Credit 3.** Issues pertaining to the evolution and development of cities and urban regions; examines the socio-economic, cultural and physical development of urban areas; addresses contemporary problems such as racial tension, unemployment and poverty, housing, pollution and environmental sustainability, traffic and congestion, land use, crime, public health, and other quality of life issues. Prerequisite: Junior or senior classification or approval of instructor.
485. **Directed Studies. Credit 1 to 5 each semester. I, II, S** Individual instruction in selected aspects of planning not adequately covered by other courses, with stress on reports and readings in selected areas of planning.
489. **Special Topics in... Credit 1 to 4. I, II, S** Selected topics in an identified field of urban planning. May be repeated for credit.

Department of Veterinary Integrative Biosciences

Professors F. W. Bazer, G. R. Bratton, R. C. Burghardt, D. L. Busbee, J. A. Calvin, R. S. Chapkin, B. P. Chowdhary, W. L. Dees, K. C. Donnelly, R. H. Finnell, B. J. Gastel, S. C. Geller, P. G. Harms, M. A. O. Höök, L. A. Jaeger, L. Johnson, J. R. Lupton, D. N. McMurray, T. D. Phillips, L. H. Russell, Jr., P. B. Samollow, L. C. Skow, M. R. Slater, E. Tiffany-Castiglioni (Head), C. J. Welsh, T. H. Welsh, Jr.; **Associate Professors** L. C. Abbott, G. T. Fosgate, N. H. Ing, G. A. Johnson, W. J. Murphy, W. W. Porter, H. M. Scott; **Assistant Professors** J. A. Arosh, C. M. Budke, G. Ko, B. Norby, T. Raudsepp; **Clinical Associate Professors** A. G. Hoffman, L. M. Ruoff; **Clinical Assistant Professors** M. D. Pine, V. S. Venkatraj; **Senior Lecturers** N. F. Funkhouser, C. L. Herman, M. T. Landis, J. R. Snell

Veterinary Integrative Biosciences (VIBS)

285. **Directed Studies. Credit 1 to 4.** Directed studies in specific problem areas of veterinary anatomy and public health. Prerequisites: Freshman or sophomore classification and approval of department head.
305. **Biomedical Anatomy. (2-4). Credit 4. I, II** Comprehensive mammalian gross anatomy course, using the dog as the model species; laboratory dissection, veterinary nomenclature with human correlates and the application of anatomy to clinical situations. Prerequisites: BIOL 114 and 124; junior or senior classification; BIMS major with a minimum overall 2.5 TAMU GPA.
343. **Histology. (3-3). Credit 4.** Normal tissues of vertebrates including histogenesis of some; histogenesis and organography of mammalian tissues. Prerequisites: BIOL 114 and 124; CHEM 228; junior or senior classification; BIMS major with a minimum overall 2.5 TAMU GPA.
404. **Food Toxicology and Safety. (3-0). Credit 3. I, II** Toxicity and safety of various foods and food additives, ingredients, and contaminants; occurrence, control and prevention of food transmitted diseases. Prerequisite: Junior or senior classification.
409. **Meat Hygiene. (2-0). Credit 2. II** Procedures and problems related to the production of wholesome and safe foods of animal origin. The scientific basis of the nation's meat and poultry inspection system. Prerequisite: Junior or senior classification.
413. **Introduction to Epidemiology. (3-0). Credit 3.** Study and measurement of disease and health in populations; examples from literature and current events; emphasizes concepts and appreciation for epidemiologic approaches and applications in life. Prerequisite: Junior or senior classification.
418. **Laboratory Animal Management and Preventive Medicine. (3-0). Credit 3. I, II** Principles of management and care of animals commonly used in biomedical research. Principles of preventive medicine with emphasis on epidemiology and disease control methodologies. Prerequisites: VTPB 405; junior or senior classification.

420. **Computer Applications in Public Health Research. (2-3). Credit 3. I, II** Introduction to the use of computers for public health research applications, including word processing, spreadsheets, data base management and telecommunications. Prerequisites: Senior classification or approval of instructor; BIMS major with a minimum overall 2.5 TAMU GPA.
432. **Public Health Practices. (3-0). Credit 3.** Study of various diseases, causes and methods of prevention; epidemiology of disease; social and behavioral sciences; health policy and management; environmental and occupational health. Prerequisites: Junior or senior classification; BIMS major with a minimum overall 2.5 TAMU GPA.
443. **Biology of Mammalian Cells and Tissues. (3-3). Credit 4.** Molecular phenomena placed in context with tissues, organs and organ systems; cell and tissue structures visualized by light microscopy and electron micrographs for functional relationships; clinical correlations reveal relevance of histology in specific disease states; conceptual thinking exercises facilitate problem solving skills. Prerequisites: VIBS 305 or BIOL 318; CHEM 228; VTPP 423 or BIOL 388; junior or senior classification in life sciences; BIMS major with a minimum overall 2.5 TAMU GPA.
450. **Mammalian Functional Neuroanatomy. (3-2). Credit 4.** Functional morphology of the domestic animal and human brain using gross specimens, microscopic sections, interactive computer-, DVD- and video-assisted instructional programs supplemented with clinical case studies. Prerequisites: Junior or senior classification; BIMS, biology, biochemistry, or psychology majors, or neuroscience minors with overall 3.5 TAMU GPA; or approval of instructor. Cross-listed with NRSC 450.
451. **Introductory Neuroscience. (3-0). Credit 3.** General principles and concepts in neuroscience at molecular, cellular, and systems level; focus on the underlying rules or mechanisms of structure, organization, or operation that gives rise to observations. Prerequisites: Junior or senior classification; BIMS major with a minimum overall 2.5 TAMU GPA.
485. **Directed Studies. Credit 1 to 4. I, II, S** Directed individual study of a selected problem in veterinary anatomy (with emphasis on neuroscience, cell biology, reproduction, developmental biology, marine mammal anatomy) approved by instructor or selected problems in veterinary public health (with emphasis on food safety, toxicology, epidemiology, informatics, zoonoses). Prerequisites: Junior or senior classification and approval of instructor.
489. **Special Topics in... Credit 1 to 4. I, II, S** Selected topics in an identified area of veterinary anatomy (with emphasis on neuroscience, cell biology, genetics, reproduction, developmental biology, marine mammal anatomy) or selected topics in veterinary public health, epidemiology, zoonoses, food hygiene, food toxicology and mycotoxicology. May be repeated for credit. Prerequisites: Junior or senior classification and approval of instructor; BIMS major with a minimum overall 2.5 TAMU GPA.
490. **Biomedical Research. (2-0). Credit 2.** Research theory and methodology for undergraduates to prepare for graduate studies in biomedical science. Prerequisite: Junior classification or approval of instructor.
910. **Gross Anatomy I. (2-6). Credit 4.** Topographical dissection of the dog and comparative aspects of the domestic cat. Prerequisite: Enrollment in first year of professional curriculum.
911. **Microscopic Anatomy I. (2-6). Credit 4.** Microscopic study of cells, tissues and organ systems of domestic animals. Prerequisite: Enrollment in first year of professional curriculum.
912. **Gross Anatomy II. (1-8). Credit 4.** Comparative anatomy of farm animals; topographic dissection of common farm species. Prerequisite: Enrollment in first year of professional curriculum.
913. **Microscopic Anatomy II. (2-6). Credit 4.** Developmental anatomy of domestic animals with special emphasis on structural congenital defects; functional neuroanatomy and clinical neurology of domestic animals; essential clinical skills for the theory and practice of veterinary neurology. Prerequisite: Enrollment in first year of professional curriculum.
926. **Introduction to Public Health Concepts. (1-0). Credit 1.** Basic concepts and issues of public health as they relate to the veterinary medical profession. Prerequisite: Enrollment in first year of the professional curriculum.
930. **Public Health. (4-0). Credit 4.** Principles and applications of epidemiology in veterinary medicine and the literature; history, epidemiology, symptoms, prevention and control of diseases transmitted between animals and humans; emphasis on emerging zoonotic diseases presenting occupational hazards for veterinary medicine; safety of foods of animal origin including foodborne illnesses. Prerequisite: Enrollment in third year of professional curriculum or enrollment in graduate studies with approval of instructor.

948. **Didactic Electives in Veterinary Anatomy. Credit 1 to 12.** Elective course in veterinary anatomy (with emphasis on neuroscience, cell biology, genetics, reproduction, developmental biology, marine mammal anatomy) for professional students who wish to supplement required curriculum. May be repeated for credit. Prerequisite: Enrollment in third year of professional curriculum.
950. **Public Health Clerkship. (0-35). Credit 1.** Application of computer technology to veterinary medical practice; computer-assisted decision support; information retrieval using on-line data bases; introduction to commercial software programs and their application. Prerequisite: Third year classification in professional veterinary curriculum.
985. **Directed Studies. Credit 1 to 4. I, II, S** Directed individual study of a selected problem in veterinary anatomy (with emphasis on neuroscience, cell biology, genetics, reproductive biology, developmental biology, or marine mammal anatomy) or directed individual study of advanced topics in veterinary public health or epidemiology (with emphasis on food safety, toxicology, informatics, or zoonoses). May be repeated for credit. Prerequisite: Matriculation in veterinary professional curriculum.
989. **Special Topics in... Credit 1 to 4. I, II, S** Selected topics in an identified area of veterinary anatomy (with emphasis on neuroscience, cell biology, genetics, reproductive biology, developmental biology or marine mammal anatomy) or selected topics in veterinary public health, epidemiology, zoonoses, food hygiene and food toxicology. Prerequisite: Matriculation in veterinary professional curriculum.

Department of Veterinary Large Animal Clinical Sciences

Professors G. K. Carter, M. K. Chaffin, N. D. Cohen, C. M. Honnas, J. R. Joyce, W. A. Moyer (Head), A. J. Roussel, J. A. Thompson, D. D. Varner, M. A. Walker, J. P. Watkins, S. E. Wikse; **Associate Professors** S. P. Brinsko, R. M. Dabareiner, R. N. Hooper, C. C. Love, M. T. Martin, D. G. Schmitz, K. E. Washburn; **Clinical Professor** K. A. Spaulding; **Clinical Associate Professors** J. Hardy, R. D. Posey, P. C. Rakestraw; **Clinical Assistant Professors** C. E. Arnold, Jr., J. M. Davidson, L. R. Dinges, J. R. Gold, C. E. Griffin, G. B. Mays, T. M. Swor, B. D. Young

Veterinary Large Animal Clinical Sciences (VLCS)

409. **Control of Cattle Diseases. (3-0). Credit 3.** Causes, clinical signs, treatments and prevention of the economically important diseases of beef and dairy cattle; emphasis on management practices that prevent disease. Prerequisites: ANSC 107 and 108; junior classification.
485. **Directed Studies. Credit 1 to 3. I, II, S** Directed individual study of selected problems in biomedical sciences approved by instructor. May be repeated for credit. Prerequisites: Senior classification in biomedical science and approval of department head.
930. **Advanced Equine Medicine and Surgery. (3-0). Credit 3.** Advanced diagnostic techniques and management strategies for species specific disorders of horses. Prerequisite: Enrollment in the third year of professional curriculum.
931. **Advanced Ruminant Medicine and Surgery. (2-0). Credit 2.** Advanced diagnostic techniques and management strategies for species specific disorders of ruminant species. Prerequisite: Enrollment in the third year of professional curriculum.
932. **Advanced Ruminant Herd Health and Production. (2-0). Credit 2.** Principles needed to provide veterinary services to populations of ruminants including preventive health programs, record keeping and approaches to controlling herd/flock disease outbreak or production shortfalls. Prerequisite: Third year veterinary student.
940. **Large Animal Clinics I. (0-35). Credit 2.** Student participation with clinical cases in the large animal medicine services of the Veterinary Teaching Hospital. Must be taken two times. Prerequisite: Fourth year classification in veterinary medicine or approval of department head.
941. **Large Animal Clinics II. (0-35). Credit 2.** Student participation with clinical cases in the large animal surgery services of the Veterinary Teaching Hospital. Must be taken two times. Prerequisite: Fourth year classification.
945. **Advanced Large Animal Clinical Elective. (0-35). Credit 2.** Student participation with clinical cases for advanced study in selected services from the large animal medicine, surgery, theriogenology and field services of the Veterinary Teaching Hospital. May be taken 12 times. Prerequisite: Fourth year classification.

948. **Large Animal Medicine and Surgery Elective. Credit 1 to 12.** In-depth study of selected disease processes in the various disciplines of large animal medicine and surgery will be conducted emphasizing management, diagnostics and medical or surgical treatment. May be repeated for credit. Prerequisite: Third year classification in veterinary medicine or approval of department head.
953. **Large Animal Clinical Skills. (0-4). Credit 1.** Acquisition of basic technical skills useful in the diagnosis and treatment of large animals in general veterinary practice. Modular one month course. Prerequisite: Third year classification in veterinary medicine in good standing.
954. **Large Animal Medicine. (5-4). Credit 6.** Medical disease of large animals; pathophysiology, diagnosis and therapy of diseases in large animals. Prerequisite: Third year classification in veterinary medicine in good standing.
985. **Directed Studies. Credit 1 to 4. I, II, III** Directed individual study of a selected problem in large animal medicine, surgery or radiology. May be repeated for credit. Prerequisites: Enrollment in veterinary medicine and approval of the department head.
989. **Special Topics in... Credit 1 to 4. I, II, III** Selected topics in an identified field of large animal medicine, surgery or radiology. Prerequisites: Enrollment in veterinary medicine and approval of the department head.

Veterinary Medicine—Interdisciplinary (VMID)

901. **Veterinary Medicine-Interdisciplinary Study Abroad. (2-0). Credit 2.** For DVM students in approved study abroad program; course credit toward the 15 hour minimum free elective credit required for the DVM degree must be negotiated with the College Curriculum Committee 90 days before departure. Requirements for approval are provided in the course syllabus. Course grade will be satisfactory/unsatisfactory.
912. **Clinical Correlates I. (0-2). Credit 1.** Introduction of clinical terminology and techniques needed to accomplish thorough history taking and physical exam. The problem-oriented medical record will be introduced and then used in system-based reviews. The student will become familiar with clinical techniques appropriate for body system evaluation. Prerequisite: Enrollment in the first year of professional curriculum.
913. **Clinical Correlates II. (0-2). Credit 1.** Continuation of Clinical Correlates I. Body system review will continue. Clinical exam techniques appropriate for each system will be emphasized and findings discussed in the context of the problem-oriented medical record. Prerequisite: Enrollment in the first year of professional curriculum.
921. **Clinical Correlates III. (1-2). Credit 2.** Developing problem and differential diagnosis lists, using texts, journals and computer databases for information retrieval in clinical problem solving; developing logical diagnostic and therapeutic plans for the diagnosis and treatment of problems in individual and group housed small and large animal patients. Prerequisite: Enrollment in the second year of professional curriculum.
922. **Clinical Correlates IV. (1-2). Credit 2.** Continuation of Clinical Correlates III. This course will build on and expand the history and physical exam skills introduced in Clinical Correlates I, II, and III. Prerequisite: Enrollment in the third year of professional curriculum.
923. **General Surgery/Anesthesiology. (3-2). Credit 4.** Anesthesia, general surgery and dentistry of domestic animals. Prerequisite: Enrollment in the second year of professional curriculum.
924. **Introduction to Diagnostic Imaging. (1-0). Credit 1.** Physical properties and production of ionizing radiation as well as production of radiographic images; introduction to image interpretation. Prerequisite: Enrollment in the second year of professional curriculum.
925. **Diagnostic Imaging Interpretation I. (2-0). Credit 2.** Diagnostic evaluation of radiographic and ultrasonographic images of large and small animals. Prerequisite: Enrollment in third year of the professional curriculum.
926. **Diagnostic Imaging Interpretation II. (2-0). Credit 2.** Continued diagnostic evaluation of radiographic and ultrasonographic images of large and small animals; emphasis on diseases of cardiac, respiratory, gastrointestinal, and urinary systems. Prerequisite: Enrollment in third year of the professional curriculum.

932. **Animals and Society: Animal Behavior, Human-Animal Bond, Veterinary Ethics. (2-0). Credit 2.** Normal behavior in the dog, cat, horse, cattle and swine; principles of a wide range of behavior problems in several species; fundamental aspects of the human-animal bond with specific applications and examples; nature, importance and application of veterinary and professional ethics. Prerequisite: Enrollment in the third year of professional curriculum.
935. **Surgery I. (2-4). Credit 4.** Diagnostic and surgical procedures of organ systems. Prerequisite: Enrollment in the third year of professional curriculum.
936. **Surgery II. (1-2). Credit 2.** Builds on principles developed in Surgery I including aseptic technique, proper use of surgical instruments and gentle tissue handling with emphasis on basic orthopedic principles. Prerequisite: Third year classification in veterinary medicine in good standing.
941. **Clinical Laboratory Diagnostics. (0-12). Credit 6.** Student group participation on a rotating schedule in applied clinical activities in the areas of pathology, microbiology, parasitology, public health and poultry diseases. Prerequisites: VMID 921 and 922.
942. **Laboratory Animal Management. (1-0). Credit 1.** Diseases and management features associated with the maintenance of various laboratory animal species used in biomedical research. Legal restrictions and welfare considerations for these subjects. Prerequisite: Enrollment in the fourth year of professional curriculum.
943. **Veterinary Practice: Legal, Ethical and Managerial. (2-0). Credit 2.** Legal considerations, business principles, management practices, economic factors and medical ethics involving veterinary practice. Prerequisite: Enrollment in the third year of professional curriculum.
945. **Advanced Specialty Elective. (0-35). Credit 4.** Advanced elective rotation in a specialized discipline with student participation in advanced science and technology of the discipline in a practicum setting. Prerequisite: Enrollment in the fourth year of professional curriculum.
950. **Clinical Nutrition. (2-0). Credit 2.** Nutritional management of medical and surgical cases. Prerequisite: Enrollment in the second year of professional curriculum.
952. **Clinics I. (0-4). Credit 1.** Student participation on a rotating schedule through clinical services in the veterinary teaching hospital; to be taken once in each semester of the third year of the professional veterinary curriculum.
953. **Clinics II. (0-4). Credit 1.** Student participation on a rotating schedule through clinical services in the veterinary teaching hospital or in a private practice. Prerequisite: Third year classification in veterinary medicine in good standing.
960. **Diagnostic Radiology I. (0-35). Credit 2.** Practical experience in technical radiography and diagnostic radiology of domestic and zoo animals to include positioning of patients, use of x-ray machines, special diagnostic procedures, radiation safety and interpretation of radiographs. Prerequisite: Fourth year classification in veterinary medicine or approval of department head.
961. **Diagnostic Radiology II. (0-35). Credit 1.** Practical experience in technical radiography and diagnostic radiology of domestic and zoo animals to include positioning of patients, use of x-ray machines, special diagnostic procedures, radiation safety and interpretation of radiographs. Prerequisite: Fourth year classification in veterinary medicine or approval of department head.
962. **Veterinary Anesthesia I. (0-35). Credit 2.** Student participation with primarily small animal clinical cases in the management of patients under anesthesia and in the peri-anesthetic period. Prerequisite: Fourth year classification in veterinary medicine.
963. **Veterinary Anesthesia II. (0-35). Credit 2.** Student participation with primarily large animal clinical cases in the management of patients under anesthesia and in the peri-anesthetic period. Prerequisite: Fourth year classification in veterinary medicine.
975. **Career Alternative Elective. Credit 2 to 16.** Approved student participation in a didactic and/or practicum experience in a unique practice discipline in veterinary medicine, the life sciences or other related areas. Prerequisites: Enrollment in the fourth year of professional curriculum and approval of individual program.
980. **Clinical Externship. (0-35). Credit 4.** Off-campus clinical practicum in a private veterinary practice, research institution, industry, diagnostic center, zoo, veterinary college or other approved career experience. Prerequisite: Enrollment in the fourth year of professional curriculum.

981. **Seminar in Professional and Leadership Development. (1-0). Credit 1.** Major issues in professional, ethical and leadership responsibilities facing a veterinarian in the 21st century; professional ethics and licensing requirements; development of specific leadership skills; leadership styles and effective interpersonal relations required in working with a team of veterinary medical professionals; public leadership role of the veterinarian. Prerequisite: Admission in the veterinary professional curriculum.
989. **Special Topics in... Credit 1 to 4. I, II, III** Selected topics in an identified area of veterinary medicine. May be repeated for credit.

Department of Veterinary Pathobiology

Professors L. G. Adams, G. R. Bratton (Head), T. M. Craig, J. N. Derr, J. F. Edwards, T. A. Ficht, A. B. Kier, J. L. Leibowitz, K. E. Murphy, A. Rice-Ficht, C. M. Scanlan, R. Smith III, G. Stoica, I. R. Tizard, G. G. Wagner, C. J. Welsh, J. E. Womack; **Associate Professors** J. M. Ball, L. R. Berghman, D. J. Caldwell, D. S. Davis, B. Lupiani, S. L. Payne, S. K. Ramaiah, S. M. Reddy, K. E. Russell, J. E. Samuel, K. F. Snowden, B. R. Weeks, G. Zhu, D. B. Zimmer; **Assistant Professors** D. H. Hong, S. D. Lawhon, W. Mwangi, R. M. Tsois; **Clinical Professors** F. J. Clubb, Jr., K. J. Mansell, R. R. Pool, A. Reinartz; **Clinical Associate Professors** M. Libal; **Clinical Assistant Professors** W. Corapi, T. L. Cyr, M. C. Johnson, J. M. Musser, M. Nabity, M. T. Ofran, B. Porter, S. D. Waghela; **Research Assistant Professor** L. A. Clark, K. A. Greer, P. J. Holman, S. Khare, R. Parr, J. Pei, K. Tsai; **Lecturers** D. J. Brightsmith, E. Jeter, C. W. Terrell; **Assistant Lecturers** F. Aloisio, S. Ashley, K. Burke, D. Calise, R. Callicott, S. Chapman, G. Gomez, E. Jackson, T. Lamon, G. Levine, F. Oliveira, C. Pfent, A. Rodrigues, C. Sivula, A. Wilcox; **Associate Research Scientists** H. R. Payne, J. Roths; **Assistant Research Scientists** A. Ambrus, J. Guo, E. Lee, G. Lungu, S. D. Rider, C. M. Seabury, Q. Tran

Veterinary Pathobiology (VTPB)

221. **Great Diseases of the World. (3-0). Credit 3.** Great infectious and parasitic diseases; introduction to the major diseases affecting humans and other mammals including plague, tuberculosis, AIDS and malaria. Prerequisite: Freshman or sophomore classification.
285. **Directed Studies. Credit 1 to 4. I, II, S** Directed individual study of selected problems in microbiology, parasitology, immunology, genetics or pathology as approved by instructor. Prerequisites: Approval of department head; freshman or sophomore classification.
289. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of veterinary pathobiology. May be repeated for credit. Prerequisite: Freshman classification.
301. **Wildlife Diseases. (3-0). Credit 3. I, II** Basic mechanisms of diseases as they occur in wildlife populations; interplay of habitat requirements, individual physiological requirements and disease producing mechanisms of varied wildlife species. Prerequisite: Junior classification or approval of department head. Cross-listed with WFSC 327.
303. **Medical Communication in the International Community. (3-0). Credit 3. I** To develop an awareness that there is a culture associated with the practice of veterinary and human medicine in other countries. Prerequisite: Junior or senior classification.
334. **Poultry Diseases. (3-2). Credit 4. II** Poultry sanitation and diseases. Prevention and control of environmental, nutritional, parasitic and contagious diseases. Prerequisites: BIOL 113 and 123; junior classification.
405. **Biomedical Microbiology. (3-5). Credit 5. I, II, S** Fundamentals of bacteriology, mycology, virology, infectious diseases, immunology and identification of pathogenic microorganisms. Prerequisite: Junior classification in a biological science.
407. **Advanced Veterinary Microbiology Laboratory. (0-4). Credit 1 to 3.** Modular course (one credit per module) that covers immunological and molecular techniques used with bacteria, parasites and viruses in animals for diagnostic and identification purposes. Prerequisites: VTPB 405, 409 and 438 or concurrent enrollment; junior or senior classification.
408. **Clinical Microbiology. (2-5). Credit 4. I** Practical application of clinical bacteriology and mycology; laboratory identification of pathogenic organisms. Prerequisites: VTPB 405; junior or senior classification.
409. **Introduction to Immunology. (3-0). Credit 3. I, II, S** Diverse concepts relative to immunologic mechanisms inherent to domestic and laboratory animals. Prerequisites: VTPB 405 or approval of instructor; advanced classification.

410. **Cell Mechanisms of Disease.** (3-0). **Credit 3. I, II** Mechanisms, morphologic manifestations and clinical signs of disease processes at the cellular level. Prerequisites: VTPP 423 or registration therein; junior or senior classification.
412. **Techniques of Clinical Pathology.** (3-3). **Credit 4. I, II** Theory and pathophysiologic principles underlying laboratory evaluation of disease states; principles of analytical methods with applications in the contemporary biomedical laboratory considered, using selected hematology and clinical chemistry techniques as examples. Prerequisites: CHEM 228 and 238; VTPP 423; senior classification in biomedical science or approval of instructor.
421. **Bacterial Diseases of Humans and Animals.** (3-0). **Credit 3.** Pathogenesis of selected bacterial pathogens of humans and animals; bacterial virulence factors, host immune responses; current concepts of extra-cellular, facultative intracellular and obligate intracellular bacterial diseases. Prerequisites: VTPB 405 and 409; junior or senior classification.
438. **Biomedical Virology.** (3-0). **Credit 3. I, II** Fundamental study of nature and characteristics of human and animal viruses; classification, morphology, chemical structure, ability to cause disease and nature of resulting disease. Prerequisite: 3 hours of microbiology or approval of instructor.
452. **Clinical Veterinary Mycology.** (2-2). **Credit 3. II** Practical application of clinical mycology; laboratory identification of important fungal and actinomycotic organisms. Prerequisites: Junior or senior classification; VTPB 405 or approval of instructor.
454. **Ornamental Fish Health Management.** (3-0). **Credit 3.** Maintenance and health care of ornamental fish in closed recirculating systems; aquariology, anatomy and physiology, nutrition, immunology, infectious and noninfectious diseases, checklists, quarantine procedures and health maintenance of ornamental fish. Prerequisites: VTPB 405 or BIOL 351; BICH 410 or MARS 360; junior or senior classification. Cross-listed with MARB 454.
485. **Directed Studies.** **Credit 1 to 4. I, II, S** Directed individual study of selected problems in microbiology, parasitology, immunology, genetics or pathology as approved by instructor. Prerequisites: Approval of department head; junior or senior classification.
487. **Biomedical Parasitology.** (3-2). **Credit 4. II** Helminth and protozoan parasites of medical and veterinary importance; life cycles, morphology, taxonomic classification, economic and public health aspects and current topics in parasitic diseases. Prerequisites: BIOL 114 or BIOL 107; junior classification or approval of instructor.
489. **Special Topics in...** **Credit 1 to 4. I, II** Selected topics in an identified area of microbiology, pathology, genetics, immunology, parasitology, or physiological chemistry. May be repeated for credit. Prerequisites: Junior or senior classification and approval of department head.
910. **Veterinary Immunology.** (2-0). **Credit 2.** Introduction to veterinary immunology; mechanisms of resistance of infectious diseases and tumors; tissue injury caused by the immune system, including hypersensitivity reactions and autoimmunity; immunization theory and practices; immunologic methods for diagnosis of disease. Prerequisite: Enrollment in the first year of professional curriculum.
911. **Veterinary Microbiology.** (3-2). **Credit 4.** Introduction to veterinary microbiology; bacterial, viral, and mycotic agents of veterinary significance; mechanisms of host injury by pathogenic microorganisms; principles of disinfection, antiseptics, and sterilization; classes and mechanisms of action of antibacterial, antifungal, and antiviral drugs; diagnostic procedures and methods of sample collection. Prerequisite: Enrollment in the first year of professional curriculum.
913. **Infectious Diseases.** (2-0). **Credit 2.** Case-based approach to infectious diseases of animals; includes infectious diseases of major body systems; etiologic agents include viruses, bacteria, fungi, protozoa, helminths, and arthropods; differential diagnosis of infectious agents, diagnostic approaches, prevention, and treatment emphasized; management practices to control infectious diseases covered by host species. Prerequisite: Enrollment in second year of the professional curriculum.
920. **Parasitology.** (3-4). **Credit 5.** Taxonomy, biological and clinical aspects of the commonly occurring helminth, protozoan and arthropod parasites of domestic and laboratory animals. Signs, pathogenesis, diagnosis, treatment, prevention, and control, public health and economic importance of parasitic diseases. Prerequisite: Enrollment in the second year of professional curriculum.
922. **Pathology I.** (5-2). **Credit 6.** Structural and functional changes in cells, tissues and organ systems of animals; pathogenesis, mechanisms and morphologic features of diseases and their relationship to clinical signs; laboratory consists of studies of gross and microscopic pathology. Prerequisite: Enrollment in the second year of professional curriculum.

923. **Pathology II. (5-2). Credit 6.** Pathogenesis, mechanisms, laboratory analysis and structural features of animal diseases; structural and functional changes in cells, tissues, body fluids and organ systems that cause or are caused by disease. Laboratory consists of studies in gross and microscopic pathology, cytology and laboratory analysis of body fluids and tissues. Prerequisite: Enrollment in the second year of professional curriculum.
940. **Diagnostic and Clinical Pathology I. (0-35). Credit 2.** Student group participation on a rotating schedule in applied clinical activities in the areas of diagnostic and clinical pathology. Prerequisite: Enrollment in the fourth year professional curriculum.
941. **Clinical Microbiology and Parasitology I. (0-35). Credit 2.** Clinical rotation in microbiology and parasitology with emphasis on performance and interpretation of diagnostic procedures. Prerequisite: Enrollment in the fourth year of professional curriculum.
948. **Didactic Elective. Credit 1 to 12.** Elective course in veterinary microbiology, pathology, genetics, immunology or parasitology for professional students who wish to supplement required curriculum. May be repeated for credit. Prerequisite: Enrollment in the third year of professional curriculum.
985. **Directed Studies. Credit 1 to 4. I, II, S** Problems in various subdisciplines. Prerequisite: Approval of instructor.
989. **Special Topics in... Credit 1 to 4. I, II, S** Selected topics in an identified area of microbiology, pathology, genetics, immunology or parasitology. May be repeated for credit. Prerequisite: Approval of department head.

Department of Veterinary Physiology and Pharmacology

Professors H. R. Adams, E. M. Bailey, Jr., T. A. Cudd, K. Hinrichs, J. F. Hunter, D. C. Kraemer, G. A. Laine (Head), A. J. Roussel, S. H. Safe, F. Schroeder, J. N. Stallone, M. E. Westhusin; **Associate Professors** D. M. Hood, D. H. Jones, C. M. Quick, E. Rucker, Y. Tian, J. S. Wasser; **Assistant Professors** C. Heaps, I. Ivanov, C. R. Long, C. M. Sayes, C. Wordman; **Clinical Associate Professors** J. D. Herman, R. H. Stewart; **Clinical Assistant Professors** A. Blue-McLendon, V. Fajt, M. M. Scott

Veterinary Physiology and Pharmacology (VTPP)

281. **Seminar. Credit 1 to 4.** Exposure to scientists from a variety of biomedical disciplines through attendance at seminars followed by review and discussion of current scientific work in physiology and related subjects, and subsequent student seminar presentations. Prerequisites: Freshman or sophomore classification; approval of instructor.
285. **Directed Studies. Credit 1 to 4. I, II, S** Course for freshman and sophomore students who desire additional laboratory work in physiology to supplement required courses. Prerequisites: Freshman or sophomore classification; approval of department head.
291. **Research. Credit 1 to 4.** Laboratory and/or field research supervised by a faculty member Prerequisites: Freshman or sophomore classification; approval of instructor.
323. **Physiology of Domestic Animals. (3-0). Credit 3. I, II** Physiology essential to understanding of life processes. For students in agriculture and related fields. Prerequisite: Junior classification.
401. **History of Human and Veterinary Medicine in Europe. (4-0). Credit 4.** Addresses the major developments in human and veterinary medicine in Europe from the Middle Ages to the present; explores key events and figures in medical history and analyzes issues of current biomedical concern in an historical context; for example, animal rights, ethics of human experimentation, euthanasia.
423. **Biomedical Physiology I. (3-2). Credit 4. I, II** Physiological principles, review of cellular physiology, and development of an understanding of the nervous system and muscle, cardiovascular, and respiratory physiology; clinical applications related to organ systems. Prerequisites: Junior or senior classification; BICH 410 and VIBS 305 recommended.

424. **Endocrine Physiology. (2-2). Credit 3. I, II** The endocrine system, endocrine homeostasis, control systems and relationship to the nervous system including pituitary, thyroid, adrenal, pancreas, gastrointestinal hormones and the endocrinology of reproduction, clinical applications. Prerequisites: VTPP 323 or VTPP 423 or equivalent; junior or senior classification.
425. **Pharmacology. (3-0). Credit 3. I, II** Introduction to pharmacokinetics and pharmacodynamics; survey of major pharmaceutical classes; uses, mechanisms of action and adverse reactions of selected agents. Prerequisites: VTPP 423 or approval of instructor; junior or senior classification.
427. **Biomedical Physiology II. (3-0). Credit 3.** Continuation of VTPP 423. Fluid balance and acid-base balance; development of an understanding of renal, gastrointestinal, endocrine and reproductive physiology using human and other mammalian models; clinical applications related to organ systems. Prerequisites: VTPP 423; junior or senior classification.
429. **Introduction to Toxicology. (3-0). Credit 3. II** An overview of toxicology with emphasis on environmental, human and animal health issues. Prerequisite: Junior or senior classification.
430. **Laboratory in Toxicology. (0-3). Credit 1. S** Practical exercises in toxicity testing. Prerequisites: VTPP 429; junior or senior classification.
431. **Clinical Toxicology. (3-0). Credit 3.** An introduction to human clinical toxicology with an emphasis on the diagnosis and treatment of chemically-induced disease; selected classes of chemicals and drugs encountered in modern American society. Prerequisites: VTPP 423 and 425 or approval of instructor; junior or senior classification.
434. **Physiology for Bioengineers I. (3-3). Credit 4. I** Cellular anatomy, cellular physiology and biochemistry; systems analysis of digestive, endocrine and musculoskeletal system function including information related to gross anatomy, histology and disease states; quantitative aspects of physiology and engineering applications to clinical medicine. Prerequisites: Junior or senior classification; biomedical engineering major or approval of instructor.
435. **Physiology for Bioengineers II. (3-3). Credit 4. II** A systems analysis of nervous, cardiovascular, respiratory and urinary function including information related to gross anatomy, histology and disease states; quantitative aspects of physiology and engineering applications to clinical medicine. Prerequisites: VTPP 334; junior or senior classification.
481. **Seminar. Credit 1 to 4.** Exposure to scientists from a variety of biomedical disciplines through attendance at seminars followed by review and discussion of current scientific work in physiology and related subjects, and subsequent student seminar presentations. Prerequisites: Junior or senior classification; approval of instructor.
485. **Directed Studies. (0-3). Credit 1 to 4 each semester. I, II, S** Course for junior and senior students who desire additional laboratory work in physiology to supplement required courses. Prerequisites: Junior or senior classification and approval of department head.
489. **Special Topics in... Credit 1 to 4. I, II** Selected topics in an identified area of physiology, pharmacology, endocrinology or toxicology. May be repeated for credit. Prerequisite: Junior or senior classification.
491. **Research. Credit 1 to 4.** Laboratory and/or field research supervised by a faculty member. Prerequisites: Junior or senior classification; approval of instructor.
910. **Physiology I. (5-2). Credit 6.** Introduction to physiology: cell physiology, cell signaling, cell cycle, body fluids, translocation of materials, membrane potentials, neurophysiology, autonomic nervous system, thermoregulation, cardiovascular, and muscle physiology. Prerequisite: Enrollment in first year of professional curriculum.
912. **Physiology II. (5-2). Credit 6.** Blood and lymph, respiration, renal physiology, and acid-base balance, gastrointestinal physiology, metabolism, endocrinology, and reproduction. Prerequisite: Enrollment in the first year of professional curriculum.
924. **Pharmacology/Toxicology I. (4-2). Credit 5.** Pharmacokinetics, pharmacodynamics, CNS pharmacology, autonomic pharmacology, antineoplastic agents, immunopharmacology, recombinant products, fluid and electrolyte therapy, diuretics, pharmacology of the integument. Prerequisite: Enrollment in the second year of professional curriculum.

925. **Pharmacology/Toxicology II. (2-2). Credit 3.** Antimicrobials, endocrine pharmacology, eicosanoids, anti-inflammatory agents, respiratory pharmacology, anticoagulants and hematinics, GI pharmacology, cardiovascular pharmacology. Prerequisite: Enrollment in the second year of professional curriculum.
926. **Pharmacology/Toxicology III. (2-2). Credit 3.** Management and treatment of toxicoses, antidotal pharmacology, toxic plants, mycotoxins and mycotoxicoes, chemical toxicants, metals, euthanasia. Prerequisite: Enrollment in the second year of professional curriculum.
948. **Didactic Elective in Veterinary Physiology and Pharmacology. Credit 1 to 12. II** Elective course in physiology and pharmacology for professional students who wish to supplement required curriculum. May be repeated for credit. Prerequisite: Enrollment in the fourth year of professional curriculum.
985. **Directed Studies. Credit 1 to 4. I, II, S** Directed, individual study of selected problems in physiology, pharmacology or toxicology. May be repeated for credit. Prerequisites: Approval of instructor and department head.

Department of Veterinary Small Animal Clinical Sciences

Professors J. R. August, C. L. Barton, J. E. Bauer, B. V. Beaver, G. L. Carroll, T. W. Fossum, S. M. Hartsfield (Head), H. P. Hobson, L. M. Howe, D. A. Hulse, S. C. Kerwin, G. E. Lees, N. S. Matthews, M. W. Miller, K. S. Rogers, M. D. Willard; **Associate Professors** J. Dziezyc, E. A. Martinez, N. J. Millichamp, C. A. Rees, J. M. Steiner, D. L. Zoran; **Assistant Professors** S. G. Gordon, J. M. Levine, A. B. Saunders; **Clinical Associate Professors** A. K. Cook; **Clinical Assistant Professors** M. A. Crist, B. F. Hettlich, S. M. Hoppes, D. A. Nelson, L. E. Peycke, M. J. Stickney, H. M. Wilson; **Lecturers** C. L. Baetge, J. J. Cooper, R. M. Roland, B. E. Smith, K. D. Snyder, A. Vinayak

Veterinary Small Animal Clinical Sciences (VSCS)

485. **Directed Studies. Credit 1 to 3. I, II, S** Directed individual study of a selected problem in biomedical sciences approved by instructor. May be repeated for credit. Prerequisites: Junior or senior classification and approval of department head and instructor.
940. **Small Animal Clinics I. (0-35). Credit 2.** Student participation with clinical cases in the small animal medicine services of the Veterinary Teaching Hospital. Must be taken two times. Prerequisite: Fourth year classification in veterinary medicine or approval of department head.
941. **Small Animal Clinics II. (0-35). Credit 2.** Student participation with clinical cases in the small animal surgery services of the Veterinary Teaching Hospital. Must be taken two times. Prerequisite: VSCS 940 or approval of department head.
945. **Advanced Small Animal Clinical Elective. (0-35). Credit 2.** Student participation with clinical cases for advanced student in selected services of the small animal medicine and surgery sections of the Veterinary Teaching Hospital. May be taken 12 times. Prerequisite: VSCS 940 or approval of department head.
948. **Small Animal Medicine and Surgery Elective. Credit 1 to 12.** In-depth study of selected disease processes in the various disciplines of small animal medicine and surgery will be conducted emphasizing management, diagnostics and medical or surgical treatment. May be repeated for credit. Prerequisite: Third year classification in veterinary medicine or approval of department head.
953. **Small Animal Clinical Skills. (0-4). Credit 1.** Acquisition of basic technical skills useful in the diagnosis and treatment of small animals in general veterinary practice. Modular one month course. Prerequisite: Third year classification in veterinary medicine in good standing.
954. **Small Animal Medicine I. (5-2). Credit 6.** Medical disease of dogs and cats; pathophysiology, diagnosis and therapy of diseases prevalent in small animals. Prerequisite: Third year classification in veterinary medicine in good standing.
955. **Small Animal Medicine II. (6-2). Credit 6.** Continuation of Small Animal Medicine I; medical disease of dogs and cats; pathophysiology, diagnosis and therapy of diseases prevalent in small animals.

985. **Directed Studies. Credit 1 to 4. I, II, III** Directed individual study of a selected problem in small animal medicine, surgery or radiology. May be repeated for credit. Prerequisites: Matriculation in veterinary professional curriculum and approval of department head.
989. **Special Topics in... Credit 1 to 4. I, II, III** Selected topics in an identified field of small animal medicine, surgery or radiology. May be repeated for credit. Prerequisites: Matriculation in veterinary professional curriculum and approval of department head.

Visual Studies
(faculty, see page 622)
(VIST)

105. **Principles of Design I. (2-6). Credit 4.** Survey of principles and theory of design and visual communication; elements and organizational structure of the visual language; sign, symbol, and meaning; visual perception; problem solving and the creative process; design in terms of value as well as color; emphasis on two-dimensional design.*
106. **Principles of Design II. (2-6). Credit 4.** Fundamentals of spatial design; theory of form; transformations, additive/subtractive techniques as process; 3D composition; traditional modeling and construction techniques; formal visual analysis and critique. Prerequisite: VIST 105.*
201. **Writing for Design. (0-2). Credit 1.** Writing as a design tool; emphasis on expanding the focus of the design studio beyond drawing and modeling; formal written analysis of works of art and architecture; writing and the design process, from concept development to final verbal presentations. Prerequisite: Concurrent enrollment in VIST 205.
205. **Principles of Design III. (2-6). Credit 4.** Introduction of design concepts and processes related to three-dimensional form, space and order; the relationship of anthropometrics and ergonomics to scale, human form and experience; conceptual notions and visual properties of form, materials, structure, lighting and environment; principles of spatial organization and movement through space. Prerequisites: VIST 106, ENDS 115.*
206. **Visual Studies Studio I. (2-6). Credit 4.** Theory and practice of traditional techniques for visual communication and visualization; the camera model; principles of physically based motion; time based media and animation; development of narrative and storytelling in the creative process. Prerequisite: VIST 205.*
271. **Computing Environments. (3-0). Credit 3.** Introduction to the theory and practice of visual computer based problem solving; system tools; scripting; high level programming constructs; interactive programming and interface design; development concepts and principles useful in digital art and visualization production. Prerequisites: CPSC 206 or approval of the Chair of the Visual Studies Option.
284. **Visualization Techniques. (0-2). Credit 1.** Introduction to software used in the visual arts including 2D raster and vector systems, modeling, rendering, animation, post production and multimedia. Specific course content will vary based upon curriculum requirements. May be repeated for up to 3 credit hours. Prerequisite: Major in environmental design.
305. **Visual Studies Studio II. (1-5). Credit 3.** Theory and practice of visual communication employing digital and conventional media; development of artistic concepts, proposal development and related implementation techniques; introduction to digital painting, 3D modeling, animatics and post production. Prerequisite: VIST 206; upper level classification in Environmental Design-Visual Studies Option.*
375. **Foundations of Visualization. (3-0). Credit 3.** A comprehensive introduction to visualization concepts, techniques and applications; major topic areas include cultural context, application areas, visual perception, the digital image, visual language, coordinate systems, geometric representation, modeling animation, image synthesis, image composing, ethics and the future of visualization. Prerequisites: CPSC 206; MATH 151, 152; VIST 271.
405. **Visual Studies Studio III. (1-5). Credit 3. I.** Theory and practice in the art and science of the visual image; scientific and mathematical principles as process; information theory and sensorial design; interactivity and user integration; integration of real and virtual environments including lighting design and material definition. Prerequisites: VIST 305; CARC 301 or VIST 494.*

406. **Visual Studies Studio IV. (1-5). Credit 3.** Theory and practice in the development of the digital image; non-traditional modeling methods; camera control and animation techniques; special effects; creative lighting methods; non-photorealistic rendering; integration of traditional and digital media in the creation of visual works. Prerequisites: VIST 305; CARC 301 or VIST 494.*
441. **Scientific and Technological Developments in Visual Arts. (3-0). Credit 3.** Advanced level course focusing on the relationship between art, science and technology; visual arts before the digital revolution; the development of computer graphic arts. Prerequisite: Upper level classification or approval of the Chair of the Visual Studies Option.
484. **Summer Internship. (3-0). Credit 3.** Practical experience in an office of design allied professionals; 12-week internship with a minimum of 480 hours; continuous employment; departmental pre-approval through the department internship coordinator required; post approval evaluation conducted following the internship. Prerequisites: Upper level classification in Environmental Design-Visual Studies Option and approval of environmental design intern coordinator.
485. **Directed Studies. Credit 1 to 6.** Special problems in visual studies. May be repeated for up to 9 credit hours. Prerequisite: Approval of instructor and program chair.
489. **Special Topics in... Credit 1 to 4.** Selected topics in an identified field of visual studies. May be repeated for up to 9 credit hours. Prerequisite: Approval of instructor and program chair.
491. **Research. Credit 1 to 4.** Research conducted under the direction of faculty members in architecture; emphasis on visual studies. May be repeated 2 times for credit. Prerequisite: Upper level classification, approval of instructor and program chair.
494. **Internship. (6-0). Credit 6.** Practical experience in an office of design allied professionals; 18-week internship with a minimum of 720 hours; continuous employment; departmental pre-approval through the department internship coordinator required; post approval evaluation conducted following the internship. May not be repeated for credit. Prerequisites: Upper level classification in Environmental Design-Visual Studies Option and approval of environmental design intern coordinator.

*Field trips may be required for which departmental fees may be assessed to cover costs.

Department of Wildlife and Fisheries Sciences

Professors C. E. Adams, R. W. Davis, N. O. Dronen, D. M. Gatlin III, J. R. Gold, W. E. Grant, T. Lacher (Head), A. M. Landry, M. Morrison W. H. Neill, T. R. Peterson, N. J. Silvy, R. D. Slack, K. O. Winemiller, B. G. Würsig; **Associate Professors** D. S. Davis, S. E. Davis III, T. J. DeWitt, L. A. Fitzgerald, F. P. Gelwick, R. R. Lopez, J. M. Packard, M. J. Peterson, D. L. Roelke; **Assistant Professor** M. Mateos

Wildlife and Fisheries Sciences (WFSC)

101. **Introduction to Wildlife and Fisheries. (1-0). Credit 1. I, II** Introduces students to the wildlife and fisheries profession and to alternatives for study in the department. Prerequisite: Open only to students with less than 36 hours at Texas A&M University. Registration through the Department of Wildlife and Fisheries Sciences only.
291. **Research. Credit 1 to 4.** Research conducted under the direction of faculty member in wildlife and fisheries sciences. May be repeated 3 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.
300. **Field Studies. Credit 3. S** Integration of principles of animal and plant ecology with environmental factors to characterize wildlife populations. Intensive analysis of specific areas will emphasize either the development of a wildlife management plan or a general vertebrate natural history survey. Prerequisite: Prior approval of instructor. Cross-listed with ENTO 300.*
301. **Wildlife and the Changing Environment. (3-0). Credit 3. I, II** Using an ecosystem approach, this course analyzes changes in the North American environment; effects of these changes on wildlife populations; and reviews areas of major, current concern. Prerequisites: Junior or senior classification; restricted to non-majors.

302. **Natural History of the Vertebrates. (2-2). Credit 3. I, II** Introduction to life histories of fishes, amphibians, reptiles, birds and mammals. Lecture covers vertebrate groups on a worldwide scale and emphasizes a comparative approach to the study of adaptation to the environment. Lecture topics include behavior, reproduction, feeding specializations, evolutionary history, locomotion, hibernation, migration, endangered species, zoogeography and importance to man. Laboratory emphasizes the recognition of Texas vertebrates. Course is designed for both science and non-science majors. Prerequisites: BIOL 111 and 112 or BIOL 101 and BIOL 107 or equivalent.*
303. **Fish and Wildlife Laws and Administration. (3-0). Credit 3. II A** review and analysis of state and federal laws and international treaties and conventions affecting fish and wildlife; their application and administration; organizational structure of state, federal and international agencies; their objectives, policies and practices. Prerequisite: Junior classification.
304. **(AGRI 2330) Wildlife and Fisheries Conservation. (3-0). Credit 3. I, II** Ecological principles used to conserve and manage wildlife and fisheries resources at the individual, population and community levels; topics include conservation biology, species interactions, animal-habitat relationships, population dynamics and harvesting, habitat management and restoration and human dimensions of fish and wildlife conservation. Prerequisite: RENR 205 and junior or senior classification or approval of instructor.*
311. **Ichthyology. (2-3). Credit 3. I** Introduction to the study of fishes, their biology, classification, evolution, distribution, ecology and economic importance. Prerequisite: WFSC 302 or BIOL 318.*
315. **Herpetology. (2-2). Credit 3. II** Evolutionary ecology of reptiles and amphibians and conservation biology of the major groups; labs concentrate on the global diversity of herps and the herpetofauna of Texas; foundation for students in wildlife science and biology. Prerequisites: WFSC 302 or approval of instructor; WFSC 302 or BIOL 318.*
316. **Field Herpetology. (0-3). Credit 1. II** Field work involving collection and preservation of herpetological specimens; natural history, ecological relations. Available for students enrolled in WFSC 315 who would like to have field trips. Prerequisite: WFSC 315 or registration therein.*
327. **Wildlife Diseases. (3-0). Credit 3. I** Basic mechanisms of diseases as they occur in wildlife populations; interplay of habitat requirements, individual physiological requirements and disease producing mechanisms of varied wildlife species. Prerequisite: Junior classification or approval of department head. Cross-listed with VTPB 301.*
335. **Natural History of the Invertebrates. (3-3). Credit 4. I, S A** phylogenetic survey of the invertebrate phyla including their taxonomy, morphology, life histories, ecology, ethology and zoogeography. Field trips may be required for which departmental fees may be assessed to cover costs.
401. **General Mammalogy. (2-3). Credit 3. I, II** Mammalian biology; evolution, classification, biogeography, reproduction, physiology, ecology, and behavior; focuses on basic concepts necessary for a foundation in both wildlife science and biology. Prerequisites: WFSC 302 or BIOL 318; junior classification.*
402. **General Ornithology. (2-3). Credit 3. I, II** Introduction to study of birds, their structure, classification, geographic distribution, ecological relations and economic status; foundation of wildlife science, also for museum work. Prerequisites: WFSC 302 or BIOL 318; junior classification.*
403. **Animal Ecology. (2-3). Credit 3. I, II** Concepts of animal ecology which emerge at various levels of organization; the ecosystem, the community, the population and the individual; laboratories emphasis on the quantitative analysis of field data and the simulation of population dynamics. Prerequisites: WFSC 201 and RENR 205 or approval of instructor; junior classification.*
405. **Urban Wildlife and Fisheries. (3-0). Credit 3. II** Urban wildlife and fisheries trains students to establish and maintain diverse, self-sustaining urban wildlife and fish populations at levels in harmony with ecological, social, and economic values of the human community and to develop optimal levels of public appreciation and use of urban wildlife and fish resources and associated habitats. Prerequisites: WFSC 201; RENR 205 and 215; junior or senior classification.
406. **Conservation Biology and Wildlife Habitat Management. (3-0). Credit 3. II** Designed to acquaint the student with major land use practices on lands that produce wildlife, how these influence wildlife production and alterations or manipulations of habitat used to achieve specific wildlife management goals. Prerequisites: WFSC 201 and 403; WFSC 401 or 402; senior classification; wildlife and fisheries sciences major or approval of instructor; concurrent registration in WFSC 407 required.

407. **Field Wildlife Habitat Management.** (0-2). **Credit 1.** II Field and laboratory studies of specific wildlife habitat management practices with special emphasis on those used in Texas; attendance required at four weekend field trips to study wildlife habitat operations. Prerequisite: Concurrent registration in WFSC 406 required.*
408. **Techniques of Wildlife Management.** (2-3). **Credit 3.** I, II Techniques available to directly and indirectly manipulate wild animal populations to achieve balance between socioeconomic and aesthetic values. Prerequisites: Senior classification; WFSC 403 and 406 or registration therein or approval of instructor.*
409. **NATURE in the Classroom: Needed Activities To Understand Resource Ecology.** (0-3). **Credit 1.** I, II Integration of natural resources through conservation ecology programs, utilization of research techniques adaptable for classroom use; field trips to community facilities, gaming strategies and computer simulations. Prerequisites: WFSC 420 or RENR 205 or concurrent enrollment; junior or senior classification.
410. **Principles of Fisheries Management.** (3-3). **Credit 4.** II Basic knowledge from ichthyology, biology of fishes and limnology related to applied aspects of freshwater and marine fishery science. Management techniques applicable to streams, ponds, reservoirs, estuaries and the oceans. Prerequisites: WFSC 311 and 414; STAT 302 or concurrent enrollment; or approval of instructor.*
412. **Aquatic Bioassessment.** (3-2). **Credit 4.** Basic ecological knowledge and theories concerning the structure and functional integrity of freshwater environments, and the practical skills and experience with methods used to assess biological components relevant to water quality and ecosystem health. Prerequisites: BIOL 111 and 112 or BIOL 101 and BIOL 107; junior or senior classification or approval of instructor. Cross-listed with ENTO 412.
414. **Ecology of Lakes and Rivers.** (3-3). **Credit 4.** I Biological, physical, chemical and geological characteristics of fresh waters; human impacts, which include influence of industrial, domestic, conservation and restoration activities. Prerequisites: CHEM 101 and 222; PHYS 201; junior or senior classification.*
416. **Adaptational Biology.** (3-3). **Credit 4.** I, II An introduction to the biological mechanisms that animals employ to survive in a diversity of environments; molecular, cellular, and physiological mechanisms discussed in an evolutionary context that emphasizes the ontogeny of adaptive responses among vertebrates from basic biochemical and biophysical constraints. Prerequisites: BIOL 112 or ZOOL 107; CHEM 101 and 102.
417. **Biology of Fishes.** (3-3). **Credit 4.** I Fishes' physiological and morphological adaptations for life in aquatic systems; physiological and behavioral responses of fish to environmental variation. Laboratory emphasizes design, conduct and analysis of virtual experiments featuring "EcoFish," a simulation model of fish autecology. Prerequisites: WFSC 302 or 311; WFSC 414; or approval of instructor.
418. **Ecology of the Coastal Zone.** (3-0). **Credit 3.** Introduction to the ecosystems that comprise the coastal zone with an emphasis on the role of freshwater inflows; open bay systems are the focus of lectures, but fringing habitats are also discussed; human components of the coastal zone are also discussed including industrial, commercial domestic, conservation and restoration issues. Prerequisite: Junior or senior classification.
419. **Wildlife Restoration.** (2-3). **Credit 3.** Study of the fundamentals of the restoration of animal populations and the resources they require; factors that control the distribution and abundances of animals in relation to restoration; and how restoration plans for wildlife are developed. Prerequisite: RENR 205 or equivalent; junior or senior classification or approval of instructor; WFSC 406 and 407 and RLEM 320 preferred.
420. **Ecology and Society.** (3-0). **Credit 3.** I, II Students study and compare human and natural ecosystems using diversity, interrelations, cycles, and energy as the conceptual organization; central themes of the course are sustainability, stewardship and science. Prerequisite: Junior or senior classification.
421. **Museums and Their Functions.** (2-3). **Credit 3.** II Role of museums, those specializing in natural history and the extent to which they serve the community, state, nation, and the advancement of the sciences included in their programs; history, operations, methods and programs. Prerequisite: Junior or senior classification. Cross-listed with ANTH 421.*

422. **Ethology.** (3-0). **Credit 3.** I Survey of the control, ontogeny, function and natural selection of behavior in a variety of vertebrate and invertebrate species; interaction between the organism and its environment with regard to the mechanisms and adaptive significance of behavior; evolution of anti-predator, feeding, reproductive and cooperative traits. Prerequisite: BIOL 112 or equivalent.*
423. **Aquaculture.** (3-3). **Credit 4.** II Principles of fish production for stock enhancement and human food. Species of fish used for production, cross-breeding and selection; feeds and feeding of fishes and nutritional and environmental requirements for optimum productivity; effects of fish production on land and water uses as related to conservation.*
425. **Marine Fisheries.** (3-0). **Credit 3.** II Survey of fisheries for marine vertebrates and invertebrates primarily in the Gulf of Mexico and South Atlantic with special emphasis being directed to their biology, economics and management.*
426. **Aquatic Animal Nutrition.** (3-0). **Credit 3.** I Chemistry, digestion, absorption and intermediary metabolism of nutrient classes with special emphasis on their relationship to warmwater fish nutrition; determination of nutrient requirements, feed evaluation, feed processing, ration formulation and feeding practices. Prerequisites: CHEM 222; CHEM 227 or equivalent. Taught even years. Cross-listed with MARB 426.*
427. **Disease Management in Fisheries and Aquaculture.** (2-2). **Credit 3.** I Fish and invertebrates of economic importance; factors influencing the maintenance of health for each species group; problems and solutions unique to each phase of aquaculture from breeding to growout; application of routine diagnosis and other management tools. Prerequisite: Junior classification.*
428. **Wetland Ecosystem Management.** (3-3). **Credit 4.** Ecosystem approach to the ecology and management of wetlands; emphasis on factors controlling wetland structure and function, characteristics of different wetland types, and applied issues of wetland restoration, creation and delineation. Prerequisite: Junior or senior classification.*
450. **Caribbean Conservation.** (0-6). **Credit 2.** Provide students with experience in and appreciation for diverse tropical habitats and the problems associated with conserving these habitats; design and conduct individual research projects on topics of their choice with approval from the instructors on project design and feasibility. Prerequisites: Concurrent enrollment in ENTO 300 and 451; junior or senior classification. Cross-listed with ENTO 450.
451. **Caribbean Research Seminar.** (1-0). **Credit 1.** Document research activities; keep a journal of activities and research methods during study abroad trips. Prerequisites: Concurrent enrollment in ENTO 300 and 450; junior or senior classification. Cross-listed with ENTO 451.
481. **Seminar.** (1-0). **Credit 1.** Oral discussion of selected topics from technical literature on recent advances in the field. Prerequisites: Senior classification in wildlife and fisheries sciences; 6 hours of 300- or 400-level wildlife and fisheries sciences courses. May be repeated for credit.
484. **Internship.** **Credit 1 to 9.** I, II, S Practical experience working in a professional wildlife or fisheries facility. Prerequisite: Approval of department head.
485. **Directed Studies.** **Credit 1 to 3.** I, II, S Individual study and research on selected problem approved by instructor and academic advisor. Prerequisites: Junior or senior classification; approval of department head.
489. **Special Topics in...** **Credit 1 to 4.** I, II, S Selected topics in an identified area of wildlife and fisheries sciences. May be repeated for credit. Prerequisite: Approval of department head.*
491. **Research.** **Credit 1 to 6 each semester.** Laboratory and/or field research supervised by a faculty member in wildlife and fisheries sciences. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification; approval of instructor.

*Field trips may be required for which departmental fees may be assessed to cover costs.

Women's Studies (WMST)

Program Director C. B. Nelson; **Associate Professor** C. E. Katz; **Assistant Professors** A. Currier, T. N. Dubriwny, J. B. Wolf

200. **Introduction to Women's Studies.** (3-0). **Credit 3.** Historical and cross-cultural perspectives on women's roles in culture, the workplace, the family and other socio-political institutions; the social construction of gender; sexuality and racism; social control mechanisms and ideologies.
207. **Introduction to Gender and Society.** (3-0). **Credit 3.** Similarities and differences between females and males in a number of cultures throughout the world; sociological analysis of gender in relation to social structure. Cross-listed with SOCI 207.
291. **Research.** **Credit 1 to 3.** Research conducted under the direction of faculty member in women's studies. May be repeated 3 times for credit. Prerequisites: 3 credits in WMST; freshman or sophomore classification and approval of instructor.
300. **Psychology of Women.** (3-0). **Credit 3.** Theoretical and research literature relevant to psychological assumptions about the female personality; challenges to and verification of these assumptions by recent experimental studies. Prerequisite: PSYC 107. Cross-listed with PSYC 300.
302. **Women and Religion.** (3-0). **Credit 3.** Investigation of women's position in religious institutions historically and/or currently, religion's influence on women's roles and status, and women's attempts to define their own religious perspectives; draws on sociological and philosophical insights and methods. Prerequisites: Junior or senior classification or approval of instructor. Cross-listed with RELS 302 and SOCI 302.
307. **Gender and Education.** (3-0). **Credit 3.** Overview of gender and education; role of feminism and feminist theory; intersections of gender, race, class, ethnicity, and sexuality. Prerequisite: Junior or senior classification.
308. **Gender and International Education.** (3-0). **Credit 3.** Exploration of the intersection of formal and informal education and understandings of gender in countries beyond the United States. Prerequisites: WMST 307; junior or senior classification.
309. **Feminist Pedagogy.** (3-0). **Credit 3.** Exploration of educational systems' and institutions' regard for women historically and contemporarily; practical and theoretical writings on feminist pedagogy. Prerequisites: WMST 307; junior or senior classification.
310. **Motherhood in Society.** (3-0). **Credit 3.** Examines expectations and/or practices relating to motherhood, with consideration of their cultural impact; taught from a social science perspective. Prerequisites: Junior or senior classification or approval of instructor. Cross-listed with SOCI 310.
316. **Sociology of Gender.** (3-0). **Credit 3.** Sociological explanations of status differences between men and women; cross-cultural comparisons; gender role socialization, cultural stereotypes, discrimination; gender roles and status in the family, economy, religion, science, other social institutions; deviance, victimization and gender; recent social changes. Cross-listed with SOCI 316.
317. **Women in Politics.** (3-0). **Credit 3.** Role of women in the political system; treatment of women in political theory; effect of law on women's status; women as political leaders; current policy issues of concern to women. Prerequisite: POLS 206. Cross-listed with POLS 317.
330. **Women in Ancient Greece and Rome.** (3-0). **Credit 3.** Survey of women in classical Greece and Rome; emphases on female occupations and family relationships, legal and political status, traditional values, notorious women, how women were viewed and how they viewed themselves. Prerequisite: Junior or senior classification. Cross-listed with CLAS 330 and HIST 330.
332. **Alternative Genders.** (3-0). **Credit 3.** Examination of theories and case studies involving alternative genders and sexualities, studied in their cultural contexts and including the role of factors such as race, class, ethnicity, age, and physical characteristics. Prerequisites: 3 credits in SOCI or WMST; junior or senior classification. Cross-listed with SOCI 332.
333. **Gay and Lesbian Literature.** (3-0). **Credit 3.** Gay and lesbian literature from classical times to present, studied in its historical and cultural context, including works by Sappho, Catullus, Shakespeare, Marlowe, Philips, Wilde, Forster, Brown, and Orton. Prerequisite: ENGL 104. Cross-listed with ENGL 333.

334. **Women's Health. (3-0). Credit 3.** A broad range of health issues that are either unique to women or of special importance to women; information for the health consumer; preparation as an advocate of healthy lifestyles; awareness of the role health plays in the life of all women. Prerequisite: Junior or senior classification. Cross-listed with HLTH 334.
374. **Women Writers. (3-0). Credit 3.** History of literature by women in English primarily from the 16th century to the present; emphasis on continuity of ideas and on literary contributions; study of poetry, essays, novels, short stories, with particular attention to characteristic themes and to racial, social, cultural diversity of women writing in English. Prerequisite: ENGL 104. Cross-listed with ENGL 374.
391. **Studies in Gender and Diversity. (3-0). Credit 3.** Exploration of a significant topic in gender studies, emphasizing the interplay of gender with one or more races, ethnicities, and/or cultures beyond the Anglo-American. Prerequisite: Junior or senior classification.
401. **Feminist Theory. (3-0). Credit 3.** Inquiry-based examination of feminist theory from various periods and disciplinary perspectives, with application to societal debates and controversies. Prerequisites: WMST 200 or approval of instructor; junior or senior classification.
404. **Women and Culture. (3-0). Credit 3.** Examines women's lives in evolutionary and cross-cultural perspective; women's roles in subsistence, politics, religion and economics in traditional cultures; women's roles in international development; the cultural and social construction of women's biology cross-culturally including circumcision, menstruation, pregnancy, childbirth and motherhood. Cross-listed with ANTH 404.
407. **Women, Minorities and the Mass Media. (3-0). Credit 3.** The contributions of women and ethnic groups to the evolution of the media; the portrayal of women and ethnic groups in the mass media; issues resulting from the recognition of women and ethnic groups as media audiences. Prerequisite: Junior classification or approval of instructor. Cross-listed with COMM 407.
411. **Representations of Motherhood. (3-0). Credit 3.** Examination of understandings of motherhood from a humanities perspective and over a variety of cultures and time periods, as reflected in written, media and/or oral texts. Prerequisites: Junior or senior classification or approval of instructor. Cross-listed with COMM 411.
420. **Gender and Communication. (3-0). Credit 3.** Survey of the role of gender in communication processes; focus on communication differences between men and women in contexts such as the family, school and work organizations; discussion of media influence in gender stereotypes. Cross-listed with COMM 420.
424. **Women and Work in Society. (3-0). Credit 3.** Social context of women's work; work patterns, labor force participation, occupational destinations and occupational mobility; alternatives to the conventional division of labor by sex in society. Cross-listed with SOCI 424.
430. **Employment Discrimination Law. (3-0). Credit 3.** Legal issues surrounding employment discrimination, including disparate treatment and impact; intent; affirmative action; sexual harassment; pregnancy, sex, race, religious, salary, disability, age, and ethnic discrimination; policy issues and perspectives to aid human resource specialists and managers. Prerequisite: Senior classification. Cross-listed with MGMT 430.
439. **Gender, Ethnicity and Class in Archaeological Research. (3-0). Credit 3.** Exploration of theoretical and methodological issues in engendering archaeology; ideological biases in the interpretation of roles attributed to women, men, and underrepresented groups in the past; the impact of cultural transformation on underrepresented groups and gender relations; and the formulation of research questions concerning these issues. Prerequisites: ANTH 202, ANTH 210, WMST 200 or WMST 207; junior or senior classification or approval of instructor. Cross-listed with ANTH 439.
461. **History of American Women. (3-0). Credit 3.** Cultural, political, legal and religious factors that helped shape the role and character of women in American society from colonial times to the present; historical role of women in the development of the nation. Cross-listed with HIST 461.
462. **Women and the Law. (3-0). Credit 3.** The legal status of American women from the adoption of the Constitution to the present: constitutional developments; the 19th Amendment and the proposed Equal Rights Amendment; employment; family law; reproductive rights; education; sexual equality in context of other claims to equality; law and social norms. Prerequisite: POLS 206 or approval of department head. Cross-listed with POLS 462.
463. **Gender in Asia. (3-0). Credit 3.** Gender dynamics in Asia; changes in gender roles; women's movements; women and the economy; women and politics; men's and women's private lives. Prerequisites: Junior or senior classification or approval of instructor. Cross-listed with ASIA 463 and SOCI 463.

473. **History of Modern American Women. (3-0). Credit 3.** Emergence of modern American women in the 1890s; examination of their history from the 1890s to the present; women as organizers, innovators, political reformers, workers, social activists, housewives, mothers, consumers and feminists. Cross-listed with HIST 473.
474. **Studies in Women Writers. (3-0). Credit 3.** A different specific topic each term examining women's writing through historical period, genre, cross-cultural study, or feminist literary theory, including minority and third world writers. May be repeated for credit. Prerequisite: 3 credits of literature at 200-level or above or approval of instructor. Cross-listed with ENGL 474.
476. **Sex and Sexuality in History. (3-0). Credit 3.** Changing ideas about sex and sexuality over time; includes their interaction with ideas about gender, race, class, religion, science, technology, medicine, politics and popular culture; historical and cultural processes creating modern concerns about sex and sexuality. Prerequisite: Junior or senior classification. Cross-listed with HIST 476.
477. **Women in Modern European History. (3-0). Credit 3.** Women in Europe from the 18th century to the present: women's contributions to their societies; realities of their daily lives and their responses; perceptions of women; role of institutions in defining women's roles; significance for women of industrialization, revolution, warfare, scientific discoveries; interaction of class, race and gender. Cross-listed with HIST 477.
481. **Senior Seminar. (3-0). Credit 3.** Inquiry-based investigation of an issue, problem, or question, using gender or feminism as the organizing principle for analysis; methods and materials of scholarship in the field; includes opportunities for student research. Prerequisites: Senior classification or approval of instructor.
484. **Internship in Women's Studies. Credit 1 to 4.** Directed internship in a public or private organization to provide students with on-the-job training and applied research experience; opportunity to observe firsthand issues and problems covered in women's studies courses; designed to enhance and clarify the student's career objectives. Prerequisites: Junior or senior classification and approval of instructor.
485. **Directed Studies. Credit 1 to 4.** Readings and/or research for specific needs of students minoring in women's studies. Prerequisite: Approval of women's studies director and faculty supervisor.
489. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of women's studies. May be repeated for credit.
491. **Research. Credit 1 to 3.** Research conducted under the direction of faculty member in women's studies. May be repeated 3 times for credit. Prerequisites: 12 credits in WMST including 6 at 300-level; junior or senior classification and approval of instructor.

Zoology

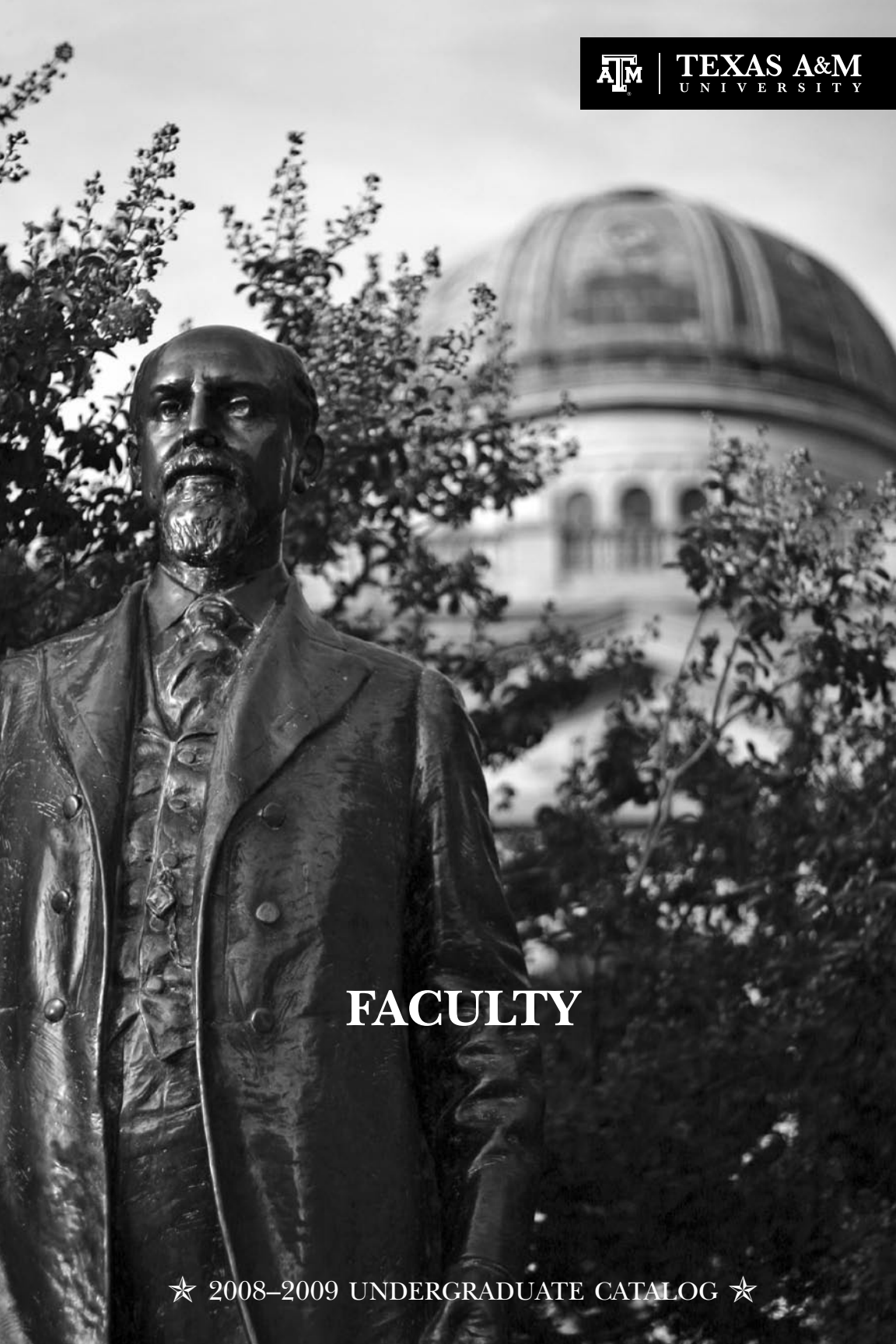
(faculty, see page 634)

(ZOOL)

289. **Special Topics in... Credit 1 to 4.** Selected topics in an identified area of zoology. May be repeated for credit. Prerequisite: Approval of instructor.
291. **Research. Credit 1 to 4.** Active research of basic nature under the supervision of a Department of Biology faculty member. Prerequisite: Freshman or sophomore classification and approval of instructor.
489. **Special Topics in... Credit 1 to 4. I, II** Selected topics in an identified area of zoology. May be repeated once for credit.
491. **Research. Credit 1 to 4.** Active research of basic nature under the supervision of a Department of Biology faculty member. Prerequisite: Junior or senior classification and approval of instructor.



TEXAS A&M
UNIVERSITY



FACULTY

Texas A&M University Faculty

Figures listed in parentheses indicate date of first appointment on the University staff and date of appointment to present position, respectively.

- Aaron, Rachel F.**, Lecturer in Health and Kinesiology. (2003) B.S., Sam Houston State University, 2001; M.A., Sam Houston State University, 2003.
- Abanov, Artem G.**, Assistant Professor of Physics. (2006) B.S., Moscow Institute of Physics and Technology, 1991; M.S., Moscow Institute of Physics and Technology, 1994; Ph.D., Texas A&M University, 1998.
- Abbott, Elton**, Associate Professor of Practice, Department of Architecture. (1999) B.S., Oklahoma State University, 1969; M.A., University of Oklahoma, 1973; Ph.D., Texas A&M University, 1983.
- Abbott, Louise C.**, Associate Professor of Veterinary Integrative Biosciences and of Toxicology. (1994, 1999) B.A., Whitman College, 1975; Ph.D., University of Washington-Seattle, 1982; D.V.M., Washington State University, 1988.
- Abrams, Robin F.**, AIA, Associate Professor of Architecture. (1994, 2000) B.A., Northwestern University, 1975; M.S., University of Texas at Austin, 1979; M.Arch., University of Texas at Austin, 1985; Ph.D., The University of Sheffield (England), 1994.
- Abu Al-Rub, Rashid K.**, Assistant Professor, Zachry Department of Civil Engineering. (2007) B.S., Jordan University of Science and Technology, 1999; M.S., Jordan University of Science and Technology, 2000; Ph.D., Louisiana State University, 2004.
- Ackerman, Jeffrey M.**, Assistant Professor of Sociology. (2003) B.S., The Pennsylvania State University, 1993; M.A., The Pennsylvania State University, 1998; Ph.D., The Pennsylvania State University, 2005.
- Acquaye, Lucy**, Assistant Professor of Construction Science. (2007) B.Sc., University of Science and Technology (Ghana), 1996; M.S., University of Florida, 2000; M.A., University of Florida, 2006; Ph.D., University of Florida, 2006.
- Acuff, Gary R.**, Professor and Head, Department of Animal Science, and Professor of Food Science and Technology. (1980, 1999) B.S., Abilene Christian University, 1980; M.S., Texas A&M University, 1982; Ph.D., Texas A&M University, 1985.
- Adair, Thomas W. III**, Professor of Physics. (1966, 2002) B.S., A&M College of Texas, 1957; M.A., Rice University, 1960; Ph.D., Texas A&M University, 1965.
- Adams, Clark E.**, Professor of Wildlife and Fisheries Sciences. (1981, 1994) B.S., Concordia Teachers College, 1964; M.S., University of Oregon, 1966; Ph.D., University of Nebraska, 1973.
- Adams, George**, Lecturer in Japanese. (2004) B.A., Macalester College, 1974; M.Ed., Temple University (Japan), 1996.
- Adams, H. Richard**, Dean, College of Veterinary Medicine and Biomedical Sciences; Professor of Veterinary Physiology and Pharmacology; and Holder of the Carl B. King Deanship in Veterinary Medicine. (1998) B.S., Texas A&M University, 1965; D.V.M., Texas A&M University, 1966; Ph.D., University of Pittsburgh, 1972.
- Adams, Leslie Garry**, Professor of Veterinary Pathobiology and Associate Dean for Homeland Security, College of Veterinary Medicine and Biomedical Sciences. (1968, 1978) B.S., A&M College of Texas, 1963; D.V.M., Texas A&M University, 1964; Ph.D., Texas A&M University, 1968; Diplomate, American College of Veterinary Pathologists, 1970.
- Adams, Marvin Lee**, Professor, Department of Nuclear Engineering; Associate Vice President for Research; and Director of Institute for National Security Education and Research. (1991, 2002) B.S., Mississippi State University, 1981; M.S.E., University of Michigan, 1984; Ph.D., University of Michigan, 1986.
- Adams, Ralph James Q.**, Professor of History and Holder of the Patricia and Bookman Peters Professorship in History. (1974, 1987) B.S., Indiana University, 1965; M.A., Valparaiso University, 1969; Ph.D., University of California, Santa Barbara, 1972.
- Adkisson, Jean A.**, Clinical Associate Professor of Finance. (2001, 2004) B.S., Texas A&M University, 1979; M.Agr., Texas A&M University, 1981; M.S., Texas A&M University, 1987; Ph.D., Texas A&M University, 1988.
- Agnolet, Glenn**, Professor of Physics and of Materials Science and Engineering. (1985, 2001) B.S., Carnegie Mellon University, 1976; M.S., Cornell University, 1980; Ph.D., Cornell University, 1983.
- Agnor, Dottiedee**, Lecturer in Health and Kinesiology. (1993) B.S., Texas A&M University, 1980; M.S., Texas A&M University, 1992.
- Aguiar, Marcelo**, Professor of Mathematics. (2001, 2008) Licenciatura, Universidad de Uruguay, 1992; Ph.D., Cornell University, 1997.
- Ahmad, Hanan**, Lecturer in Arabic. (2008) M.A., Al-Minia University, 2002.

- Ahmed, Anwer S.**, Professor of Accounting. (2005, 2008) B.S., London School of Economics, 1979; M.S., London Business School, 1985; Ph.D., University of Rochester, 1992.
- Ahr, Wayne Merrill**, Professor of Geology and Geophysics. (1970, 1995) B.S., University of Texas at El Paso, 1960; M.S., Texas A&M University, 1965; Ph.D., Rice University, 1967.
- Aitkenhead-Peterson, Jacqueline**, Assistant Professor of Soil and Crop Sciences. (2006) B.S., University of Stirling, 1995; M.S., University of Aberdeen, 1996; Ph.D., University of New Hampshire, 2000.
- Akleman, Derya G.**, Senior Lecturer in Statistics. (1998, 2008) B.S., Middle East Technical University (Turkey), 1987; M.S., Middle East Technical University (Turkey), 1989; M.S., Texas A&M University, 1993; Ph.D., Texas A&M University, 1996.
- Akleman, Ergun**, Professor, Department of Visualization. (1995, 2007) B.S., Istanbul Technical University, 1981; M.S., Georgia Institute of Technology, 1986; Ph.D., Georgia Institute of Technology, 1992.
- Albrecht, Carol M.**, Senior Lecturer in Sociology. (1996, 2003) B.S., Utah State University, 1978; M.S., Iowa State University, 1983; Ph.D., Texas A&M University, 1996.
- Alcorn, Marion E.**, Lecturer in Atmospheric Sciences and Practical Meteorologist. (1988) B.S., Fort Hays Kansas State College, 1968; M.S., Naval Postgraduate School, 1974.
- Alexander, Gerianne M.**, Associate Professor of Psychology. (2002, 2006) B.A., Mus., St. Francis Xavier University (Canada), 1981; B.A., St. Francis Xavier University (Canada), 1984; Ph.D., McGill University (Canada), 1991.
- Alford, Patricia L.**, Senior Lecturer in Library Science. (1999, 2008) B.S., Birmingham-Southern College, 1968; D.V.M., Auburn University, 1974.
- Alfred, Mary**, Associate Professor of Educational Administration and Human Resource Development. (2006) B.S., University of Central Texas, 1980; M.S., University of Central Texas, 1983; Ph.D., University of Texas at Austin, 1995.
- Allen, Angela**, Lecturer in Mathematics. (2005) B.S., Texas A&M University, 2001; M.S., Texas A&M University, 2005.
- Allen, Graham Donald**, Professor of Mathematics. (1971, 1988) B.S., University of Wisconsin, 1965; M.S., University of Wisconsin, 1966; Ph.D., University of Wisconsin, 1971.
- Allen, John William**, Professor of Economics. (1967, 1978) B.S., University of Illinois, 1958; M.S., University of Illinois, 1963; Ph.D., University of Illinois, 1967.
- Allen, Natalie L.**, C.P.A., Senior Lecturer in Accounting. (1989, 1996) B.S., Texas A&M University, 1986; M.S., Texas A&M University, 1988.
- Allen, Roland E.**, Professor of Physics and of Materials Science and Engineering. (1970, 1983) B.A., Rice University, 1963; Ph.D., University of Texas at Austin, 1968.
- Allen, Steven J.**, Adjunct Member, Department of Veterinary Physiology and Pharmacology. (1993) B.S., Rice University, 1973; M.D., University of Texas Medical Branch, Galveston, 1977.
- Allred, Clinton D.**, Assistant Professor of Nutrition and Food Science and Member of the Intercollegiate Faculty of Nutrition. (2006) B.S., University of Georgia, 1997; Ph.D., University of Illinois, 2002.
- Almeida, Paul D.**, Associate Professor of Sociology. (2001, 2008) B.A., University of California, Santa Cruz, 1991; M.A., The University of New Mexico, 1994; Ph.D., University of California, Riverside, 2001.
- Aloisio, Fabio**, Assistant Lecturer in Veterinary Pathobiology. (2006) D.V.M., University of Perugia, 2000.
- Alonzo, Armando C.**, Associate Professor of History. (1996, 1998) B.A., University of Notre Dame, 1972; M.A., University of Texas-Pan American, 1983; Ph.D., Indiana University, 1990.
- Alonzo, Juan J.**, Assistant Professor of English. (2003) B.A., Williams College, 1992; M.A., University of Texas at Austin, 1998; Ph.D., University of Texas at Austin, 2003.
- Alpern, Sara**, Associate Professor of History. (1977, 1988) B.A., Western Reserve University, 1964; M.A., University of California, Los Angeles, 1968; Ph.D., University of Maryland, 1978.
- Altmeier, Jeffrey T.**, MSG, Senior Military Instructor, Department of Military Science.
- Alvarado, Jorge A.**, P.E., Assistant Professor, Departments of Engineering Technology and Industrial Distribution and Mechanical Engineering. (2004) B.S., University of Puerto Rico at Mayaguez, 1991; M.S., University of Illinois at Urbana-Champaign, 2000; Ph.D., University of Illinois at Urbana-Champaign, 2004.
- Alvard, Michael S.**, Associate Professor of Anthropology. (2000, 2003) B.A., Colorado State University, 1984; M.S., University of New Mexico, 1987; Ph.D., University of New Mexico, 1993.
- Amato, Nancy M.**, Professor, Department of Computer Science. (1995, 2004) B.S., Stanford University, 1986; A.B., Stanford University, 1986; M.S., University of California at Berkeley, 1988; Ph.D., University of Illinois at Urbana-Champaign, 1995.
- Ambrus, A.**, Assistant Research Scientist, Department of Veterinary Pathobiology. D.V.M., Michigan State University, 1982; M.S., Michigan State University, 1983.

- Amendt, Brad A.**, Associate Professor, Health Science Center. (2006) B.S., University of Iowa, 1979; M.S., University of Iowa, 1989; Ph.D., University of Iowa, 1994.
- Ammons, Paul F.**, Lecturer in Information and Operations Management. (1998) B.S., Texas A&M University, 1971; M.S., Boston University, 1986; M.S., Texas A&M University, 1997.
- Amon, Rainer**, Assistant Professor of Marine Sciences (Galveston) and of Oceanography. (2003) B.S., University of Vienna (Austria), 1986; M.S., University of Vienna (Austria), 1990; Ph.D., University of Texas at Austin, 1995.
- Amstalden, Marcel**, Assistant Professor of Animal Science. (2006) D.V.M., Paulista State University (Brazil), 1992; M.S., Texas A&M University, 2000; Ph.D., Texas A&M University, 2003.
- Anand, Nagamangala K.**, P.E., Professor, Department of Mechanical Engineering, and Associate Dean for Graduate Programs for the Dwight Look College of Engineering. (1985, 1996) B.E., Bangalore University (India), 1978; M.S., Kansas State University, 1979; Ph.D., Purdue University, 1983.
- Anderson, Evan E.**, Professor of Information and Operations Management and Holder of the E. D. Brockett Professorship in Business Administration. (1998) B.B.A., University of Iowa, 1965; M.B.A., University of Wisconsin-Madison, 1966; Ph.D., Cornell University, 1970.
- Anderson, James E.**, Professor Emeritus of Political Science. (1986) B.S., Southwest Texas State University, 1955; Ph.D., University of Texas at Austin, 1959.
- Anderson, Margaret**, Assistant Professor of Library Science. (2007) B.S., Texas A&M University, 1998; M.S., University of North Texas, 2003.
- Anderson, Richard Kenneth**, Professor of Economics and Director of Undergraduate Studies. (1975, 1995) B.A., Rockford College, 1967; M.A.T., Rockford College, 1971; M.S., Purdue University, 1972; Ph.D., Purdue University, 1976.
- Anderson, Robin Carl**, Adjunct Member, Department of Veterinary Physiology and Pharmacology. (2000) B.S., Colorado State University, 1989; M.S., Iowa State University, 1991; Ph.D., Iowa State University, 1995.
- Anderson, S. Kent**, Visiting Executive Associate Professor of Landscape Architecture and Urban Planning. (2008) B.A., Sam Houston State University, 1972; M.A., Sam Houston State University, 1973; Ph.D., Texas A&M University, 1993.
- Anderson, Stuart D.**, P.E., Professor, Zachry Department of Civil Engineering. (1989, 2004) B.S., University of Washington, Seattle, 1971; M.S., University of Illinois at Urbana, 1973; Ph.D., University of Texas at Austin, 1989.
- Anderson, Terry H.**, Professor of History. (1979, 1995) B.A., University of Minnesota, 1971; M.A., University of Missouri, 1973; Ph.D., Indiana University, 1978.
- Anding, Jenna D.**, Associate Professor and Extension Program Leader, Department of Nutrition and Food Science. (1999) B.S., Texas A&M University, 1987; M.S., Texas A&M University, 1991; Ph.D., Texas A&M University, 1994.
- Andreadis, Harriette**, Professor of English. (1975, 2001) B.A., Temple University, 1961; M.A., Temple University, 1966; Ph.D., University of Wisconsin, 1970.
- Andrews, Malcolm J.**, P.E., Professor, Department of Mechanical Engineering, and of Materials Science and Engineering. (1991, 2004) M.A., Oxford University (England), 1980; M.E., Imperial College, London (England), 1984; Ph.D., Imperial College, London (England), 1986.
- Anis, Ayal**, Assistant Professor of Marine Sciences (Galveston) and of Oceanography. (2000) B.S., Tel-Aviv University (Israel), 1982; M.S., Hebrew University (Israel), 1984; Ph.D., Oregon State University, 1993.
- Annamalai, Kalyan**, Paul Pepper Professor, Department of Mechanical Engineering, and TEES Senior Fellow. (1981, 1993) B.S., University of Madras (India), 1966; M.S., Indian Institute of Science, 1968; Ph.D., Georgia Institute of Technology, 1975.
- Anshelevich, Michael V.**, Assistant Professor of Mathematics. (2005) B.S., California Institute of Technology, 1994; M.A., University of California at Berkeley, 1997; Ph.D., University of California at Berkeley, 2000.
- Appel, David Nye**, Professor of Plant Pathology and Microbiology and of Ecosystem Science and Management. (1981, 1995) B.A., West Virginia University, 1973; M.S., West Virginia University, 1976; Ph.D., Virginia Polytechnic Institute and State University, 1980.
- Applegate, Brian E.**, Assistant Professor, Department of Biomedical Engineering. (2006) B.S., Wright State University, 1994; M.S., Ohio State University, 1998; Ph.D., Ohio State University, 2000.
- Aramayo, Rodolfo**, Associate Professor of Biology, of Genetics and of Biotechnology. (1997, 2004) B.S., University of Brasilia, 1982; M.S., University of Brasilia, 1986; Ph.D., University of Georgia, Athens, 1992.
- Arizpe, Norma L.**, Senior Lecturer in Hispanic Studies. (1985, 1998) B.A., Pan American University, 1971; M.A., University of Michigan, 1977.
- Arizpe, Victor**, Professor of Hispanic Studies and Head of Department. (1983, 1998) B.A., Pan American University, 1971; M.A., University of Michigan, Ann Arbor, 1974; Ph.D., University of Michigan, Ann Arbor, 1982.
- Armstrong, Carisa L.**, Lecturer in Health and Kinesiology. (2003) B.S., Southwest Texas State University, 1999; M.A., Case Western Reserve University, 2002.

- Arnaud, Sabine**, Assistant Professor of European and Classical Languages and Cultures. (2007) M.A., University of Paris VIII - Vincennes-St. Denis, 1997; Ph.D., City University of New York/Ecole des Hautes Etudes en Sciences Sociales, 2007.
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- Arnold, Michael A.**, Professor of Horticultural Sciences. (1993, 2005) B.S., Ohio State University, 1983; B.S., Ohio State University, 1984; M.S., Ohio State University, 1987; Ph.D., North Carolina State University, 1990.
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- Witt, Peter A.**, Professor of Recreation, Park and Tourism Sciences and Holder of the Elda K. Bradberry Chair for Youth Development. (1993) B.S., University of California, Los Angeles, 1966; M.S., University of California, Los Angeles, 1967; Ph.D., University of Illinois at Champaign, 1970.
- Wolf, Joan B.**, Assistant Professor of Women's Studies. (2002, 2006) B.A., Michigan State University, 1989; M.A., University of Chicago, 1992; Ph.D., University of Chicago, 1997.
- Wolf, Rebecca**, Lecturer/Designer in Theatre Arts. (2006) B.S., Rhodes College, 2001; M.F.A., Tulane University, 2006.
- Wolfe, Christopher J.**, C.P.A., Professor of Accounting. (1985, 2000) B.S., Utah State University, 1977; M.B.A., Kent State University, 1981; D.B.A., Kent State University, 1984.
- Wolken, Lawrence C.**, Clinical Professor of Finance. (1978, 2004) B.A., University of Missouri-Columbia, 1967; M.S., Texas A&M University, 1968; Ph.D., Texas A&M University, 1972.
- Wollock, Jennifer G.**, Professor of English. (1982, 1997) A.B., Radcliffe College, 1974; A.M., University of Toronto, 1975; A.M., Harvard University, 1977; Ph.D., Harvard University, 1981.

- Womack, James E.**, Distinguished Professor of Veterinary Pathobiology, of Medical Biochemistry and Medical Genetics, and of Genetics; and Holder of the W. P. Luse Endowed Professorship in Veterinary Medicine. (1977, 1987) B.S., Abilene Christian University, 1964; Ph.D., Oregon State University, 1968.
- Wood, B. Dan**, Professor of Political Science. (1988, 1997) B.A., University of Houston, 1976; M.A., University of Houston, 1985; Ph.D., University of Houston, 1987.
- Wood, Thomas K.**, Professor, Artie McFerrin Department of Chemical Engineering, and of Zachry Department of Civil Engineering, and Holder of the Mike O'Connor Chair II in Chemical Engineering. (2005) B.S., University of Kentucky, 1985; Ph.D., North Carolina State University, 1991.
- Woodard, Kathryn**, Assistant Professor of Performance Studies. (2004) B.M., Hochschule fur Musik, 1991; M.M., University of Cincinnati College Conservatory of Music, 1993; D.M.A., University of Cincinnati College Conservatory of Music, 1999.
- Woodcock, David G.**, FAIA, Professor of Architecture. (1962, 1992) B.Arch., University of Manchester (England), 1960; Dip. T.P., University of Manchester (England), 1966; Chartered Architect (United Kingdom), R.I.B.A.
- Woodfin, Thomas M.**, Associate Professor of Landscape Architecture and Urban Planning. (1981, 1994) B.L.A., Texas A&M University, 1976; M.L.A., Harvard University, 1981; Ph.D., Texas A&M University, 2007.
- Woodman, Christopher**, Assistant Professor of Health and Kinesiology and of Veterinary Physiology and Pharmacology. (2006) B.S., Colgate University, 1986; M.S., University of Arizona, 1989; Ph.D., University of Arizona, 1995.
- Woodman, Richard W.**, Professor of Management and Holder of the Lawrence E. Fouraker Professorship in Business Administration. (1978, 1997) B.S., Oklahoma State University, 1968; M.B.A., Oklahoma State University, 1969; Ph.D., Purdue University, 1978.
- Woods, Paul K.**, Associate Professor of Construction Science. (1976, 1993) A.S., Kilgore College, 1965; B.A., University of Texas at Austin, 1970; M.Arch., University of Texas at Austin, 1975; D.E.D., Texas A&M University, 1982.
- Woodward, Jason E.**, Assistant Professor and Extension Specialist, Department of Plant Pathology and Microbiology. (2006) B.S., Southwestern Oklahoma State University, 2002; M.S., Oklahoma State University, 2002; Ph.D., University of Georgia, 2006.
- Woodward, Richard T.**, Associate Professor of Agricultural Economics and Member of Water Management and Hydrological Science. (1997, 2003) B.A., Middlebury College, 1984; M.S., University of Wisconsin, 1994; Ph.D., University of Wisconsin, 1996.
- Woodward, Robert S.**, Lecturer in Educational Psychology. (2004) B.A., Texas A&M University, 1997; M.S., Texas A&M University, 1999; Ph.D., Texas A&M University, 2004.
- Woolley, James Braden**, Professor of Entomology. (1983, 1995) B.S., Oregon State University, 1977; Ph.D., University of California, Riverside, 1983.
- Woosley, James R.**, Senior Lecturer in Health and Kinesiology and in Educational Administration and Human Resource Development. (1996, 2007) B.S., Western Illinois University, 1974; M.S., Western Illinois University, 1975.
- Wormuth, John Hazen**, Professor of Oceanography. (1972, 1986) B.A., Hope College, 1966; Ph.D., Scripps Institution of Oceanography, 1971.
- Wortman, Martin A.**, Professor, Department of Industrial and Systems Engineering. (1988, 1999) B.S., North Carolina State University, 1977; M.S., North Carolina State University, 1980; Ph.D., Virginia Polytechnic Institute and State University, 1982; Ph.D., Virginia Polytechnic Institute and State University, 1988.
- Wright, David L.**, Professor of Health and Kinesiology. (1989, 2003) B.A., Crewe and Alsager College of Education (England), 1982; M.A., University of North Carolina at Chapel Hill, 1986; Ph.D., Pennsylvania State University, 1989.
- Wright, George B.**, Senior Lecturer, Department of Engineering Technology and Industrial Distribution. (1982, 1995) B.S., University of Houston, 1971; M.Ed., University of Houston, 1975.
- Wright, Lori Ellen**, Associate Professor of Anthropology and of Nutrition. (1996, 2002) B.Sc., Trent University, 1987; M.A., University of Chicago, 1989; Ph.D., University of Chicago, 1994.
- Wright, M. Scott**, Lecturer in Health and Kinesiology. (2006) B.S., Sam Houston State University, 1995; M.Ed., University of Texas Pan-American, 1997.
- Wright, Steven M.**, P.E., Professor, Departments of Electrical and Computer Engineering and Biomedical Engineering, and Holder of the Royce E. Wisenbaker Professorship II in Engineering. (1988, 2000) B.S., University of Illinois at Urbana, 1980; M.S., University of Illinois at Urbana, 1981; Ph.D., University of Illinois at Urbana, 1984.
- Wu, Chaodong**, Assistant Professor of Nutrition and Food Science and Member of the Intercollegiate Faculty of Nutrition. (2007) M.D., Hubei College of Chinese Medicine, 1992; M.S., Tongji Medical University, 1995; Ph.D., Beijing Medical University, 1998.
- Wu, Guoyao**, Professor of Animal Science and of Nutrition. (1991, 2001) B.Sc., South China Agricultural University, 1982; M.Sc., Beijing Agricultural University, 1984; M.Sc., University of Alberta (Canada), 1986; Ph.D., University of Alberta (Canada), 1989.

- Wu, Hsin-i, P.E.**, Professor, Department of Biomedical Engineering. (1977, 1987) B.S., Tunghai University (Taiwan), 1960; M.S., University of Missouri, 1964; Ph.D., University of Missouri, 1967.
- Wu, Wenhao**, Associate Professor of Physics and of Materials Science and Engineering. (2005) B.S., Nanjing University (China), 1983; M.S., Chinese Academy of Science, 1986; Ph.D., University of Chicago, 1992.
- Wu, X. Ben**, Professor and Associate Head for Graduate Programs, Department of Ecosystem Science and Management. (1995, 2007) B.S., Lanzhou University (China), 1982; M.S., University of Tennessee, 1988; M.S., University of Tennessee, 1990; Ph.D., University of Tennessee, 1991.
- Wu, Ximing**, Assistant Professor of Agricultural Economics. (2005) B.A., Peking University, 1998; Ph.D., University of California at Berkeley, 2003.
- Wunneburger, Douglas F.**, Assistant Research Scientist/Senior Lecturer, Department of Landscape Architecture and Urban Planning. (1984, 2000) B.A., University of Texas at Austin, 1977; M.F., Stephen F. Austin State University, 1981; Ph.D., Texas A&M University, 1992.
- Wurbs, Ralph A., P.E.**, Professor, Zachry Department of Civil Engineering, and of Water Management and Hydrological Science. (1980, 1997) B.S., Texas A&M University, 1971; M.S., University of Texas at Arlington, 1974; Ph.D., Colorado State University, 1978.
- Wursig, Bernd W.**, Professor of Wildlife and Fisheries Sciences. (1989) B.A., College of New Rochelle, 1969; B.S., Ohio State University, 1971; Ph.D., State University of New York at Stony Brook, 1978.
- Wylie, Wayne E.**, Associate Professor of Health and Kinesiology. (1981, 1987) B.S., Texas A&M University, 1974; M.Ed., Texas A&M University, 1975; Ed.D., University of Tennessee, 1981.
- Xiang, Ping**, Associate Professor of Health and Kinesiology. (1996, 2005) B.Ed., Hunan Teachers University, 1981; M.Ed., Shanghai Institute of Physical Education, 1987; Ph.D., Louisiana State University, 1996.
- Xiao, Yi**, Associate Professor of Library Science. (1994, 2001) B.A., Zhongshan University (China), 1983; M.L.S., Emporia State University, 1993.
- Xiong, Jin**, Assistant Professor of Biology. (2001) B.S., Zhongshan University (China), 1984; M.S., Eastern Illinois University, 1988; Bowling Green State University, 1991; Ph.D., University of Illinois-Urbana, 1996.
- Xiong, Zixiang**, Professor, Department of Electrical and Computer Engineering, and IEEE Fellow. (1999, 2007) B.S., Wuhan University (P.R. China), 1987; M.A., University of Kansas, 1991; M.S., Illinois Institute of Technology, 1992; Ph.D., University of Illinois at Urbana-Champaign, 1996.
- Yadav, Manjit S.**, Associate Professor of Marketing. (1990, 1996) B.S., University of Roorkee, 1983; Ph.D., Virginia Polytechnic Institute, 1990.
- Yalvac, Bugrahan**, Assistant Professor of Teaching, Learning and Culture. (2006) B.S., Middle Eastern Technical University, Ankara, 1996; M.S., Middle Eastern Technical University, Ankara, 1999; Ph.D., Pennsylvania State University, 2005.
- Yamauchi, Takashi**, Associate Professor of Psychology. (2001, 2008) B.A., Columbia University, 1991; M.A., Columbia University, 1995; Ph.D., Columbia University, 1997.
- Yan, Catherine Huafei**, Professor of Mathematics. (1999, 2004) B.S., Peking University, 1993; Ph.D., Massachusetts Institute of Technology, 1997.
- Yan, Wei**, Assistant Professor of Architecture. (2005) B.E., Tianjin University, 1992; M.E., Tianjin University, 1996; M.S., University of California at Berkeley, 2004; Ph.D., University of California at Berkeley, 2005.
- Yancey, Thomas E.**, Professor of Geology and Geophysics. (1980, 1994) B.A., University of California at Berkeley, 1966; M.A., University of California at Berkeley, 1969; Ph.D., University of California at Berkeley, 1971.
- Yang, Jiong**, Assistant Professor of Chemistry. (2007) B.S., Lanzhou University (China), 1994; M.S., Lanzhou University (China), 1997; M.S., New York University, 1999; Ph.D., The Ohio State University, 2003.
- Yang, Ping**, Professor of Atmospheric Sciences. (2001, 2008) B.S., Lanzhou University (China), 1985; M.S., Chinese Academy of Science, 1988; Ph.D., University of Utah, 1995.
- Yang, Zheng Y.**, Professor of Library Science. (1991, 2008) B.A., Shanghai International Studies University, 1986; M.L.S., University of Washington, 1990.
- Yarak, Larry W.**, Associate Professor of History. (1985, 1991) B.A., Kalamazoo College, 1972; Ph.D., Northwestern University, 1983.
- Yasskin, Philip B.**, Associate Professor of Mathematics. (1982, 1988) B.A., University of Pennsylvania, 1971; M.S., University of Pennsylvania, 1971; M.S., University of Maryland, 1975; Ph.D., University of Maryland, 1979.
- Yeager, Danny L.**, Professor of Chemistry. (1978, 1987) B.S., University of Iowa, 1968; B.A., University of Iowa, 1968; Ph.D., California Institute of Technology, 1975.

- Yeh, Alvin T.**, Assistant Professor, Department of Biomedical Engineering. (2003) B.S., University of Michigan, 1993; M.S., University of California at Berkeley, 2000.
- Yennello, Sherry J.**, Professor of Chemistry. (1993, 2002) B.S., Rensselaer Polytechnic Institute, 1985; B.S., Rensselaer Polytechnic Institute, 1986; Ph.D., Indiana University, 1990.
- Ying, Qi**, Assistant Professor, Zachry Department of Civil Engineering. (2007) B.S., Tsinghua University, 2000; Ph.D., University of California, Davis, 2004.
- Yoon, Byung-Jun**, Assistant Professor, Department of Electrical and Computer Engineering. (2008) B.S., Seoul National University (Korea), 1998; M.S., California Institute of Technology, 2002; Ph.D., California Institute of Technology, 2006.
- Yoon, Myeongsun**, Assistant Professor of Educational Psychology. (2007) B.A., Seoul National University, 2000; M.A., Arizona State University, 2004; Ph.D., Arizona State University, 2007.
- Young, Benjamin D.**, Clinical Assistant Professor of Veterinary Large Animal Clinical Sciences. (2006) B.S., Colorado State University, 1996; D.V.M., Colorado State University, 2000; Board Certified, American College of Veterinary Radiology, 2006.
- Young, Matthew P.**, Assistant Professor of Mathematics. (2007) B.S., University of Minnesota, 1999; Ph.D., Rutgers University, 2004.
- Young, Ryland F.**, Professor of Biochemistry and Biophysics and of Biology. (1978, 1987) B.A., Rice University, 1968; Ph.D., University of Texas at Dallas, 1975.
- Youngblood, Dave Harper**, Professor of Physics. (1967, 1991) B.S., Baylor University, 1961; M.A., Rice University, 1963; Ph.D., Rice University, 1965.
- Yu, Choongho**, Assistant Professor, Department of Mechanical Engineering. (2007) B.S., Korea University, 1997; M.S., Korea University, 1999; Ph.D., University of Texas at Austin, 2004.
- Yurttas, Lale**, Senior Lecturer, Artie McFerrin Department of Chemical Engineering. (1996) B.S., Middle East Technical University (Ankara, Turkey), 1973; M.S., Ege University (Izmir, Turkey), 1976; Ph.D., Texas A&M University, 1988.
- Yurttas, Salih**, Senior Lecturer, Department of Computer Science. (1982, 1990) B.S., Middle East Technical University, 1972; M.S., Ege University (Turkey), 1976; Ph.D., Ege University (Turkey), 1981.
- Yvon-Lewis, Shari**, Assistant Professor of Oceanography. (2004) B.S., University of Massachusetts, 1989; Ph.D., University of Miami, 1994.
- Zajicek, Jayne M.**, Professor of Horticultural Sciences. (1986, 1998) B.S., University of Nebraska, 1980; M.S., University of Nebraska, 1982; Ph.D., Kansas State University, 1986.
- Zardkoohi, Asghar**, Professor of Management and Holder of the T. J. Barlow Professorship in Business Administration. (1981, 1989) B.A., Abadan Institute of Technology, 1968; M.S., Auburn University, 1973; Ph.D., Virginia Polytechnic Institute and State University, 1977.
- Zarestky, Jill**, Lecturer in Mathematics. (2007) B.S., University of Tennessee, 1999; M.S., University of Texas at Austin, 2002.
- Zechman, Emily M.**, Assistant Professor, Zachry Department of Civil Engineering. (2007) B.S., University of Kentucky, 2000; M.S., University of Kentucky, 2001; Ph.D., North Carolina State University, 2005.
- Zellner, Luana**, Clinical Associate Professor of Educational Administration and Human Resource Development and Director of the Principals' Center. (1999) B.S., San Jose State University, 1969; M.S., University of Northern Colorado, 1977; Ph.D., Texas A&M University, 1998.
- Zellner, Ronald D.**, Associate Professor of Educational Psychology. (1984) A.A.S., Erie County Technical Institute, 1962; B.S., Arizona State University, 1968; M.A., Arizona State University, 1972; Ph.D., Arizona State University, 1973.
- Zent, Rodney L.**, Visiting Assistant Professor of Educational Administration and Human Resource Development; Director, Educational Broadcasting Services; and Co-Director, Center for Distance Learning Research. (1972, 1996) B.S., Montana State University, 1970; M.A., Texas A&M University, 1974; Ph.D., Texas A&M University, 1981.
- Zhan, Hongbin**, Professor of Geology and Geophysics and of Water Management and Hydrological Science. (1996, 2007) B.S., University of Science and Technology of China, 1989; M.S., University of Nevada, Reno, 1993; Ph.D., University of Nevada, Reno, 1996.
- Zhan, Wei**, Assistant Professor, Department of Engineering Technology and Industrial Distribution. (2006) B.S., Beijing University, 1983; M.S., Beijing University, 1985; M.S., Washington University, 1988; D.Sc., Washington University, 1991.
- Zhang, Dalun**, Associate Professor of Educational Psychology. (2005) B.A., East China Normal University, Shanghai, 1983; M.A., East China Normal University, Shanghai, 1987; M.Ed., University of New Orleans, 1994; Ph.D., University of New Orleans, 1998.
- Zhang, Fuqing**, Associate Professor of Atmospheric Sciences. (2001, 2006) B.S., Nanjing University, 1991; M.S., Nanjing University, 1994; Ph.D., North Carolina State University, 2000.

- Zhang, Hongbin**, Professor of Soil and Crop Sciences, of Genetics, of Molecular and Environmental Plant Sciences and of Biotechnology. (1997, 2006) B.A., Agricultural University of Hebei, 1982; M.S., Chinese Academy of Science, 1984; Ph.D., University of California, Davis, 1990.
- Zhang, Jun**, Professor, Zachry Department of Civil Engineering, and Program Head of Ocean Engineering. (1987, 2000) M.S., Shanghai Jiao Tong University, 1981; S.M., Massachusetts Institute of Technology, 1984; Sc.D., Massachusetts Institute of Technology, 1987.
- Zhang, Renyi**, Professor of Atmospheric Sciences and of Chemistry. (1997, 2005) B.S., Nanjing Institute of Meteorology (China), 1983; M.S., University of Nevada-Reno, 1989; Ph.D., Massachusetts Institute of Technology, 1993.
- Zhang, Wenquan**, Assistant Professor of Sociology. (2006) B.A., Beijing College of Economics, 1991; Ph.D., University of Albany, State University of New York, 2004.
- Zhang, Xi**, Associate Professor, Department of Electrical and Computer Engineering. (2002, 2008) B.S., Xidian University (China), 1982; M.S., Xidian University (China), 1984; M.S., Lehigh University, 1992; Ph.D., University of Michigan, 2002.
- Zhang, Xinghang**, Assistant Professor, Department of Mechanical Engineering, and of Materials Science and Engineering. (2005) B.S., Jilin University, 1995; M.S., Institute of Metal Research, 1998; Ph.D., North Carolina State University, 2001.
- Zhang, Xiuren**, Assistant Professor of Biochemistry and Biophysics. (2008) B.A., Wannan Agricultural University (China), 1989; M.S., Auburn University, 1999; Ph.D., Cornell University, 2003.
- Zhang, Yunlong**, Assistant Professor, Zachry Department of Civil Engineering. (2004) B.S., Southeast University of China, 1984; M.S., Southeast University of China, 1987; Ph.D., Virginia Polytechnic Institute and State University, 1996.
- Zhao, Chunfang**, Lecturer in Chinese. (2005) B.A., Xi'an International Studies University (China), 2002; M.A., Texas Tech University, 2005.
- Zheng, Lu**, Assistant Professor of Sociology. (2006) B.A., Renmin University of China, 1997; M.A., Renmin University of China, 2001; Ph.D., Stanford University, 2007.
- Zhou, Huaijun**, Assistant Professor of Poultry Science and of Genetics. (2006) B.S., Yangzhou University (China), 1988; M.S., Yangzhou University (China), 1991; Ph.D., Iowa State University, 2002; M.S., Iowa State University, 2003.
- Zhou, Jianxin**, Professor of Mathematics. (1987, 1999) B.S., Shanghai University of Science and Technology (P.R.C.), 1977; M.S., Shanghai University of Science and Technology (P.R.C.), 1982; Ph.D., Pennsylvania State University, 1986.
- Zhou, Rong**, Visiting Lecturer in Chinese. (2008) M.A., Beijing Language University, 2000.
- Zhu, Ding**, Associate Professor, Harold Vance Department of Petroleum Engineering. (2004, 2008) B.S., Beijing University of Science and Technology, 1982; M.S., University of Texas at Austin, 1988; Ph.D., University of Texas at Austin, 1992.
- Zhu, Guan**, Associate Professor of Veterinary Pathobiology and of Genetics. (2000, 2005) B.S., Zhejiang University (China), 1983; M.S., Zhejiang University (China), 1986; Ph.D., University of Georgia, 1993.
- Zhu, Li**, Assistant Professor of Statistics. (2001) Ph.D., University of Minnesota, 2000.
- Zhu-Salzman, Keyan**, Associate Professor of Entomology, of Molecular and Environmental Plant Sciences, of Genetics and of Biotechnology. (1999, 2005) B.S., Fudan University (China), 1985; M.S., Fudan University (China), 1988; Ph.D., Purdue University, 1994.
- Zimmer, Danna Beth**, Associate Professor of Veterinary Pathobiology. (2003) B.A., Rice University, 1978; Ph.D., Baylor College of Medicine, 1983.
- Zimmer, Mary R.**, Clinical Associate Professor of Marketing. (2002, 2005) B.S., Northern Michigan University, 1978; M.S., Purdue University, 1981; Ph.D., University of Texas at Austin, 1985.
- Zimmerman, Ryan D.**, Assistant Professor of Management. (2006) B.S., State University of New York at Albany, 1996; M.B.A., University of Iowa, 1999; Ph.D., University of Iowa, 2006.
- Zinn, Joel**, Professor of Mathematics and of Statistics. (1981, 1983) B.A., Queen's College, 1966; M.A., University of Wisconsin, 1968; Ph.D., University of Wisconsin, 1972.
- Zoghi, Behbood, P.E.**, Professor, Department of Engineering Technology and Industrial Distribution. (1987, 1999) B.S., Seattle University, 1982; M.S., Ohio State University, 1986; Ph.D., Texas A&M University, 1993.
- Zollinger, Dan G., P.E.**, Professor, Zachry Department of Civil Engineering, and of Materials Science and Engineering. (1989, 2006) B.S., Utah State University, 1977; M.S., Utah State University, 1981; Ph.D., University of Illinois at Urbana, 1989.
- Zoran, Debra L.**, Associate Professor of Veterinary Small Animal Clinical Sciences and of Nutrition. (1996, 2006) B.S., Kansas State University, 1982; D.V.M., Kansas State University, 1984; M.S., Iowa State University, 1992; Ph.D., Texas A&M University, 1997; Diplomate, American College of Veterinary Internal Medicine.
- Zoran, Mark J.**, Associate Professor of Biology and Associate Dean for Graduate Studies, College of Science. (1991, 1997) B.A., Augustana College, 1979; M.S., Illinois State University, 1981; Ph.D., Illinois State University, 1987.

- Zou, Jun**, Assistant Professor, Department of Electrical and Computer Engineering. (2004) B.S., Chongqing University, 1994; M.S., Tsinghua University, 1997; Ph.D., University of Illinois at Urbana-Champaign, 2002.
- Zourntos, Takis**, Assistant Professor, Department of Electrical and Computer Engineering. (2003) B.A.Sc., University of Toronto, 1993; M.A.Sc., University of Toronto, 1996; Ph.D., University of Toronto, 2002.
- Zubairy, Muhammad Suhail**, Professor of Physics. (2002, 2004) B.S., Edwardes College (Pakistan), 1971; M.S., Quaid-i-Azam University (Pakistan), 1974; Ph.D., University of Rochester, 1978.
- Zuber, Kenneth W.**, Captain, Assistant Professor of Military Science. (2007)
- Zuberer, David Alan**, Professor of Soil and Crop Sciences. (1978, 1990) B.S., West Virginia University, 1969; M.S., West Virginia University, 1971; Ph.D., University of South Florida, 1976.

Texas A&M University at Galveston

The faculty and administrative positions are current as of Spring, 2008. Figures in parentheses indicate date of first appointment at the University and date of appointment to present positions, respectively. An asterisk indicates a graduate faculty appointment. Two asterisks indicates a pending graduate faculty appointment.

- Acero-Schertzer, Carmen**, Lecturer in Marine Sciences (2005). B.S., U.N.M. San Marcos, Lima, Peru, 1978; M.S., Drexel University, 1984; M.S., University of Miami, 1990; Ph.D., University of Miami, 1996.
- Alexander, Erin M.**, Lecturer in Maritime Administration (2004). B.A., Business Administration, University of St. Thomas, 1977; B.A., Economics, University of St. Thomas, 1977; M.B.A., Southern Methodist University, 1978.
- Alexander, William B.**, Lecturer in Maritime Administration (2003). B.A., University of St. Thomas, 1976; M.A., University of Notre Dame, 1977.
- Alvarado-Bremer, Jaime R.**, Associate Professor of Marine Biology, Wildlife and Fisheries Sciences* and Marine Sciences*(1999). B.S., Universidad, Autonoma Metropolitana, Mexico, 1985; M.S., University of Toronto, 1988; Ph.D., University of Toronto, 1994.
- Amon, Rainer**, Associate Professor of Marine Sciences* and Oceanography* (2003, 2007). B.S., University of Vienna, Austria, 1986; M.S., University of Vienna, Austria, 1990; Ph.D., University of Texas, Austin, 1995.
- Anis, Ayal**, Associate Professor of Marine Sciences* and Oceanography* (2000, 2007). B.S., Tel-Aviv University, 1982; M.S., Hebrew University, 1984; Ph.D., Oregon State University, 1993.
- Armitage Chan, Anna R.**, Assistant Professor of Marine Biology, Marine Sciences*, and EcoSystem Science and Management* (2006) (2007). B.S., University of California, Los Angeles, 1995; Ph.D., University of California, Los Angeles, 2003.
- Atchley, James D.**, Lecturer in General Academics (Competitive Sailing) (2004). B.B.A., Southern Methodist University, 1958; Master of Banking, Southern Methodist University, 1966.
- Baker, Robert K.**, Lecturer in Maritime Administration (1983) (2002). B.S., Texas A&M University, 1977; M.B.A., University of Houston, 1983. Master of Steam and Motor Vessels of Not More Than 1600 Gross Tons Upon Oceans.
- Balaban, Alexandru**, Professor of Marine Sciences* (2000). Diploma, Radiochemist, Ph.D., Polytechnic University, Bucharest, Romania, 1953, 1957, 1959.
- Baldwin, Janetta**, Senior Lecturer in General Academics (Kinesiology) (1980, 1994). B.S., University of Texas, 1969; M.S., Texas A&M University, 1980.
- Barousse, Candice U.**, Lecturer in General Academics (Kinesiology) (2003). B.S., University of Houston at Clear Lake, 2000.
- Bateman, Craig A.**, Lecturer in Maritime Systems Engineering (2000). B.S., University of Michigan, 1979; M.S., Naval Postgraduate School, 1993.
- Bell, Janice S.**, Lecturer in General Academics (Spanish) (2002). B.A., University of Houston, 1970; M.A., University of Northern Iowa, 1995.
- Bodson, Bruce**, Lecturer in Marine Sciences (2002). B.S., University of Arizona, 1980; M.S., University of Texas at Dallas, 1987; J.D., South Texas College of Law, 1993.
- Boudreaux, Lowell A.**, Lecturer in Maritime Administration (2003). B.B.A., Lamar University, 1993; M.B.A., Lamar University, 1996.
- Brinkmeyer, Robin L.**, Assistant Professor of Marine Sciences* (2003, 2006). B.S., University of Texas, 1988; B.S., University of Texas, 1988; M.A., University of Texas, 1993; Ph.D., University of Bremen, Germany, 2003.
- Brown, Philip R.**, Associate Professor of General Academics, (Mathematics) (2001, 2007). B.S., University of Witwatersrand, Johannesburg, South Africa, 1991; M.S., University of Witwatersrand, Johannesburg, South Africa, 1993; Ph.D., Texas A&M University, 2000.
- Brumbaugh, Fred R.**, Lecturer in Marine Sciences (2002). B.S., Shippensburg University, 1972; M.S., University of Houston at Clear Lake, 1978.
- Buch, Kevin**, Lecturer in General Academics (Scuba Diving) (2005). B.S., University of Texas at Arlington, 1998; M.S., University of Texas at Arlington, 2000.
- Bunch-Davis, Carol A.**, Assistant Professor in General Academics (English) (2003). B.A., Trinity University, 1990; M.A., University of Houston at Clear Lake, 1998.

- Calvert, Jeffrey A.**, Lecturer in Maritime Administration (2006). B.S., Ashland University, 1963; M.S., University of Washington, 1970.
- Carhart, John W.**, Senior Lecturer in General Academics (Political Science) and Assistant Department Head (1988) (2002). B.A., Southwest Texas State University, 1981; M.A., Southwest Texas State University, 1988.
- Carlson, Janet F.**, Professor of General Academics (Psychology) (2002). B.S., Union College, 1979; M.A., Fordham University, 1982; Ph.D., Fordham University, 1987.
- Ciminello Jr., Vito J.**, C.P.A., Senior Lecturer in Maritime Administration (1994). B.A., Brown University, 1977; M.S., Northwestern University, 1979.
- Cole, Collier M.**, Lecturer in General Academics (Psychology) (1983). B.A., University of California at Los Angeles, 1971; M.A., University of Houston, 1973; Ph.D., University of Houston, 1976.
- Coleman Jr., Charles H.**, Senior Lecturer in Marine Sciences and Director of the Geology Laboratory (1981, 1992). B.S., Texas A&M University, 1975; M.S., University of Houston at Clear Lake, 1986.
- Coleman, Cheryl L.**, Lecturer in General Academics (Kinesiology) (1997). B.S., United States Naval Academy, 1984; J.D., Northwestern University, 1993.
- Coleman, Gerard T.**, P.E., Senior Lecturer in Marine Engineering Technology (1996). B.S., U.S. Naval Academy, 1980; M.S., George Washington University, 1996.
- Conway, Steven M.**, Senior Lecturer in Maritime Administration (2007). B.S., U.S. Coast Guard Academy, 1975; M.S., University of Bridgeport, 1980; M.P.P.M., Yale School of Management, 1982.
- Curley, Stephen J.**, Professor of General Academics (English) (1973, 1996). B.A., Fordham University, 1968; Ph.D., Rice University, 1974.
- Daigle, David A.**, Lecturer in Naval Science (2006). B.S., Old Dominion University, 2002.
- Davis, Randall W.**, Professor of Marine Biology and Wildlife and Fisheries Sciences* (1990, 1994). B.S., University of California, Riverside, 1974; Ph.D., University of California, San Diego, 1980.
- Davison, Don F.**, C.P.A., Lecturer in Maritime Administration (2002). B.S., Southern Methodist University, 1975; M.A., University of Texas, 1977; M.B.A., Southern Methodist University, 1989.
- Dellapenna, Timothy M.**, Associate Professor of Marine Sciences* and Oceanography* (Geology) (1999). B.S., Michigan State University, 1986; M.S. Western Michigan University, 1993; Ph.D., College of William and Mary, 1999.
- Edwards, Patricia**, Lecturer in Marine Biology (2005). B.S., Texas A&M University at Galveston, 2001; MARM, Texas A&M University at Galveston, 2004.
- English, Thomas T.**, Lecturer in General Academics (Mathematics) (2005). B.S., Penn State University, 1986; M.S., University of New Hampshire, 1991; M.S., University of Houston, 2000.
- Estes III, Ernest L.**, Professor and Interim Department Head of Marine Sciences* (1976, 1987, 2006). B.S., Lawrence University, 1965; M.A., Duke University, 1967; Ph.D., University of North Carolina, 1971.
- Estrada, Joselito K.**, Assistant Professor of Maritime Administration (2005). B.A., Ateneo de Manila University, Philippines, 1985; M.A., Fordham University, 1988; Ph.D., Mississippi State University, 1992.
- Fieglein, J. Michael**, Lecturer in Maritime Administration (1999). B.S.M.E., University of Houston, 1970; J.D., Villanova School of Law, 1974.
- Fieglein, Susan A.**, Lecturer in General Academics (Mathematics) (1999). B.A., College of William and Mary, 1964.
- Fitzhugh III, Thomas C.**, Lecturer in Maritime Administration (1996). B.S., Texas A&M University, 1971; J.D., University of Texas, 1976.
- Folden, Charles A.**, Lecturer in Marine Sciences (1980). B.S., California State University, Long Beach, 1975; M.A., Governors State University, 1979.
- Fredrickson, Henry W.**, Lecturer in Marine Engineering Technology (2005). B.S., Texas A&M University at Galveston, 1968.
- Gilbertson, Michelle L.**, Lecturer in Marine Sciences (2004). B.S., Valparaiso University, 1990; M.S., Northwestern University, 1992; Ph.D., Northwestern University, 1994.
- Glenn Jr., William P.**, Lecturer in Maritime Administration and Marine Transportation (1997). B.S., Texas A&M University, 1981; J.D., Franklin Pierce Law Center, 1992.
- Gonzales, Raquel**, Lecturer in General Academics (Spanish) (2004). B.S., University of Houston, 1968; M.A., University of Houston at Clear Lake, 1977.

- Gracia, Pete A.**, Lecturer in General Academics (Mathematics) (1993). B.S., Lamar University, 1959; M.S., University of Houston at Clear Lake, 1991.
- Griffin, Lawrence L.**, Professor of Marine Sciences* and Oceanography* (1976, 2007). B.A., University of Texas, 1962; M.S., University of Texas, 1965; Ph.D., University of Texas, 1972.
- Hark, John F.**, Lecturer in Maritime Administration (2002). B.S., Texas A&M University, 1989.
- Haupt, Karl H.**, Lecturer in Marine Transportation (1995). B.S., Texas A&M University, 1981. Master of Steam and Motor Vessels of Any Gross Tons Upon Oceans.
- Haymes, William E.**, Lecturer in Marine Sciences and Director of the Physics Laboratory (1989, 1992). B.S., University of Missouri-Rolla, 1964; M.S., University of Missouri-Rolla, 1971; Ph.D., University of Manchester, England, 1976.
- Hickey, Curtis M.**, Lecturer in General Academics (Kinesiology) (2005). B.S., University of Houston, 1996; M.A., University of Houston at Clear Lake, 2002.
- Hite, Gerald E.**, Professor of Marine Sciences* (1980, 1998). B.S., Case Western Reserve, 1962; M.S., University of Illinois, 1965; Ph.D., University of Illinois, 1967; Habilitation, Universitat Kaiserslautern, 1974.
- Hufton, Amie J.**, Lecturer in General Academics (Kinesiology) (2006). B.S., Texas A&M University at Galveston, 2002.
- Iliffe, Thomas M.**, Professor of Marine Biology, Wildlife and Fisheries Sciences* and Oceanography* (1989, 1997). B.S., Penn State University, 1970; M.S., Florida State University, 1973; Ph.D., University of Texas Medical Branch, 1977.
- Ingole, Sudeep P.**, Lecturer in Marine Engineering Technology (2005). B.E., Nagpur University, Nagpur, India, 1999; M.E., Indian Institute of Science, Bangalore, India, 2001; Ph.D., Texas A&M University, 2005.
- Jin, Jun**, Assistant Professor of Maritime Systems Engineering and Civil Engineering* (2003). B.S., Harbin Engineering University, Harbin, China, 1991; M.S., Tianjin University, Tianjin, China, 1994; Ph.D., University of Central Florida, 2002.
- Johnson, Thomas S.**, Associate Professor of General Academics (English) (1974, 1981). B.A., Loyola University of Los Angeles, 1966; M.A., University of California at Los Angeles, 1968; Ph.D., University of Texas, 1973.
- Jones, Glenn A.**, Professor of Marine Sciences* and Oceanography* (1996). B.A., University of Rhode Island, 1977; M.S., Columbia University, 1979; Ph.D., Columbia University, 1983.
- Jones, Victoria L.**, Lecturer in Maritime Systems Engineering, (1993). B.S., Texas A&M University, 1991; M.S., University of Florida, 1993.
- Kang, Cong X.**, Lecturer in General Academics (Mathematics) (2004). B.S., Carnegie Mellon University, 1992; Ph.D., University of Texas, 1999.
- Kanz, James E.**, Associate Professor of Marine Biology and Biology* (1978, 1985). B.A., University of Washington, 1966; Ph.D., Tufts University, 1973.
- Kemery, Frank X.**, Senior Lecturer, Maritime Administration (2008), B.S., St. Joseph's University, 1971; M.S., South Dakota State University, 1973; B.S., Texas A&M University, 1984. Master of Steam and Motor Vessels of Any Gross Tons Upon Oceans.
- Klein, Douglas J.**, Professor of Marine Sciences* and Oceanography* (1979, 1987). B.S., Oregon State University, 1965; M.A., University of Texas, 1967; Ph.D., University of Texas, 1969.
- Knock, Susan L.**, Senior Lecturer in Marine Sciences* and Director of Chemistry Laboratories (1996, 2003). B.A., Colorado State College, 1975; Ph.D., University of Texas Medical Branch, 1988.
- Knox, Kris J.**, C.P.A., Senior Lecturer in Maritime Administration (1984). B.B.A., University of Houston, 1979; M.B.A., University of Houston, 1984; Ph.D., University of Texas Health Science Center at Houston, 1992.
- Ko, Jae-Young**, Assistant Professor of Marine Sciences* (2005). B.A., Hankuk University, Seoul, Korea, 1983; M.A., Hankuk University, Seoul, Korea, 1987; M.A., Syracuse University, 1994; Ph.D., State University of New York, 2000.
- Landry Jr., André M.**, Professor of Marine Biology, Wildlife and Fisheries Sciences* and Marine Sciences* (1977, 1991). B.S., Tulane University, 1968; M.S., Texas A&M University, 1971; Ph.D., Texas A&M University, 1977.
- Lane, John M.**, Lecturer in Maritime Administration (2002). B.S., State University of New York Maritime College, 1965; M.S., University of Houston at Clear Lake, 1978. Master of Steam and Motor Vessels of Any Gross Tons Upon Oceans. First Class Pilot of Vessels of Any Gross Tons (Houston, Bolivar, Texas City).

- Lang, Donna C.**, Lecturer in Maritime Administration, Associate Vice President for Enrollment Management and Educational Outreach (1996, 2007). B.S., Texas A&M University, 1988; M.A. University of Houston at Clear Lake, 1992; Ed.D., University of Houston, 2000.
- Lang Jr., Victor J.**, Lecturer in General Academics (Speech) (1997). B.A., University of Texas, 1960.
- Lawhon, David R.**, Lecturer in General Academics (History) (2003). B.A., University of Houston at Clear Lake, 1995; M.A., University of Houston at Clear Lake, 2000.
- Lesko, Melanie J.**, Senior Lecturer in Marine Sciences* and Associate Department Head (Chemistry) (1983, 1996). Associate Department Head (1996). B.S., Lamar University, 1972; Ph.D., University of Houston, 1977.
- Linton, Thomas L.**, Senior Lecturer in Marine Sciences* and Wildlife and Fisheries Sciences*. (1981, 1989) B.S., Lamar University, 1959; M.S., University of Oklahoma, 1961; Ph.D., University of Michigan, 1965.
- Loftin, R. Bowen**, Professor of Maritime Systems Engineering, Vice President and Chief Executive Officer (2005). B.S., Texas A&M University, 1970; M.A., Rice University, 1973; Ph.D., Rice University, 1975.
- Louchouart, Patrick**, Associate Professor of Marine Sciences* (2006). B.S., McGill University, Montreal, Quebec, Canada, 1989; M.S., Université du Québec à Montréal, 1992; Ph.D., Université du Québec à Montréal, 1997.
- Luxemburg, Leon A.**, Assistant Professor of General Academics (Mathematics) (1990, 2005). M.S., The Mari State Teacher's Training Institute (MGPI), Russia, 1973; M.S., University of Kentucky, 1983; Ph.D., Texas A&M University, 1987.
- Maack, Pamela A.**, Lecturer in General Academics (Anthropology)(2008). B.A., University of Virginia, 1982; Ph.D., Northwestern University, 1992.
- Maceo, Debra A.**, Senior Lecturer in General Academics (Kinesiology) (1994, 2003). B.S., Lamar University, 1975; M.A., University of Houston, 1995.
- Mark, Samuel E.**, Associate Professor of General Academics (Anthropology*/Archeology) (2001, 2006). B.S., Ball State University, 1980; M.A., Texas A&M University, 1993; Ph.D., Texas A&M University, 2000.
- Marshall, Christopher D.**, Associate Professor of Marine Biology and Wildlife and Fisheries Science* (2001). B.S., Virginia Polytechnic Institute and State University, 1990; M.S., Nova Southeast University Oceanographic Center, 1992; Ph.D., University of Florida, 1997.
- Martinez, Rudy D., P.E.**, Lecturer in Marine Engineering Technology (2006). B.B.A., Sam Houston State University, 1972; B.S., Lamar University, 1984; M.S., University of South Carolina, 1996; Ph.D., University of South Carolina, 2004.
- McCloy, James M.**, Professor of Marine Sciences,* Maritime Administration and Geography* (1971, 1984). B.A., State College at Los Angeles, 1961; Ph.D., Louisiana State University, 1969.
- McGonagle, W. Brad**, Lecturer in Maritime Administration (2001). B.B.A. Texas A&M University, 1990; B.B.A., Texas A&M University, 1992; M.S., Texas A&M University, 1993; Ph.D., Texas A&M University, 1996.
- McMullen, Peggy L.**, Lecturer and Library Archivist (2004). B.Mus., St. Olaf College, 1963; M.Mus., University of Houston, 1979; M.S.L.S., Long Island University, 1987.
- McMullen, William T.**, Professor and Department Head of Maritime Administration, Professor of Marine Sciences* and Interim Department Head of Marine Transportation, (1995, 2000). B.S., State University of New York Maritime College, 1964; M.B.A., University of Houston, 1973; Ph.D., University of Wales, 1993. Master of Steam and Motor Vessels of Any Gross Tons Upon Oceans.
- Merrell, Jr., William J.**, Professor of Marine Sciences,* (1987, 1992), B.S., Sam Houston State University, 1965; M.A., Sam Houston State University, 1967; Ph.D. Texas A&M University, 1971.
- Metz, Tasha L.**, Lecturer in Marine Biology (2006). B.S., Texas Christian University, 1995; M.S., Texas Christian University, 1997; Ph.D., Texas A&M University, 2004.
- Mileski, Joan P.**, C.P.A., Associate Professor of Maritime Administration and Marine Sciences* (2004). B.B.A., University of Notre Dame, 1979; M.S., Pace University, 1983; Ph.D., University of Texas at Dallas, 2000.
- Miller, Martin C.**, Visiting Associate Professor in Maritime Systems Engineering (2007). B.S., U.S. Coast Guard Academy, 1964; M.A.L.S., Wesleyan University, 1969; M.S., The George Washington University, 1970; Ph.D. Oregon State University, 1977.
- Miller, Michael B.**, Lecturer in Marine Transportation (2001). B.S. Texas A&M University, 1981. Master of Steam and Motor Vessels of Any Gross Tons Upon Oceans. First Class Pilot of Vessels of Any Gross Tons (Freeport).
- Mohler, Robert R.**, Lecturer in Marine Sciences (2001). B.S., University of Toledo, 1975; M.A., University of Toledo, 1977; M.S. University of Nevada at Reno, 1979; M.S., University of Houston at Clear Lake, 1981; Ph.D., Texas A&M University, 1994.
- Oertling, Thomas J.**, Lecturer in General Academics (Nautical Archaeology) (2000). B.S., Tulane University, 1977; M.A., Texas A&M University, 1984.

- O'Neal, Clifford C.**, Lecturer in Marine Biology (2007). B.S., Texas A&M University at Galveston, 1996; M.S., Louisiana State University, 2000; Ph.D., Southern Illinois University at Carbondale, 2005.
- Panchang, Vijaykumar G.**, Department Head and Professor of Maritime Systems Engineering, Department Head of Marine Engineering Technology, Professor of Civil Engineering.* (2002). B.S., University of Poona, India, 1980; M.S., University of Maine, 1982; Ph.D., University of Maine, 1985.
- Pearl, Frederic B.**, Associate Professor of General Academics and Marine Sciences* (Anthropology) (2000, 2007). B.A., San Diego State University, 1991; M.A., Texas A&M University, 1997; Ph.D., Texas A&M University, 2001.
- Penuel, Victor B.**, Lecturer in General Academics (English) (1994). B.A., University of Houston at Clear Lake, 1989; M.A., University of Houston at Clear Lake, 1994.
- Quigg, Antonietta S.**, Assistant Professor of Marine Biology, Oceanography* and Marine Sciences.* (2003). B.S., Chemistry, La Trobe University, Australia, 1989; B.S., Biochemistry, La Trobe University, Australia, 1990; Ph.D., Monash University, Australia, 2000.
- Radford, Melisa**, Lecturer in General Academics (English) (2006). B.A., University of Houston at Clear Lake, 2004; M.A., University of Houston at Clear Lake, 2004.
- Ravandi, Ali**, Lecturer in General Academics (Mathematics) (2004), B.E., Pahlavi International University, Iran, 1978; M.S., Mississippi State University, 1981; Ph.D., Mississippi State University, 1983.
- Ray, Sammy M.**, Professor Emeritus of Marine Biology and Wildlife and Fisheries Sciences* (1959)(1990). B.S., Louisiana State University, 1942; M.S., Rice University, 1952; Ph.D., Rice University, 1954.
- Rooker, Jay R.**, Associate Professor of Marine Biology, Wildlife and Fisheries Sciences* and Marine Sciences* (1998). B.A., Gustavus Adolphus College, 1985; M.S., University of Puerto Rico, 1991; Ph.D., University of Texas, 1997.
- Roth, Augusta D.**, Lecturer in Marine Transportation (2000). B.S., Texas A&M University, 1996. Master of Steam and Motor Vessels of Any Gross Tons Upon Oceans.
- Rowe, Gilbert T.**, Professor of Marine Biology and Oceanography* and Associate Vice President of Academic Affairs and Chief Academic Officer (2003, 2007). B.S., Texas A&M University, 1964; M.S., Texas A&M University, 1966; Ph.D., Duke University, 1968.
- Ryan, James G.**, Professor of General Academics (History) (1990, 1996). B.A., University of Delaware, 1970; M.A., University of Delaware, 1973; M.A., University of Notre Dame, 1975; Ph.D., University of Notre Dame, 1981.
- Santschi, Peter H.**, Professor of Marine Sciences* and Oceanography*(1988). B.S., Gymnasium Berne, Switzerland, Matura, 1963; M.S., University of Berne, 1971; Ph.D., University of Berne, 1975; Privatdozent, Switzerland Federal Institute of Technology, 1984.
- Schlemmer II, Frederick C.**, Associate Professor of Marine Sciences* and Oceanography* (1978, 1985). B.S., U.S. Naval Academy, 1965; M.A., University of South Florida, 1971; Ph.D., Texas A&M University, 1978.
- Schmalz, Thomas G.**, Professor of Marine Sciences* and Oceanography* (1981, 1996). B.S., Montana State University, 1970; Ph.D., University of Illinois, 1975.
- Schulze, Anja**, Assistant Professor of Marine Biology and Oceanography.* (2006). Diplom, University of Bielefeld, Germany, 1995; Ph.D., University of Victoria, Canada, 2001.
- Schwarz, John R.**, Interim Department Head and Professor of Marine Biology and Oceanography,* (1976, 1986). B.S., Rensselaer Polytechnic Institute, 1967; Ph.D., Rensselaer Polytechnic Institute, 1972.
- Seitz, William A.**, Professor of Marine Sciences* and Oceanography* (1977, 2002), Associate Vice President for Research and Graduate Studies (2006). B.A., Rice University, 1970; Ph.D., University of Texas at Austin, 1973.
- Shannon, Roderick**, Lecturer in Naval Science (2004), B.B.A., East Texas State University, 1986; M.B.A., University of Dallas, 2002.
- Shepherd, Beth**, Lecturer in General Academics (Kinesiology) (2005). B.S., Slippery Rock University, 1982; M.A., Southwest Texas State University, 1989.
- Sindylek, Robert A.**, Lecturer in General Academics (Psychology) (2006). B.S., Excelsior College-The University of the State of New York, 1993; M.A., University of Houston at Clear Lake, 1995; Ed.D., Argosy-University of Sarasota, 2000.
- Slatton, Katie, J.**, Lecturer in General Academics (Kinesiology) (2003). B.S., University of Montevallo, 1999; M.A., University of Montevallo, 2003.

- Smith, Jack H.**, Senior Lecturer in Marine Transportation (2003). B.S., Texas A&M University at Galveston, 1966. Master of Steam and Motor Vessels of Any Gross Tons Upon Oceans. First Class Pilot of Vessels of Any Gross Tons (Houston, Bolivar, Texas City).
- Suen, Ching Y.**, Professor of General Academics (Mathematics) (1984, 1998). M.S., Tsing Hua University, 1978; Ph.D., University of Houston, 1983.
- Sweetman, John A.**, P.E., Assistant Professor of Maritime Systems Engineering and Civil Engineering* (2003). B.S., University of Michigan, 1986; M.E., Texas A&M University, 1987; Ph.D., Stanford University, 2001.
- Szucs, Joseph M.**, Professor and Interim Department Head of General Academics (Mathematics) (1980, 1991, 2006). M.S., Szeged University, 1965; Ph.D., Szeged University, 1967.
- Theis, William D.**, Lecturer in General Academics (English) (2005). B.A., University of Texas, 1978; M.A., University of Houston, 1988.
- Thraikill, Robert L.**, Lecturer in Marine Transportation (2006). B.S., Texas A&M University at Galveston, 1969. Master of Steam and Motor Vessels of Any Gross Tons Upon Oceans.
- Townsend, Grace L.**, Senior Lecturer in Marine Sciences (2001). B.S., Texas A&M University, 1981; M.S., University of Houston at Clear Lake, 1983.
- Traber, Daniel S.**, Associate Professor of General Academics, (English) (2001, 2007). B.A., University of Texas, Austin, 1991; M.A., University of Texas, El Paso, 1995, Ph.D., University of Houston, 2000.
- Treglia, Vincent A.**, P.E., Lecturer in Marine Engineering Technology (2001). B.S., State University of New York Maritime College, 1966. First Assistant Engineer of Steam Vessels of Any Horsepower.
- Turner, Elizabeth A.**, Lecturer in General Academics (CAEX Courses) (1997). B.S., University of Houston, Clear Lake, 1992.
- Varadarjan, Nadathur**, Lecturer in Maritime Systems Engineering (2008). B.E., Birla Institute of Technology and Science, 1989; M.S., Birla Institute of Technology and Science, 1991; Ph.D., Rice University, 2004.
- von Zharen, Wyndlyn M.**, Professor of Maritime Administration and Marine Sciences*, Wildlife and Fisheries Sciences* and Oceanography* (1990, 2000). B.A., University of Florida, 1970; M.Ed., University of Florida, 1971; Ed.D., University of Florida, 1976; J.D., University of South Carolina Law School, 1987; L.L.M., University of Texas, 1998.
- Waddell Jr., Mathis T.**, Lecturer in General Academics (Political Science) (1995). B.A., University of Texas, 1962; M.A., University of Texas, 1963.
- Wade, Beth**, Lecturer in General Academics (English) (1999). B.A., University of Texas, 1984; M.P.A., University of Texas, 1986; M.L.A., University of St. Thomas, 1997.
- Wardle, William J.**, Lecturer in Marine Biology (1973, 2003). B.S., Lynchburg College, 1963; M.S., Texas A&M University, 1970; Ph.D., Texas A&M University, 1974.
- Warnakulasuriya, Frank S. K.**, Senior Lecturer in Marine Engineering Technology (2003). B.S., University of Moratuwa, Sri Lanka, 1987; M.S., University of Illinois at Chicago, 1997; Ph.D., University of Illinois at Chicago, 1999.
- Wickliffe, Jeffrey K.**, Lecturer in General Academics (Philosophy) (2004). B.S., Texas A&M University, 1991; M.S., Texas A&M University, 1997; Ph.D., Texas Tech University, 2002.
- Wiest, Natalie H.**, Lecturer and Library Director (1982). B.A., Pennsylvania State University, 1971; M.S., Drexel University, 1973; M.S., University of Tennessee, 1980.
- Willett, Donald E.**, Associate Professor of General Academics (History) (1985, 1993). B.A., St. Edward's University, 1972; M.A., Stephen F. Austin University, 1976; Ph.D., Texas A&M University, 1985.
- Withoff, Alan B.**, Lecturer and Public Services Librarian (2003). B.A., Southern Methodist University, 1979; M.L.S., University of North Texas, 1989.
- Wursig, Bernd G.**, Professor of Marine Biology and Wildlife and Fisheries Sciences* (1989). B.A., College of New Rochelle, 1969; B.S., Ohio State University, 1971; Ph.D., State University of New York, Stony Brook, 1978.
- Yalamanchili, Rattaya**, Lecturer in Maritime Systems Engineering (2008). B. Tech., Anna University, 1984; M.S., University of Pittsburgh, 1987; Ph.D., University of Pittsburgh, 1992.
- Yi, Eunjeong**, Assistant Professor in General Academics (Mathematics) (2003, 2006). B.S., Pusan National University, Pusan, South Korea, 1995; M.S., University of Houston, 2000; Ph.D., University of Houston, 2003.

Distinguished Professors

Adkisson, Perry Lee, Distinguished Professor Emeritus of Entomology and Chancellor Emeritus.

Armstrong, Robert B., Distinguished Professor Emeritus of Health and Kinesiology and Holder of the Omar Smith Chair in Health and Kinesiology.

Arnowitz, Richard L., Distinguished Professor Emeritus of Physics.

Bass, George F., Distinguished Professor Emeritus of Anthropology and Holder of the George T. and Gladys H. Abell Chair in Nautical Archaeology and the George O. Yamini Family Chair in Liberal Arts.

Bazer, Fuller W., Distinguished Professor of Animal Science and of Veterinary Integrative Biosciences; Associate Vice President for Research; and Holder of the O. D. Butler Endowed Chair in Animal Science.

Berry, Leonard L., Distinguished Professor of Marketing and Holder of the M. B. Zale Chair in Retailing and Marketing Leadership.

Bockris, John O'M. (retired), Distinguished Professor of Chemistry.

Borlaug, Norman E., Distinguished Professor of International Agriculture; Professor of Soil and Crop Sciences; and Holder of the Eugene Butler Endowed Chair in Agricultural Biotechnology.

Bramble, James H., Distinguished Professor Emeritus of Mathematics.

Calhoun, John C., Jr., Distinguished Professor Emeritus, Harold Vance Department of Petroleum Engineering.

Carroll, Raymond J., Distinguished Professor of Statistics and Professor of Nutrition and of Toxicology.

Chui, Charles K. T., Distinguished Professor Emeritus of Mathematics and of Computer Science.

Clearfield, Abraham, Distinguished Professor of Chemistry.

Crompton, John L., Distinguished Professor of Recreation, Park and Tourism Sciences.

Douglas, Ronald G., Distinguished Professor of Mathematics.

Duce, Robert A., Distinguished Professor of Oceanography and of Atmospheric Sciences.

Edwards, George C. III, Distinguished Professor of Political Science and Holder of the George and Julia Blucher Jordan Chair in Presidential Studies, The George Bush School of Government and Public Service.

Ezell, Margaret, Distinguished Professor of English and Holder of the John Paul Abbott Professorship in Liberal Arts.

Fackler, John P., Jr., Distinguished Professor of Chemistry, of Toxicology and of Materials Science and Engineering.

Flipse, John E., P.E., Distinguished Professor Emeritus of Civil Engineering and of Ocean Engineering, and Director Emeritus of the Offshore Technology Research Center.

Golden, Susan S., Distinguished Professor of Biology.

Golsan, Richard J., Distinguished Professor of European and Classical Languages and Cultures and Head of Department.

Goodman, D. Wayne, Distinguished Professor of Chemistry; Professor of Materials Science and Engineering; and Holder of the Robert A. Welch Chair in Chemistry.

Granger, Harris J., Distinguished Professor and Head, Department of Systems Biology and Translational Medicine, and Director of the College of Medicine's Cardiovascular Institute.

Greenhut, Melvin L., Distinguished Professor Emeritus of Economics.

Griffin, Ricky W., Distinguished Professor of Management; Executive Associate Dean, Mays Business School; and Holder of the Jeanne and John R. Blocker Chair in Business Administration.

Grigorochuk, Rostislav, Distinguished Professor of Mathematics.

- Hall, Timothy C.**, Distinguished Professor of Biology, of Genetics, of Molecular and Environmental Plant Sciences, and of Biotechnology; and Director, Institute for Developmental and Molecular Biology.
- Han, Je-Chin**, Distinguished Professor of Mechanical Engineering, and Holder of the Marcus C. Easterling Chair in Mechanical Engineering.
- Hardy, John C.**, Distinguished Professor of Physics.
- Harris, William J., Jr., P.E.**, Distinguished Professor Emeritus of Civil Engineering.
- Hitt, Michael A.**, Distinguished Professor of Management and Holder of the Joe B. Foster '56 Chair in Business Leadership and the C. W. and Dorothy Conn Chair in New Ventures Leadership.
- Johnson, Arthur E.**, Professor of Molecular and Cellular Medicine and of Biochemistry and Biophysics, and Distinguished Professor of Chemistry and Holder of the Wehner-Welch Chair in Chemistry.
- Johnson, William B.**, Distinguished Professor of Mathematics and Joint Holder of the Arthur George and Mary Emolene Owen Chair in Mathematics.
- Junkins, John L., P.E.**, Distinguished Professor, Department of Aerospace Engineering; Holder of the George J. Eppright Chair in Engineering; and Director, Center of Mechanics and Control.
- Kaplan, Howard B.**, Distinguished Professor of Sociology and Holder of the Mary Thomas Marshall Professorship in Liberal Arts.
- Kocharovskaya, Olga**, Distinguished Professor of Physics. Kettleborough, Charles Fred, P.E., Distinguished Professor Emeritus, Department of Mechanical Engineering.
- Koepke, Wulf**, Distinguished Professor Emeritus of Modern and Classical Languages.
- Lincoln, Yvonna S.**, Distinguished Professor of Educational Administration and Human Resource Development, and Holder of the Ruth Harrington Chair in Educational Leadership.
- Loving, Jerome M.**, Distinguished Professor of English.
- Lunsford, Jack Horner**, Distinguished Professor Emeritus of Chemistry.
- Macfarlane, Ronald D.**, Distinguished Professor of Chemistry.
- McCarl, Bruce A.**, Distinguished Professor of Agricultural Economics.
- McDermott, John J.**, Distinguished Professor of Philosophy and Humanities and of Humanities in Medicine; Presidential Professor for Teaching Excellence; and Holder of the George T. and Gladys H. Abell Professorship in Liberal Arts.
- Meier, Kenneth J.**, Distinguished Professor of Political Science and Holder of the Charles H. Gregory Chair in Liberal Arts.
- Meserole, Harrison T.**, Distinguished Professor of English (Retired).
- Nanopoulos, Dimitri V.**, Distinguished Professor of Physics and Holder of the Mitchell-Heep Chair in Theoretical High Energy Physics.
- Natowitz, Joseph Bernard**, Distinguished Professor of Chemistry and Holder of Cyclotron Institute Bright Chair in Nuclear Science.
- North, Gerald R.**, Distinguished Professor of Atmospheric Sciences and of Oceanography; Professor of Water Management and Hydrological Science; and Inaugural Holder of the Harold J. (Bill) Haynes '46 Chair in Geosciences.
- Nowlin, Worth Dabney, Jr.**, Distinguished Professor of Oceanography.
- Parzen, Emanuel**, Distinguished Professor of Statistics.
- Pisier, Gilles**, Distinguished Professor of Mathematics and Joint Holder of the Arthur George and Mary Emolene Owen Chair in Mathematics.
- Pokrovsky, Valery L.**, Distinguished Professor of Physics.
- Pope, Christopher N.**, Distinguished Professor of Physics and Holder of the Stephen Hawking Chair in Fundamental Physics.
- Quantrill, Malcolm W. F.**, Distinguished Professor of Architecture.

958 Distinguished Professors

Rajagopal, Kumbakonam R., Distinguished Professor, Departments of Mechanical Engineering, Biomedical Engineering, Civil Engineering and Mathematics; Professor of Materials Science and Engineering; and Holder of the James M. Forsyth Chair in Mechanical Engineering.

Reddy, J. N., P.E., Distinguished Professor, Departments of Mechanical Engineering, Civil Engineering and Aerospace Engineering, and of Mathematics; Professor of Materials Science and Engineering; and Holder of the Oscar S. Wyatt, Jr., '45 Endowed Chair in Mechanical Engineering.

Reid, Robert Osborne, Distinguished Professor Emeritus of Oceanography.

Richardson, Herbert H., P.E., Distinguished Professor and Regents Professor, Department of Mechanical Engineering.

Safe, Stephen H., Distinguished Professor of Veterinary Physiology and Pharmacology and of Toxicology; Professor of Biochemistry and Biophysics, of Genetics and of Biotechnology; and Holder of the Sid Kyle Endowed Chair in Veterinary Toxicology.

Saric, William S., Distinguished Professor, Department of Aerospace Engineering, and Holder of the Stewart and Stevenson Services, Inc. Endowed Professorship II in Engineering.

Saving, Thomas R., Distinguished Professor of Economics; Director, Private Enterprise Research Center; and Holder of the Private Enterprise Research Center Jeff Montgomery Professorship.

Sawyer, Donald T., Distinguished Professor Emeritus of Chemistry.

Scully, Marlan O., Distinguished Professor of Physics; Professor of Materials Science and Engineering and Chemical Engineering; Director, Center for Theoretical Physics; Director, Institute for Quantum Studies; and Holder of the Hershel E. Burgess Chair in Non-High Energy Physics and the TEES Distinguished Research Chair.

Summers, Max D., Distinguished Professor of Entomology; Professor of Biochemistry and Biophysics, of Genetics, and of Biology; Director, Center for Advanced Insect Molecular Services; and Holder of the Endowed Chair in Agricultural Biotechnology.

Thompson, Bruce, Distinguished Professor of Educational Psychology and Distinguished Professor of Library Science.

Varadarajan, P. Rajan, Distinguished Professor of Marketing and Holder of the Ford Chair in Marketing and E-Commerce.

Welch, Finis, Distinguished Professor Emeritus of Economics.

Wilmore, Jack H., Distinguished Professor of Health and Kinesiology.

Womack, James E., Distinguished Professor of Veterinary Pathobiology, of Medical Biochemistry and Medical Genetics, and of Genetics; and Holder of the W. P. Luse Endowed Professorship in Veterinary Medicine.

Endowed Chairs and Professorships

- Adams, H. Richard**, Dean, College of Veterinary Medicine and Biomedical Sciences; Professor of Veterinary Physiology and Pharmacology; and Holder of the Carl B. King Deanship in Veterinary Medicine
- Adams, Ralph James Q.**, Professor of History and Holder of the Patricia and Bookman Peters Professorship in History
- Alfriend, Kyle T.**, Professor, Department of Aerospace Engineering, and Holder of the Royce E. Wisenbaker '39 Chair II in Engineering and the TEES Distinguished Research Chair
- Anderson, Evan E.**, Professor of Information and Operations Management and Holder of the E. D. Brockett Professorship in Business Administration
- Anderson, Stuart D.**, Professor, Zachry Department of Engineering and Holder of the Zachry Professorship in Design and Construction Integration II
- Annamalai, Kalyan, P.E.**, Professor, Department of Mechanical Engineering and Holder of the G. Paul Pepper Professorship in Mechanical Engineering
- Anthony, Rayford Gaines, P.E.**, Professor, Artie McFerrin Department of Chemical Engineering; TEES Senior Fellow; and Holder of the Charles D. Holland Professorship in Chemical Engineering
- Armstrong, Robert B.**, Distinguished Professor Emeritus of Health and Kinesiology and Holder of the Omar Smith Chair in Health and Kinesiology
- Atkins, Stephen**, Professor of Library Science and Holder of the Dorothy G. Whitley Endowed Professorship
- Autenrieth, Robin L., P.E.**, Professor, Zachry Department of Civil Engineering, of Toxicology, of Water Management and Hydrological Science and of Environmental and Occupational Health, and Holder of the A. P. and Florence Wiley Professorship III in Civil Engineering
- Back, Kerry E.**, Professor of Finance; Holder of the Jerry and Kay Cox Endowed Chair in Business; and Holder of the Thomas W. Leland Memorial Chair in Finance
- Balbuena, Perla B.**, Professor, Artie McFerrin Department of Chemical Engineering, and Holder of the Gas Processors Suppliers Association (GPSA) Endowed Professorship in Chemical Engineering
- Baltagi, Badi H.**, Professor of Economics and Holder of the George Summey, Jr. Professorship in Liberal Arts
- Bass, George F.**, Distinguished Professor Emeritus of Anthropology and Holder of the George T. and Gladys H. Abell Chair in Nautical Archaeology and the George O. Yamini Family Chair in Liberal Arts
- Batchelor, Bill, P.E.**, Professor, Zachry Department of Civil Engineering, and of Water Management and Hydrological Science, and Inaugural Holder of the Endowed Arthur McFarland Professorship in Engineering
- Bauer, John E.**, Professor of Veterinary Small Animal Clinical Sciences and of Nutrition and Holder of the Mark L. Morris Professorship in Veterinary Clinical Nutrition
- Bazer, Fuller W.**, Distinguished Professor of Animal Science and of Veterinary Integrative Biosciences; Associate Vice President for Research; and Holder of the O. D. Butler Endowed Chair in Animal Science
- Benjamin, James J., C.P.A.**, Professor of Accounting and Head of Department and Holder of the Arthur Andersen and Company Former Students Professorship in Accounting
- Benjamin, Ludy T., Jr. C.P.A.**, Professor of Psychology and of Educational Psychology and Holder of the Glasscock University Professorship in Undergraduate Teaching Excellence
- Berry, Leonard L.**, Distinguished Professor of Marketing and Holder of the M. B. Zale Chair in Retailing and Marketing Leadership
- Bevan, John W.**, Professor of Chemistry and Joint Holder of the C. J. Davidson Chair in Science
- Bhattacharyya, Shankar P., P.E.**, Professor, Department of Electrical and Computer Engineering; Inaugural Holder of the Robert M. Kennedy '26 Professorship II in Electrical Engineering; TEES Fellow; and IEEE Fellow
- Bilbo, David L.**, Professor of Construction Science and Holder of the Clark Construction Group, Inc., Endowed Professorship in Construction Science
- Blackwell, David W.**, Professor of Finance and Head of Department and Holder of the James W. Aston/Republic Bank Professorship in Finance
- Blasingame, Thomas A., P.E.**, Professor, Harold Vance Department of Petroleum Engineering, and Holder of the Robert L. Whiting Professorship for Teaching Excellence in Petroleum Engineering, and Professor of Geology and Geophysics
- Borlaug, Norman E.**, Distinguished Professor of International Agriculture; Professor of Soil and Crop Sciences; and Holder of the Eugene Butler Endowed Chair in Agricultural Biotechnology

960 Endowed Chairs and Professorships

- Bowen, Ray M., P.E.**, Professor, Department of Mechanical Engineering, and Holder of the John H. Lindsey Chair in The George Bush School of Government and Public Service
- Briaud, Jean-Louis, P.E.**, Professor, Zachry Department of Civil Engineering, and Holder of the Spencer J. Buchanan Chair in Civil Engineering
- Bryant, William R.**, Professor of Oceanography, and Holder of the Enron Oil and Gas Teaching Professorship
- Buchanan, Walter W., P.E.**, Professor and Head, Department of Engineering Technology and Industrial Distribution; Inaugural Holder of the J. R. Thompson Department Head Chair in Engineering Technology and Industrial Distribution at Texas A&M University (2005); ASEE Fellow; and NSPE Fellow
- Bukur, Dragomir B., P.E.**, Professor, Artie McFerrin Department of Chemical Engineering; Holder of the Joe M. Nesbitt Professorship in Chemical Engineering; and TEES Senior Fellow
- Burchill, William E.**, Professor, Department of Nuclear Engineering, and Holder of the Heat Transfer Research Incorporated Endowed Professorship in Engineering
- Burgess, Kevin**, Professor of Chemistry and Holder of the Rachal Professorship in Chemistry
- Burt, Richard A.**, Associate Professor of Construction Science and Holder of the James C. Smith/CIAC Endowed Professorship
- Byrne, David Hawkins**, Professor of Horticultural Sciences and Holder of the Robert E. Basye Chair in Rose Genetics
- Capps, Oral, Jr.**, Professor of Agricultural Economics; Member of Intercollegiate Faculty of Agribusiness; and Holder of the Southwest Dairy Marketing Chair
- Carlson, Deborah N.**, Assistant Professor of Anthropology and Holder of the Sara W. and George O. Yamini Professorship in Nautical Archaeology
- Carlson, Richard L.**, Regents Professor of Geology and Geophysics and Holder of the Dudley J. Hughes Endowed Chair in Geology and Geophysics
- Carrigan, Esther E.**, Professor; Director, Medical Sciences Library; Associate Dean, Texas A&M University Libraries; and Holder of the Lila B. King Estate Professorship
- Carter, Norvella P.**, Professor of Teaching, Learning and Culture and Holder of the Houston Endowment, Inc. Chair in Urban Education
- Chang, Kai, P.E.**, Professor, Department of Electrical and Computer Engineering; IEEE Fellow; Director, Microwave and Electromagnetic Laboratory; and Holder of the TI Chair in Analog Engineering and the Raytheon Company Professorship in Electrical Engineering
- Chapman, David L.**, Professor of Library Science; University Archivist; and Holder of the Mary and Mavis Kelsey Cushing Library Endowed Professorship
- Chilcoat, Richard A., Lt. Gen., USA (Ret)**, Dean of The George Bush School of Government and Public Service and Holder of the Edward and Howard Kruse Endowed Chair for the Dean of the Bush School
- Childs, Dara W., P.E.**, Regents Professor, Department of Mechanical Engineering; Director, Turbomachinery Laboratory; TEES Senior Fellow; and Inaugural Holder of the Leland T. Jordan '29 Endowed Chair in Mechanical Engineering
- Claridge, David E., P.E.**, Professor, Department of Mechanical Engineering; and Holder of the Leland T. Jordan Professorship in Mechanical Engineering
- Cocanougher, A. Benton**, Professor of Marketing; Dean Emeritus, Mays Business School; and Holder of the Earline and A. P. Wiley Professorship in Business Administration
- Conner, J. Richard**, Professor of Agricultural Economics and of Ecosystem Science and Management and Holder of the Thomas M. O'Connor Professorship in Range Science
- Cook, C. Colleen**, Professor of Library Science; Dean of Texas A&M University Libraries; and Holder of the Sterling C. Evans Endowed Chair and the John L. and Mary T. Wright Endowed Library Professorship
- Cooper, S. Kerry**, Professor of Finance; Executive Director, Center for International Business Studies; and Holder of the Cullen Trust for Higher Education Chair in Business Administration in Honor of Sidney V. Smith '44
- Cote, Gerard L.**, Professor and Head, Department of Biomedical Engineering; Professor of Materials Science and Engineering; and Inaugural Holder of the Charles H. and Bettye Barclay Professorship in Engineering
- Cremer, Paul S.**, Professor of Chemistry and Joint Holder of the C.J. Davidson Chair in Science

- Daniel, Stephen**, Professor of Philosophy and Humanities; and Holder of the Murray and Celeste Fasken Chair in Distinguished Teaching in Liberal Arts
- Datta, Aniruddha**, Professor, Department of Electrical and Computer Engineering, and Holder of the J. W. Runyon, Jr. '35 Professorship II
- Datta-Gupta, Akhil, P.E.**, Professor, Harold Vance Department of Petroleum Engineering, and Inaugural Holder of the LeSuer Chair in Reservoir Management
- Desch, Michael C.**, Professor, The George Bush School of Government and Public Service, and Holder of the Robert M. Gates Chair in Intelligence and National Security Decision-Making
- Dougherty, Edward R.**, Professor, Department of Electrical and Computer Engineering; International Society of Optical Engineering Fellow; and Holder of the Robert M. Kennedy '26 Chair in Electrical Engineering
- Dunbar, Kim R.**, Professor of Chemistry and of Materials Science and Engineering and Joint Holder of the C. J. Davidson Chair in Science
- Eddy, James M.**, Professor of Health and Kinesiology and Interim Head of Department, and Holder of the Thomas A. and Joan Read Chair for Disadvantaged Youth
- Edge, Billy L.**, Professor, Zachry Department of Civil Engineering; Program Head of Ocean Engineering; and Holder of the W. H. Bauer Professorship in Dredging Engineering
- Edwards, George C. III**, Distinguished Professor of Political Science and Holder of the Julia von Blucher and George R. Jordan, Jr. Endowed Chair for the Center in Presidential Studies, The George Bush School of Government and Public Service
- Ehlig-Economides, Christine A.**, Professor, Harold Vance Department of Petroleum Engineering, and Holder of the Albert B. Stevens Endowed Chair in Petroleum Engineering
- Ehsani, Mehrdad, P.E.**, Professor, Department of Electrical and Computer Engineering; Inaugural Holder of the Robert M. Kennedy '26 Professorship I in Electrical Engineering; and IEEE Fellow
- El-Halwagi, Mahmoud M.**, Professor, Artie McFerrin Department of Chemical Engineering, and Holder of the McFerrin Professorship in Chemical Engineering
- Enjeti, Prasad, P.E.**, Professor, Department of Electrical and Computer Engineering; IEEE Fellow; and Inaugural Holder of the TI Professorship in Engineering
- Ezell, Margaret J.M.**, Distinguished Professor of English and Holder of the John Paul Abbott Professorship in Liberal Arts
- Feagin, Joe R.**, Professor of Sociology; and Holder of the Ella C. McFadden Professorship in Liberal Arts
- Fletcher, Leroy S., P.E.**, Regents Professor, Department of Mechanical Engineering, and Holder of the Thomas A. Dietz Memorial Professorship in Mechanical Engineering
- Flores, Benito E.**, Professor of Information and Operations Management and Holder of the Tenneco Professorship in Business Administration
- Ford, David M.**, Associate Professor, Artie McFerrin Department of Chemical Engineering, and of Materials Science and Engineering, and Holder of the Kenneth R. Hall Endowed Professorship in Chemical Engineering
- Fossum, Theresa W.**, Professor of Veterinary Small Animal Clinical Sciences and Holder of the Tom and Joan Read Chair in Veterinary Surgery
- Fraser, Donald R.**, Professor of Finance and Holder of the Hugh Roy Cullen Chair in Business Administration
- Fry, Edward Strauss**, Professor of Physics and Head of Department; Professor of Materials Science and Engineering; and Holder of the George P. Mitchell '40 Chair in Experimental Physics
- Gage, E. Dean**, Professor Emeritus of Veterinary Small Animal Medicine and Surgery, and Holder of the Charles H. and Mildred Kruse Bridges Chair in Veterinary Medical Education
- Gawande, Kishore S.**, Associate Professor, The George Bush School of Government and Public Service, and Holder of the Helen and Roy Ryu Chair in International Affairs
- Georgiades, Costas N., P.E.**, Professor, Department of Electrical and Computer Engineering, and Head of Department; Holder of the Delbert A. Whitaker Chair in Electrical Engineering; and IEEE Fellow
- Ghassemi, Ahmad**, Associate Professor, Harold Vance Department of Petroleum Engineering, and Holder of the George and Joan Voneiff Development Professorship in Petroleum Engineering
- Giroux, Gary A., C.P.A.**, Professor of Accounting and Holder of the Deborah D. Shelton Accounting Systems Professorship
- Gladysz, John A.**, Distinguished Professor of Chemistry and Holder of the Dow Chair of Chemical Invention

962 Endowed Chairs and Professorships

- Goebel, Frank E.**, Associate Professor of Anthropology; Associate Director, Center for the Study of the First Americans; and Holder of the Center for the Study of the First Americans Professorship in Liberal Arts
- Gold, Roger E.**, Professor of Entomology and Holder of the Endowed Chair in Urban Entomology
- Goodman, D. Wayne**, Distinguished Professor of Chemistry; Professor of Materials Science and Engineering; and Holder of the Robert A. Welch Chair in Chemistry
- Graham, Charles W.**, AIA, Professor and Interim Head, Department of Construction Science, and Holder of the HistoryMaker Homes Endowed Professorship in Construction Science, Emphasizing the Role of Visualization in the Discipline of Residential Construction
- Grau, James W.**, Professor of Psychology and Holder of the Mary Tucker Currie Professorship in Liberal Arts
- Greer, John Only**, FAIA, Professor of Architecture and Holder of the Wallie E. Scott, Jr. Professorship in Architectural Practice and Management
- Griffin, James M.**, Professor of The George Bush School of Government and Public Service, and Holder of the Bob Bullock Chair in Public Policy and Finance
- Griffin, Ricky W.**, Distinguished Professor of Management; Executive Associate Dean, Mays Business School; and Holder of the Jeanne and John R. Blocker Chair in Business Administration
- Grossman, Ethan L.**, Professor of Geology and Geophysics and Holder of the Mollie B. and Richard A. Williford Professorship in Petroleum Geology
- Gyszly, Suzanne**, Professor of Library Science and Holder of the Mary and James Crawley '47 Endowed Professorship in International Librarianship
- Hajash, Andrew, Jr.**, Professor of Geology and Geophysics and Holder of the David Bullock Harris Chair in Geology
- Hall, Halbert Weldon**, Professor of Library Science; and Holder of the Irene B. Hoaldley Professorship in Academic Librarianship
- Hall, Kenneth Richard, P.E.**, Professor, Artie McFerrin Department of Chemical Engineering; TEES Senior Fellow; and Holder of the Jack E. and Frances Brown Chair in Engineering
- Hall, Michael Bishop**, Professor of Chemistry and of Materials Science and Engineering; Executive Associate Dean, College of Science; and Joint Holder of the C.J. Davidson Chair in Science
- Hamilton, Donny L.**, Professor of Anthropology and Holder of the George T. and Gladys H. Abell Chair in Nautical Archaeology and the George O. Yamini Chair in Liberal Arts; Director of the Center for Maritime Archaeology and Conservation
- Han, Je-Chin, P.E.**, Distinguished Professor, Department of Mechanical Engineering, and Holder of the Marcus C. Easterling Chair in Mechanical Engineering
- Hardin, Paul E.**, Professor of Biology and Holder of the John W. Lyons '59 Chair in Biology
- Harner, James L.**, Professor of English and Holder of the Samuel Rhea Gammon Professorship in Liberal Arts
- Harris, Charles Edwin, Jr.**, Professor of Philosophy and Humanities and the Zachry Department of Civil Engineering, and Holder of the Sue G. and Harry E. Bovay, Jr. Endowed Chair for the History and Ethics of Professional Engineering
- Hermann, Charles F.**, Professor in The George Bush School of Government and Public Service and Political Science; Associate Dean for International Programs in the George Bush School; and Holder of the Scowcroft Chair in International Policy Studies for the George Bush School of Government and Public Service
- Hill, Alfred Daniel**, Professor, Harold Vance Department of Petroleum Engineering, and Holder of the Robert L. Whiting Chair in Petroleum Engineering
- Hill, Rodney C.**, AIA, Professor of Architecture and Holder of the Eppright University Professorship in Undergraduate Teaching Excellence
- Hitt, Michael A.**, Distinguished Professor of Management and Holder of the Joe B. Foster '56 Chair in Business Leadership and the Carroll and Dorothy Conn Chair in New Venture Leadership
- Holditch, Stephen A.**, P.E., Professor, Harold Vance Department of Petroleum Engineering, and Head of Department, and Holder of the Noble Chair
- Holmes, Sarah A.**, C.P.A., Professor of Accounting and Holder of the Arthur Andersen and Company Former Students Professorship in Accounting
- Hook, Magnus A.O.**, Professor of Biochemistry and Biophysics and of Veterinary Integrative Biosciences, and Holder of the Neva and Wesley West Foundation Chair (Houston)
- Horlen, Joseph P. (Joe)**, Associate Professor and Head, Department of Construction Science, and Holder of the Charles Dewey McMullan Chair in Construction Science

- Howze, Jo W.**, Professor, Department of Electrical and Computer Engineering; Associate Dean, Dwight Look College of Engineering; Assistant Director, Texas Engineering Experiment Station; and Holder of the Ford Motor Company Design Professorship I
- Hueste, Mary Beth D.**, P.E., Associate Professor, Zachry Department of Civil Engineering, and Holder of the E. B. Snead Professorship II in Civil Engineering
- Humphrey, Jay D.**, Professor, Departments of Biomedical Engineering and Mechanical Engineering, and Holder of the Carolyn S. and Tommie E. Lohman '59 Professorship in Engineering Education
- Hyland, David C.**, Professor, Department of Aerospace Engineering; TEES Director of Space Science and Space Engineering Research; and Holder of the Royce E. Wisenbaker '39 Chair II in Engineering
- Ikelle, Luc T.**, Professor of Geology and Geophysics and Holder of the Robert R. Berg Professorship in Geology
- Ireland, R. Duane**, Professor of Management and Holder of the Foreman R. and Ruby S. Bennett Chair in Business Administration
- Jain, Sanjay**, Professor of Marketing and Holder of the Macy's Foundation Professorship in Retailing and Marketing
- Jayasuriya, Suhada**, P.E., Professor, Department of Mechanical Engineering, and Holder of the Meinhard H. Kotzebue Professorship in Mechanical Engineering
- Jenkins-Smith, Hank C.**, Professor, The George Bush School of Government and Public Service, and Holder of the Joe R. and Teresa Lozano Long Chair in Business and Government
- Jennings, Daniel F.**, P.E., Professor, Department of Engineering Technology and Industrial Distribution, and Holder of the I. Andrew Rader Professorship of Industrial Distribution
- Johnson, James Lee**, Distinguished Lecturer in Horticultural Sciences and Holder of the M. Buddy Benz Chair in Floral Design
- Johnson, Robert E.**, AIA, Professor of Architecture; Director of the College of Architecture's CRS Center; and Holder of the Thomas A. Bullock Chair in Leadership and Innovation in the Design and Construction Industries
- Johnson, Shane A.**, Professor of Finance and Holder of the Halliburton Professorship in Finance
- Johnson, William B.**, Distinguished Professor of Mathematics and Joint Holder of the Arthur George and Mary Emolene Owen Chair in Mathematics
- Junkins, John L.**, P.E., Distinguished Professor, Department of Aerospace Engineering; Holder of the George J. Eppright Chair in Engineering and the Royce E. Wisenbaker '39 Chair I for Innovation in Engineering; and Director, Center of Mechanics and Control
- Juvkam-Wold, Hans C.**, P.E., Professor, Harold Vance Department of Petroleum Engineering, and Holder of the John Edgar Holt '27 Endowed Chair in Petroleum Engineering
- Juzaitis, Raymond J.**, Professor and Head, Department of Nuclear Engineering, and Holder of the Sallie and Don Davis '61 Professorship in Engineering at Texas A&M University
- Kaplan, Howard B.**, Distinguished Professor of Sociology and Holder of the Mary Thomas Marshall Professorship in Liberal Arts
- Kezunovic, Mladen**, P.E., Professor, Department of Electrical and Computer Engineering; IEEE Fellow; and Holder of the Eugene E. Webb Professorship in Electrical Engineering
- Kinra, Vikram K.**, P.E., Professor, Department of Aerospace Engineering, and of Materials Science and Engineering, and Holder of the General Dynamics Professorship in Aerospace Engineering
- Knight, Stephanie L.**, Professor of Educational Psychology and of Teaching, Learning and Culture, and Holder of the Houston Endowment, Inc. Chair in Urban Education
- Kolari, James W.**, Professor of Finance and Holder of the J. P. Morgan Chase Bank Professorship in Finance
- Kronenberg, Andreas K.**, Professor of Geology and Geophysics and Holder of the Ray C. Fish Professorship in Geology
- Kulm, Gerald O.**, Professor of Teaching, Learning and Culture and Holder of the Curtis D. Robert Endowed Chair in Mathematics Education
- Kuo, Yue**, Professor, Artie McFerrin Department of Chemical Engineering, and of Materials Science and Engineering; Director of Thin Film Microelectronics Research Laboratory; and Holder of the Dow Professorship in Chemical Engineering

964 Endowed Chairs and Professorships

- Lagoudas, Dimitris C., P.E.**, Professor, Department of Aerospace Engineering, and of Materials Science and Engineering; Holder of the John and Bea Slattery Chair in Aerospace Engineering; and Director, Texas Institute for Intelligent Bio Nano Materials and Structures (TiIMS)
- Laine, Glen A.**, Professor and Head, Department of Veterinary Physiology and Pharmacology; Director, Michael E. DeBaKey Institute; and Holder of the Wiseman-Lewie-Worth Endowed Chair in Cardiology
- Lane, Robert H.**, Professor, Harold Vance Department of Petroleum Engineering, and Holder of Aghorn Energy Development Professorship in Petroleum Engineering
- Lassila, Dennis R., C.P.A.**, Professor of Accounting and Holder of the Deborah D. Shelton Professorship in Taxation
- Lawrence, F. Barry**, Associate Professor, Department of Engineering Technology and Industrial Distribution, and Holder of the Harvey Hubbell Endowed Professorship in Industrial Distribution
- Lee, William John, P.E.**, Professor, Harold Vance Department of Petroleum Engineering, and Holder of the L. F. Peterson '36 Endowed Chair in Petroleum Engineering
- Leon, V. Jorge, P.E.**, Professor, Departments of Engineering Technology and Industrial Distribution and Industrial and Systems Engineering, and Holder of the Allen-Bradley Endowed Professorship in Factory Automation
- Li, Qi**, Professor of Economics and Holder of the Hugh Roy Cullen Professorship in Economics
- Lincoln, Yvonna S.**, Distinguished Professor of Educational Administration and Human Resource Development, and Holder of the Ruth Harrington Chair in Educational Leadership
- Little, Dallas Neville, Jr., P.E.**, Professor, Zachry Department of Civil Engineering; Senior Research Fellow, Texas Transportation Institute; Associate Director, International Center for Aggregates Research; and Holder of the E. B. Snead '25 Chair in Transportation Engineering
- Litzenberg, Kerry K.**, Professor of Agricultural Economics and Intercollegiate Faculty of Agribusiness; Minnie Stevens Piper Professor; and Holder of the George and Irma Eppright Professorship in Undergraduate Teaching Excellence
- Livesay, Harold C.**, Professor of History and Holder of the Clifford A. Taylor, Jr. '49 Professorship in Liberal Arts
- Lupton, Joanne R.**, Professor of Nutrition and Food Science and of Veterinary Integrative Biosciences, and Holder of the William W. Allen Chair in Nutrition
- Lytton, Robert L., P.E.**, Professor, Zachry Department of Civil Engineering, and of Materials Science and Engineering; Director, Center for Infrastructure Engineering; and Holder of the Fred J. Benson Chair in Civil Engineering
- Mahajan, Arvind**, Professor of Finance and Holder of the Lamar Savings Professorship in Finance
- Mamora, Daulat D.**, Professor, Harold Vance Department of Petroleum Engineering, and Holder of the Rob L. Adams Endowed Professorship in Petroleum Engineering
- Mander, John B.**, Professor, Zachry Department of Civil Engineering, and Inaugural Holder of the Zachry Professorship in Design and Construction Integration I
- Mann, George J.**, AIA, Professor of Architecture and Holder of the Ronald L. Skaggs Professorship in Health Facility Design
- Mannan, M. Sam**, Professor, Artie McFerrin Department of Chemical Engineering; Director, Mary Kay O'Conner Process Safety Center; and inaugural Holder of the Mike O'Connor Chair I in Chemical Engineering
- Masad, Eyad A.**, Associate Professor, Zachry Department of Civil Engineering, and Holder of the E. B. Snead '25 Professorship I in Civil Engineering
- McArthur, Newell H.**, Professor of Veterinary Integrative Biosciences and Joint Holder of the Earline and A. P. Wiley Endowed Veterinary Professorships
- McDermott, John J.**, Distinguished Professor of Philosophy and Humanities and of Humanities in Medicine; Presidential Professor for Teaching Excellence; and Holder of the George T. and Gladys H. Abell Professorship in Liberal Arts
- McFarland, Andrew R., P.E.**, Professor, Department of Mechanical Engineering; TEES Senior Fellow; and Inaugural Holder of the Oscar S. Wyatt, Jr. '45 Professorship in Mechanical Engineering
- McIntyre, Peter M.**, Professor of Physics and of Materials Science and Engineering, and Holder of the Mitchell/Heep Chair in Experimental High Energy Physics
- McKeehan, Wallace L.**, Professor of Biochemistry and Biophysics and of Nutrition, and Holder of the John S. Dunn, Sr. Endowed Chair in Comparative Neuro-Oncology at IBT
- McVay, Duane A.**, Associate Professorship, Harold Vance Department of Petroleum Engineering, and Holder of the Mike and Heidi Gaters Development Professorship in Unconventional Resources

- Meier, Kenneth J.**, Distinguished Professor of Political Science and Holder of the Charles H. Gregory '64 Chair in Liberal Arts
- Mintz, Alex**, Professor of Political Science and Holder of the Cullen/McFadden Professorship in Political Science in Honor of Stewart E. Cartwright '44
- Morgan, Joseph A.**, P.E., Professor, Department of Engineering Technology and Industrial Distribution, and Holder of the Victor H. Thompson III '64 Professorship in Electronics Engineering Technology
- Morrison, Gerald L.**, P.E., Professor, Department of Mechanical Engineering, and Holder of the Nelson-Jackson Professorship in Mechanical Engineering
- Morrison, Michael L.**, Professor of Wildlife and Fisheries Sciences and Holder of the Caesar Kleberg Chair of Wildlife Ecology
- Morse, John W.**, Professor of Oceanography and Holder of the Louis and Elizabeth Scherck Chair in Oceanography
- Mullet, John E.**, Professor of Biochemistry and Biophysics, of Molecular and Environmental Plant Sciences, of Genetics and of Biotechnology and Holder of the Perry L. Adkisson Chair in Agricultural Biology
- Nanopoulos, Dimitri V.**, Distinguished Professor of Physics and Holder of the Mitchell/Heep Chair in Theoretical High Energy Physics
- Nation, Jack R.**, Professor of Psychology and of Toxicology and Holder of the Ralph R. Thomas Class of '21 Professorship in Liberal Arts
- Natowitz, Joseph Bernard**, Distinguished Professor of Chemistry and Holder of Cyclotron Institute Bright Chair in Nuclear Science
- Neilson, William S.**, Professor of Economics and Holder of the Mary Julia and George R. Jordan, Jr. Professorship in Public Policy
- Newton, H. Joseph**, Professor of Statistics; Dean, College of Science; and Holder of the Richard H. Harrison, III/External Advisory and Development Council Endowed Dean's Chair in Science
- Nguyen, Cam**, P.E., Professor, Department of Electrical and Computer Engineering; Holder of the TI Professorship II in Analog Engineering; and IEEE Fellow
- Niedzwecki, John M.**, P.E., Professor, Zachry Department of Civil Engineering; Professor of Ocean Engineering; Associate Vice Chancellor, Texas A&M University System; Executive Associate Dean, Dwight Look College of Engineering; Associate Director, Texas Engineering Experiment Station; and Holder of the R. P. Gregory '32 Chair in Civil Engineering
- Nikolov, Zivko**, Professor, Departments of Biological and Agricultural Engineering and Chemical Engineering, and Holder of the Dow Chemical Endowed Professorship in Bioprocess Engineering
- Nixon, Clair J.**, C.P.A., Professor of Accounting and Holder of the PricewaterhouseCoopers Accounting Excellence Professorship
- North, Gerald R.**, Distinguished Professor of Atmospheric Sciences and of Oceanography; Professor of Water Management and Hydrological Science; and Inaugural Holder of the Harold J. (Bill) Haynes '46 Chair in Geosciences
- Omer, Thomas C.**, Professor of Accounting and Holder of the Ernst and Young Professorship in Accounting
- O'Neal, Dennis L.**, Professor and Head, Department of Mechanical Engineering; and Holder of the Holdredge/Paul Professorship in Engineering Education
- Palmer, Douglas J.**, Professor of Educational Psychology; Dean, College of Education and Human Development; and Holder of the J. L. and Sydney Huffines '44 Chair
- Park, Joon Y.**, Professor of Economics and Holder of the Claude H. Everett, Jr. Chair in Liberal Arts
- Parnell, Calvin B., Jr.**, P.E., Regents Professor in the Department of Biological and Agricultural Engineering and Inaugural Holder of the Endowed Chair in Cotton Engineering, Ginning and Mechanization
- Penson, John B., Jr.**, Professor of Agricultural Economics and Intercollegiate Faculty of Agribusiness and Holder of the Stiles Professor of Agriculture
- Peterson, Tarla R.**, Professor of Wildlife and Fisheries Sciences and Holder of the Boone and Crockett Wildlife and Conservation Policy Chair at Texas A&M University
- Phillips, Don T.**, P.E., Professor, Department of Industrial and Systems Engineering, and Holder of the Chevron Corporation Professorship I in Engineering
- Pishko, Michael**, Professor and Head, Artie McFerrin Department of Chemical Engineering, and Holder of the UNOCAL Foundation Professorship
- Pisier, Gilles**, Distinguished Professor of Mathematics and Joint Holder of the Arthur George and Mary Emolene Owen Chair in Mathematics

966 Endowed Chairs and Professorships

- Pooch, Udo Walter, P.E.**, Professor, Department of Computer Science, and Holder of the Raytheon Company Professorship in Computer Science
- Pope, Christopher N.**, Distinguished Professor of Physics and Holder of the Stephen Hawking Chair in Fundamental Physics
- Poston, Dudley L., Jr.**, Professor of Sociology and Holder of the George T. and Gladys H. Abell Endowed Professorship in Liberal Arts
- Pulak, Cemalettin M.**, Associate Professor of Anthropology and Holder of the Frederick R. Mayer Professorship in Nautical Archaeology I
- Pustay, Michael W.**, Professor of Management and Holder of the Anderson Clayton and Company and the Clayton Fund Professorship in Business Administration
- Putnam, Linda L.**, Professor of Communication and Holder of the George T. and Gladys H. Abell Professorship in Liberal Arts
- Rajagopal, Kumbakonam R.**, Distinguished Professor, Departments of Mechanical Engineering, Biomedical Engineering, Civil Engineering and Mathematics; Professor of Materials Science and Engineering; and Holder of the James M. Forsyth Chair in Mechanical Engineering
- Raushel, Frank Michael**, Professor of Chemistry, of Biochemistry and Biophysics and of Toxicology, and Joint Holder of the C.J. Davidson Chair in Science
- Reddy, J. N., P.E.**, Distinguished Professor, Departments of Mechanical Engineering, Civil Engineering and Aerospace Engineering, and of Mathematics; Professor of Materials Science and Engineering; and Holder of the Oscar S. Wyatt, Jr., '45 Chair in Mechanical Engineering
- Reinschmidt, Kenneth F.**, Professor, Zachry Department of Civil Engineering, and Inaugural Holder of the J. L. Frank/ Marathon Ashland Petroleum LLC Chair in Engineering Project Management
- Reynolds, Larry J.**, Professor of English and Holder of the Thomas Franklin Mayo Professorship in Liberal Arts
- Roesset, Jose M.**, Professor, Zachry Department of Civil Engineering, and of Ocean Engineering, and Holder of the Wofford Cain '13 Senior Chair of Engineering in Offshore Technology
- Roschke, Paul N., P.E.**, Professor, Zachry Department of Civil Engineering, and of Materials Science and Engineering, and Holder of the A. P. and Florence Wiley Professorship I in Civil Engineering
- Rosen, David H.**, Professor of Psychology and of Humanities in Medicine and Holder of the Frank N. McMillan, Jr. Professorship in Analytical Psychology
- Rosowsky, David V., P.E.**, Professor and Head, Zachry Department of Civil Engineering, and Holder of the A. P. and Florence Wiley Chair in Civil Engineering
- Russell, B. Don, P.E.**, Regents Professor, Department of Electrical and Computer Engineering; IEEE Fellow; and Holder of the J. W. Runyon, Jr. Endowed Professorship I in Electrical Engineering, National Academy of Engineering
- Russell, David Harold**, Professor of Chemistry and Head of Department; Professor of Biotechnology and Holder of the Applied Biosystems/MDS Sciex Professorship in Mass Spectrometry in Chemistry
- Russell, James Edward, P.E.**, Professor, Harold Vance Department of Petroleum Engineering, and of Geology and Geophysics, and Holder of the Baker-Hughes Chair in Petroleum Engineering
- Sacchettini, James C.**, Professor of Biochemistry and Biophysics and of Chemistry, and Holder of the R. J. Wolfe-Welch Foundation Chair in Science
- Safe, Stephen H.**, Distinguished Professor of Veterinary Physiology and Pharmacology and of Toxicology; Professor of Biochemistry and Biophysics, of Genetics and of Biotechnology; and Holder of the Sid Kyle Endowed Chair in Veterinary Toxicology and the Chester J. Reed Chair in Veterinary Medicine
- Sager, William W.**, Professor of Oceanography and of Geology and Geophysics and Inaugural Holder of the Jane and R. Ken Williams '45 Chair in Ocean Drilling Science, Technology and Education
- San Andres, Luis A., P.E.**, Professor, Department of Mechanical Engineering, and Inaugural Holder of the Mast-Childs Professorship in Mechanical Engineering
- Sanchez-Sinencio, Edgar**, Professor, Department of Electrical and Computer Engineering; Holder of the T/I Jack Kilby Chair in Analog Engineering; and IEEE Fellow
- Saric, William S.**, Professor, Department of Aerospace Engineering; and Holder of the Stewart and Stevenson Services, Inc. Endowed Professorship II in Engineering
- Savell, Jeffrey W.**, Professor of Animal Science and of Food Science and Technology, and Holder of the E.M. Manny Rosenthal Chair in Animal Science

- Saving, Thomas R.**, Distinguished Professor of Economics; Director, Private Enterprise Research Center; and Holder of the Private Enterprise Research Center Jeff Montgomery Professorship
- Schechter, David S.**, P.E., Associate Professor, Harold Vance Department of Petroleum Engineering, and Holder of the George Hickox Development Professorship in Petroleum Engineering
- Schuessler, Hans Achim**, Professor of Physics and Holder of the Schuessler/Mitchell/Heep Chair in Experimental Optical and Biomedical Physics
- Schultz, Charles R.**, Professor of Library Science and Clements Archivist and Holder of the William P. Clements, Jr. Professorship
- Scott, Stuart L.**, Associate Professor, Harold Vance Department of Petroleum Engineering, and Holder of the John and Debbie Bethancourt Development Professorship in Petroleum Engineering
- Scrutchfield, W. Leon**, Professor of Large Animal Clinical Sciences and Joint Holder of the Earline and A. P. Wiley Endowed Veterinary Professorships
- Scully, Marlan O.**, Distinguished Professor of Physics; Professor of Materials Science and Engineering and Chemical Engineering; Director, Center for Theoretical Physics; Director, Institute for Quantum Studies; and Holder of the Hershel E. Burgess '29 Chair in Physics and the TEES Distinguished Research Chair
- Seminario, Jorge M.**, Professor, Artie McFerrin Department of Chemical Engineering, and of Electrical and Computer Engineering; and Inaugural Holder of the Lanatter and Herbert Fox Professorship in Chemical Engineering
- Shankar, Venkatesh**, Professor of Marketing and Holder of the Brandon C. Coleman, Jr. '78 Chair in Marketing
- Shearon, Winston T., Jr.**, Professor of Accounting and Holder of the Ernst and Young Professorship in Accounting
- Shepley, Mardelle M.**, Professor of Architecture; Holder of the William M. Pena Professorship in Information Management; and Director, Center for Health Systems and Design
- Shetty, Bala**, Professor of Information and Operations Management; Associate Dean, Mays Business School; and Holder of the Jenna and Calvin R. Guest Professorship in Business Administration
- Silva Martinez, Jose**, Associate Professor, Department of Electrical and Computer Engineering, and Holder of the TI Professorship I in Analog Engineering
- Singh, Chanan L.**, P.E., Regents Professor of Electrical and Computer Engineering; TEES Senior Fellow; IEEE Fellow; and Holder of the Irma Runyon Chair in Electrical Engineering and the J.W. Runyon, Jr. Endowed Professorship II in Electrical Engineering
- Singh, Vijay P.**, Professor, Department of Biological and Agricultural Engineering, and Holder of the Caroline and William N. Lehrer Distinguished Chair in Water Engineering
- Singleton, Daniel A.**, Professor of Chemistry and Joint Holder of the C.J. Davidson Chair in Science
- Skaggs, Chris L.**, Professor of Animal Science and Holder of the San Antonio Livestock Exposition Inc. Chair in Animal Science
- Smith, Dennie L.**, Professor of Teaching, Learning and Culture and Head of Department and Holder of the Claude H. Everett, Jr. Chair in Education
- Smith, Roger E.**, P.E., Professor, Zachry Department of Civil Engineering, and of Materials Science and Engineering, and Holder of the Herbert D. Kelleher Professorship in Transportation
- Smith, Steven E.**, Professor of Library Science; Associate Dean for Advancement; Director of the Cushing Library; and Holder of the Dr. C. Clifford Wendler Endowed Professorship
- Sokolov, Alexei V.**, Associate Professor of Physics and of Materials Science and Engineering, and Holder of the Stephen E. Harris Professorship in Quantum Optics
- Startzman, Richard A.**, P.E., Professor, Harold Vance Department of Petroleum Engineering and Holder of the L. F. Pete Peterson '36 Professorship in Petroleum Engineering
- Strawser, Jerry R.**, Professor of Accounting; Dean of the Mays Business School; Holder of the Development Council Dean's Chair in Business; and Holder of the Thomas W. Leland/Oscar A. Weinke Chair in Accounting
- Strawser, Robert H.**, C.P.A., Professor of Accounting and Holder of the Arthur Andersen and Company Former Students Chair in Accounting
- Stroustrup, Bjarne**, College of Engineering Endowed Chair Professor in Computer Science and in Computer Engineering
- Stubbs, Norris**, P.E., Professor, Zachry Department of Civil Engineering, and of Materials Science and Engineering, and Holder of the A. P. and Florence Wiley Professorship II in Civil Engineering
- Sui, Daniel Z.**, Professor of Geography and Holder of the Reta A. Haynes Chair in Geosciences
- Summers, Max D.**, Distinguished Professor of Entomology; Professor of Biochemistry and Biophysics, and of Biology; Director, Center for Advanced Insect Molecular Services; and Holder of the Endowed Chair in Agricultural Biotechnology

968 Endowed Chairs and Professorships

Suntzeff, Nicholas B., Professor of Physics and Holder of the Mitchell/Heep/Munnerlyn Chair in Observational Astronomy

Swanson, Edward P., C.P.A., Professor of Accounting and Holder of the Nelson D. Durst Chair in Accounting

Szymanski, David M., Professor of Marketing and Holder of the JCPenney Chair of Retailing Studies

Talreja, Ramesh R., Professor, Department of Aerospace Engineering, and of Materials Science and Engineering, and Holder of the Tenneco Professorship in Engineering

Taylor, Valerie E., Professor and Head, Department of Computer Science, and Holder of the Royce E. Wisenbaker Professorship I

Tizard, Ian R., Professor of Veterinary Pathobiology and Holder of the Richard M. Schubot Endowed Chair in Avian Health

Toliyat, Hamid A., Professor, Department of Electrical and Computer Engineering; IEEE Fellow; and Holder of the Raytheon Company Professorship

Townsend, Christine D., Professor of Agricultural Leadership, Education and Communications and Head of Department, and Holder of the Dr. R. H. Cintron University Professorship in Undergraduate Teaching Excellence

Tse, Senyo, Professor of Accounting and Holder of the KPMG Peat Marwick Professorship in Accounting

Vadali, Srinivas Rao, P.E., Professor, Department of Aerospace Engineering, and Holder of the Stewart & Stevenson Services, Inc. Endowed Professorship I in Engineering

Valko, Peter P., Professor, Harold Vance Department of Petroleum Engineering, and Holder of the L. F. Peterson Endowed Professorship in Petroleum Engineering

Van Huyck, John B., Professor of Economics and Holder of the Rex B. Grey Endowed Professorship in Private Enterprise Research Center

Varadarajan, P. Rajan, Distinguished Professor of Marketing and Holder of the Ford Chair in Consumerism/E-Business/E-Commerce

Varner, Dickson D., Professor of Veterinary Large Animal Clinical Sciences and Holder of the Pin Oak Stud Chair in Stallion Reproductive Studies

Vedlitz, Arnold, Professor in The George Bush School of Government and Public Service and Political Science; Director of the George Bush School's Institute for Science, Technology and Public Policy; and Inaugural Holder of the Bob Bullock Chair in Government and Public Service

Vieira de Castro, Luis Filipe, Assistant Professor of Anthropology and Holder of the Frederick R. Mayer Professorship in Nautical Archaeology II

Vigh, Gyula, Professor of Chemistry and of Materials Science and Engineering and Holder of the Gradipore Chair in Separation Science

Wachsmann, Shelley, Associate Professor of Anthropology and Holder of the Meadows Foundation Professorship in Biblical Archaeology

Wang, Lifan, Associate Professor of Physics and Holder of the Mitchell/Heep/Munnerlyn Career Enhancement in Physics

Waters, Michael R., Professor of Anthropology and of Geography and Holder of the Center for the Study of the First Americans Chair in Liberal Arts

Welch, Jennifer L., Professor, Department of Computer Science, and Holder of the Chevron Professorship II in Engineering

Wells, Robert D., Professor of Biochemistry and Biophysics and of Genetics; Director, Institute of Biosciences and Technology; and Holder of the Robert A. Welch Foundation Chair in Chemistry (Houston)

West, William F., Professor in The George Bush School of Government and Public Service and Political Science; Director of the George Bush School's Master of Public Service and Administration; and Holder of the Sara H. Lindsey Chair in The George Bush School of Government and Public Service

Wichern, Dean W., Professor of Information and Operations Management and Holder of the John E. Pearson Professorship in Business Administration

Wilheit, Thomas T., Professor of Atmospheric Sciences and Holder of the E. D. Brockett Professorship in Geosciences

Wilhelm, Wilbert E., P.E., Professor, Department of Industrial and Systems Engineering, and Holder of the Mike and Sugar Barnes Professorship in Industrial Engineering

Wilson, Lloyd T., II, Professor of Entomology and of Molecular and Plant Sciences and Holder of the B. Jack Wendt '44 Texas Rice Research Foundation Chair

Wiltschko, David V., Professor of Geology and Geophysics and Joint Holder of the Michel T. Halbouty Chair in Geology

Witt, Peter A., Professor of Recreation, Park and Tourism Sciences and Holder of the Bradberry Chair for Youth Development

Womack, James E., Distinguished Professor of Veterinary Pathobiology, of Medical Biochemistry and Medical Genetics, and of Genetics; and Holder of the W. P. Luse Endowed Professorship in Veterinary Medicine

Wood, Thomas K., Professor, Artie McFerrin Department of Chemical Engineering, and Zachry Department of Civil Engineering, and Holder of the Mike O'Connor Chair II in Chemical Engineering

Woodman, Richard W., Professor of Management and Holder of the Lawrence E. Fouraker Professorship in Business Administration

Wright, Steven M., P.E., Professor, Departments of Electrical and Computer Engineering and Biomedical Engineering, and Holder of the Royce E. Wisenbaker Professorship II in Engineering

Young, Ryland F., Professor of Biochemistry and Biophysics and of Biology and Holder of the Sadie Hatfield Professorship in Agriculture

Zardkoohi, Asghar, Professor of Management and Holder of the T. J. Barlow Professorship in Business Administration

Emeriti Faculty and Staff Members

Figures in parentheses indicate date of first appointment on the University staff and date emeritus/emera title was conferred, respectively.

- Aberth, Oliver G., Professor Emeritus of Mathematics. (1970, 1999)
- Adair, Carolyn, Director Emerita of Student Activities. (1974, 1998)
- Adams, Billy Joe, Director Emeritus of Continuing Education. (1966, 1983)
- Adkisson, Perry L., Distinguished Professor Emeritus of Entomology and Chancellor Emeritus. (1958, 1996)
- Alexander, Richard M., P.E., Professor Emeritus of Mechanical Engineering. (1977, 2007)
- Alston, Jon P., Professor Emeritus of Sociology. (1974, 2005)
- Amoss, Max S., Professor Emeritus of Veterinary Physiology and Pharmacology. (1975, 2004)
- Anderson, Carl G., Professor and Extension Specialist Emeritus of Agricultural Economics. (1960, 1966)
- Anderson, James E., Professor Emeritus of Political Science. (1986, 2005)
- Anderson, James G., Professor Emeritus of Veterinary Physiology and Pharmacology. (1966, 1996)
- Anderson, Warren Boyd, Associate Professor Emeritus of Soil and Crop Sciences. (1964, 1992)
- Anthony, Rayford G., P.E., Professor Emeritus of Chemical Engineering. (1966, 2008)
- Anthony, Ted F., Associate Professor Emeritus of Information and Operations Management. (1976, 2004)
- Anthony, William W., Senior Lecturer Emeritus of Political Science. (1971, 2005)
- Armstrong, Robert B., Distinguished Professor Emeritus of Health and Kinesiology. (1992, 2008)
- Arnold, Keith A., Professor Emeritus of Wildlife and Fisheries Sciences. (1966, 2006)
- Arnowitz, Richard L., Distinguished Professor Emeritus of Physics. (1986, 2004)
- Austin, Donald B., Professor Emeritus of Landscape Architecture and Urban Planning. (1974, 1999)
- Baker, Glenn E., Professor Emeritus of Educational Human Resource Development. (1977, 1997)
- Baker, Robert D, Professor Emeritus of Forest Science. (1970, 2000)
- Barker, Donald G., Professor Emeritus of Educational Psychology. (1959, 1993)
- Bass, George F., Distinguished Professor Emeritus of Anthropology. (1976, 2001)
- Bassett, James W., Professor Emeritus of Animal Science. (1963, 1987)
- Bates, George Winston, Professor Emeritus of Biochemistry and Biophysics. (1969, 2001)
- Bay, W. Wallace, Professor Emeritus of Veterinary Pathology. (1965, 1983)
- Bayliss, Garland E., Director Emeritus of Academic Services and Associate Professor Emeritus of History. (1956, 1992)
- B Beard, James B., Professor Emeritus of Soil and Crop Sciences. (1975, 1992)
- Beasley, William L., P.E., Professor Emeritus of Electrical Engineering. (1963, 1985)
- Beatty, Paulette T., Professor Emerita of Educational Administration and Human Resource Development. (1978, 2002)
- Beaumont, Roger A., Professor Emeritus of History. (1974, 2003)
- Benedict, Chauncey R., Professor Emeritus of Biochemistry and Biophysics. (1969, 1999)
- Berner, Leo, Jr., Dean Emeritus of the Graduate College and Professor Emeritus of Oceanography. (1965, 1987)
- Bertrand, Clint A., Professor Emeritus of Engineering Technology and Industrial Distribution. (1953, 2003)
- Birch, Wade G., Director Emeritus of Student Counseling Service. (2001)
- Blank, Leland T., Professor Emeritus of Industrial Engineering. (1978, 1998)
- Bockholt, Anton J., Associate Professor Emeritus of Soil and Crop Sciences. (1966, 1997)
- Bonnicksen, Thomas M., Professor Emeritus of Forest Science. (1985, 2004)
- Boone, James L., Jr., Professor Emeritus of Industrial, Vocational and Technical Education. (1952, 1988)
- Bormann, Al, Director Emeritus of Student Financial Aid. (1966, 2002)
- Bowen, Ray M., President Emeritus. (1994, 2002)
- Bowman, Charles H., Professor Emeritus of Petroleum Engineering. (1997, 2002)

- Boyd, Charles L., Professor Emeritus of Veterinary Large Animal Medicine and Surgery. (1964, 1986)
- Boyer, Lester L., Professor Emeritus of Architecture. (1984, 2001)
- Bradley, Walter L., Professor Emeritus of Mechanical Engineering. (1976, 2000)
- Bramble, James H., Distinguished Professor Emeritus of Mathematics. (1994, 2008)
- Bratlien, Maynard J., Associate Professor Emeritus of Educational Administration and Human Resource Development. (1980, 2004)
- Bray, Don E., Associate Professor Emeritus of Mechanical Engineering. (1978, 1999)
- Bridges, Charles H., Professor Emeritus of Veterinary Pathology. (1954, 1986)
- Brown, Kirk W., Professor Emeritus of Soil and Crop Sciences. (1970, 2003)
- Browning, Gilbert B., Associate Professor Emeritus of Landscape Architecture and Urban Planning. (1985, 2000)
- Browning, J. Artie, Professor Emeritus of Plant Pathology and Microbiology. (1981, 1992)
- Bryant, Jack Douglas, Professor Emeritus of Mathematics. (1964, 2001)
- Bullin, Jerry Allen, P.E., Professor Emeritus of Chemical Engineering. (1974, 1998)
- Bunting, Camille J., Associate Professor Emerita of Health and Kinesiology. (1978, 2005)
- Burger, Christian P., Professor Emeritus of Mechanical Engineering. (1986, 2001)
- Burke, Horace R., Professor Emeritus of Entomology. (1958, 1996)
- Burns, Edward Eugene, Professor Emeritus of Horticultural Sciences. (1956, 1992)
- Calhoun, John C., Jr., Deputy Chancellor for Engineering Emeritus and Distinguished Professor Emeritus of Petroleum Engineering. (1955, 1983)
- Calliham, Melvin R., Professor Emeritus of Veterinary Large Animal Medicine and Surgery. (1958, 1984)
- Camp, Bennie J., Professor Emeritus of Veterinary Physiology and Pharmacology. (1956, 1989)
- Campbell, Jack K., Professor Emeritus of Educational Curriculum and Instruction. (1970, 1992)
- Cannon, Garland, Professor Emeritus of English. (1966, 1995)
- Caputo, Michele, Professor Emeritus of Geophysics. (1981, 1988)
- Cargill, Charles R., Vice President for Operations Emeritus. (1961, 1987)
- Caris-Underwood, Nina, Associate Professor Emerita of Biology. (1984, 2003)
- Carpenter, Zerle L., Professor Emeritus of Animal Science and Director and Associate Vice Chancellor Emeritus, The Agricultural Program. (1962, 1998)
- Carter, Neville L., Professor Emeritus of Geology and Geophysics. (1978, 1996)
- Cartwright, Thomas C., Professor Emeritus of Animal Science. (1958, 1987)
- Catala, Pierre J., Senior Lecturer Emeritus of Engineering Technology and Industrial Distribution. (1985, 2002)
- Chenoweth, Robert D., P.E., Professor Emeritus of Electrical Engineering. (1947, 1989)
- Chester, David Kenneth, Professor Emeritus of Veterinary Small Animal Medicine and Surgery. (1967, 1995)
- Chevrette, John M., Professor Emeritus of Health and Kinesiology. (1967, 1999)
- Childers, Asa Bill, Associate Professor Emeritus of Veterinary Anatomy and Public Health. (1967, 2004)
- Childs, S. Bart, P.E., Professor Emeritus of Computer Science. (1974, 2007)
- Chilton, Robert, Professor Emeritus of Aerospace Engineering. (1978, 1988)
- Christian, Chester C., Professor Emeritus of Modern and Classical Languages. (1973, 1995)
- Christiansen, James E., Professor Emeritus of Agricultural Education. (1968, 2004)
- Chui, Charles K. T., Distinguished Professor Emeritus of Mathematics. (1970, 2000)
- Claborn, Larry D., Professor Emeritus of Veterinary Physiology and Pharmacology. (1966, 2006)
- Clark, Donald L., Professor Emeritus of Educational Human Resource Development. (1967, 1996)
- Clark, Donald R., Professor Emeritus of Veterinary Physiology and Pharmacology. (1963, 1997)
- Clark, William J., Professor Emeritus of Wildlife and Fisheries Sciences. (1957, 1989)
- Clarke, Neville P., Director Emeritus, The Agriculture Programs. (1975, 1997)
- Claycamp, Carrol D., P.E., Professor Emeritus of Architecture. (1967, 2005)

972 Emeriti Faculty and Staff Members

Coble, Charlie G., Professor Emeritus of Agricultural Engineering. (1972, 2001)

Cocanougher, A. Benton, Dean Emeritus of the Lowry Mays College and Graduate School of Business. (1987, 2001)

Cochran, Robert G., P.E., Professor Emeritus of Nuclear Engineering. (1959, 1983)

Cohen, Aaron, Professor Emeritus of Mechanical Engineering. (1993, 2000)

Collier, Jesse Wilton, Professor Emeritus of Soil and Crop Sciences. (1949, 1979)

Collisson, Ellen W., Professor Emerita of Veterinary Pathobiology. (1985, 2007)

Comstock, Thomas W., Professor Emeritus of Engineering Technology. (1972, 1989)

Conoley, Collie W., Professor Emeritus of Educational Psychology. (1996, 2006)

Conoley, Jane Close, Professor Emerita of Educational Psychology and Dean Emerita of the College of Education. (1996, 2006)

Coon, Jesse B., Professor Emeritus of Physics. (1946, 1976)

Coppock, Carl E., Professor Emeritus of Animal Science. (1977, 1992)

Cornish, Robert S., Associate Professor Emeritus of Urban and Regional Planning. (1970, 1989)

Cornwell, Leonard R., P.E., Professor Emeritus of Mechanical Engineering. (1971, 2000)

Corrigan, Dean C., Professor Emeritus of Educational Administration and Human Resource Development. (1980, 2001)

Costa, Richard H., Professor Emeritus of English. (1970, 1990)

Cote, Duane K., Professor Emeritus of Architecture. (1973, 1986)

Coyle, Harry M., P.E., Professor Emeritus of Civil Engineering. (1965, 1989)

Craig, James W., Professor Emeritus of Construction Science. (1976, 2008)

Crawford, Paul B., P.E., Professor Emeritus of Petroleum Engineering. (1952, 1991)

Crawford, Richard P., Professor Emeritus of Veterinary Anatomy and Public Health. (1972, 1995)

Crenshaw, Walter Elmo, Associate Professor Emeritus of Veterinary Small Animal Medicine and Surgery. (1971, 1993)

Critchfield, Richard D., Professor Emeritus of Modern and Classical Languages. (1976, 2001)

daConturbia, Sandra, Associate Professor Emerita of Texas A&M University Libraries. (1989, 2007)

Dahm, Karl Heinz, Professor Emeritus of Biology. (1968, 2001)

Darby, Ronald, P.E., Professor Emeritus of Chemical Engineering. (1965, 2001)

Darling, Thomas G., Major General, Commandant Emeritus, Corps of Cadets. (1987, 1996)

Darnell, Reznear M., Professor Emeritus of Oceanography. (1968, 1995)

Das, Phanindramohan, Professor Emeritus of Meteorology. (1967, 2003)

David, David Warren, Professor Emeritus of Educational Curriculum and Instruction. (1968, 1998)

Davis, Claude D., Professor Emeritus of Construction Science. (1965, 1988)

Davis, Ernest E., Professor and Extension Specialist Emeritus of Agricultural Economics. (1972, 2004)

Davison, Richard Read, P.E., Professor Emeritus of Chemical Engineering. (1958, 1996)

Degelman, Larry O., Professor Emeritus of Architecture. (1977, 2000)

Denison, John S., P.E., Professor Emeritus of Electrical Engineering. (1949, 1984)

Dennis, Maurice E., Professor Emeritus of Health and Kinesiology. (1976, 2006)

Dethloff, Henry C., Professor Emeritus of History. (1969, 1999)

Deuermeyer, Bryan L., P.E., Professor Emeritus of Industrial and Systems Engineering. (1978, 2007)

Dinkel, John J., Professor Emeritus of Information and Operations Management. (1980, 2005)

Dirks, Kenneth R., M.D., Director Emeritus of Student Health Services. (1989, 1995)

Disney, Ralph L., Professor Emeritus of Industrial Engineering. (1988, 1996)

Dixon, James R., Professor Emeritus of Wildlife and Fisheries Sciences. (1956, 1995)

Dixon, Joe Boris, Professor Emeritus of Soil and Crop Sciences. (1966, 2001)

Dockweiler, Clarence J., Professor Emeritus of Educational Curriculum and Instruction. (1976, 1995)

Dodd, Jane A., Associate Professor Emerita of Library Science and Associate Professor Emerita of West Campus Library. (1973, 1998)

- Dodd, Jimmie D., Professor Emeritus of Rangeland Ecology and Management. (1963, 1993)
- Dollar, Fred W., Colonel, Director Emeritus of Food Services. (1965, 1987)
- Dowell, Linus J., Professor Emeritus of Health and Kinesiology. (1966, 1993)
- Drew, Dan D., Professor Emeritus of Computer Science. (1960, 1987)
- Drew, Malcolm C., Professor Emeritus of Horticulture. (1986, 2003)
- Driscoll, Dennis M., Professor Emeritus of Meteorology. (1969, 2003)
- Druce, Albert John, Professor Emeritus of Electrical Engineering. (1946, 1983)
- Duce, Robert A., Distinguished Professor Emeritus of Oceanography and of Atmospheric Sciences. (1991, 2006)
- Dudek, Conrad L., P.E., Professor Emeritus of Civil Engineering. (1967, 2007)
- Dunlap, Wayne A., P.E., Professor Emeritus of Civil Engineering. (1959, 2003)
- Durbin, Leo D., Professor Emeritus of Chemical Engineering. (1961, 2000)
- Earle, James Hubert, Professor Emeritus of Civil Engineering. (1957, 1995)
- Eaton, Gordon P., Professor Emeritus of Geology and Geophysics. (1981, 2003)
- Echols, Ralph Gordon, Professor Emeritus of Landscape Architecture and Urban Planning. (1975, 1998)
- Edwards, William F., Professor Emeritus of Agricultural Economics. (1987, 1997)
- Ellis, Newton C., Professor Emeritus of Industrial Engineering. (1969, 2000)
- Ellis, William C., Professor Emeritus of Animal Science. (1961, 2004)
- Elmqvist, Anne Marie, Professor Emerita of Modern and Classical Languages. (1965, 1986)
- Engelage, Donald L., Executive Director Emeritus of Student Financial Aid. (1985, 2001)
- Erlanson, David A., Professor Emeritus of Educational Administration and Human Resource Development. (1977, 2006)
- Estok, Rita B., Professor Emerita of Library Science. (1969, 1977)
- Etter, Wayne E., Professor Emeritus of Finance. (1969, 2006)
- Eubank, Philip T., Professor Emeritus of Chemical Engineering. (1961, 2005)
- Eugster, A. Konrad, Director Emeritus of the Texas Veterinary Medical Diagnostic Laboratory. (2002)
- Evans, J. Warren, Professor Emeritus of Animal Science. (1985, 2005)
- Fahlquist, Davis A., Professor Emeritus of Geology and Geophysics. (1963, 1996)
- Fanguy, Roy C., Associate Professor Emeritus of Poultry Science. (1958, 2005)
- Farris, Donald Edward, Professor Emeritus of Agricultural Economics. (1963, 1995)
- Feldman, Roger Guy, Associate Professor Emeritus of Veterinary Pathology. (1965, 1990)
- Fife, William P., Professor Emeritus of Biology. (1966, 1984)
- Fisher, Dennis, Professor and Extension Specialist Emeritus of Agricultural Economics. (1980, 2005)
- Fisher, Richard F., Professor Emeritus of Forest Science. (1990, 1999)
- Fiske, Robert A., Head, Diagnostic Pathology Emeritus. (1997)
- Fletcher, L. S. "Skip", P.E., Professor Emeritus of Mechanical Engineering. (1980, 2006)
- Floyd, Richard L., Executive Vice President and Chief of Staff Emeritus. (1974, 2005)
- Foster, Billy Glen, Professor Emeritus of Biology. (1985, 1996)
- Fox, Mildred J., Jr., Professor Emeritus of Industrial Engineering. (1965, 1992)
- Franke, Harold W., Professor Emeritus of Animal Science. (1961, 1986)
- Frederiksen, Richard Allan, Professor Emeritus of Plant Pathology and Microbiology. (1964, 2000)
- Freund, Rudolf J., Professor Emeritus of Statistics. (1962, 1992)
- Frisbie, Raymond E., Professor Emeritus of Entomology. (1972, 2003)
- Fryxell, Greta A., Professor Emerita of Oceanography. (1980, 1994)
- Furr, Howard Lee, P.E., Professor Emeritus of Civil Engineering. (1962, 1981)

974 Emeriti Faculty and Staff Members

- Gage, E. Dean**, Senior Vice President and Provost Emeritus and Professor Emeritus of Veterinary Small Animal Medicine and Surgery. (1968, 1999)
- Gaither, Norman**, Professor Emeritus of Business Analysis and Research. (1979, 1992)
- Galloway, Bob Mitchell, P.E.**, Professor Emeritus of Civil Engineering. (1944, 1982)
- Gangi, Anthony F.**, Professor Emeritus of Geology and Geophysics. (1967, 1997)
- Garcia-Diaz, Alberto**, Professor Emeritus of Industrial Engineering. (1978, 2005)
- Gardner, Frederick A.**, Professor Emeritus of Poultry Science. (1959, 1990)
- Gaston, Jerry C.**, Professor of Sociology. (1981, 2007)
- Gates, Charles E.**, Professor Emeritus of Statistics. (1966, 1994)
- Gillespie, Samuel M.**, Professor Emeritus of Marketing. (1968, 2001)
- Gilmore, Charles L., P.E.**, Associate Professor Emeritus of Industrial Engineering. (1975, 1983)
- Gingerich, Karl A.**, Professor Emeritus of Chemistry. (1968, 1999)
- Goforth, Ramon E.**, Associate Professor Emeritus of Mechanical Engineering. (1979, 1999)
- Gooch, Brison P.**, Professor Emeritus of History. (1973, 1991)
- Gougler, P. Doyle**, Professor Emeritus of Journalism. (1960, 1987)
- Grady, J. C., Jr.**, Professor Emeritus of Agricultural Economics. (1967, 1987)
- Greathouse, Terrence R.**, Professor Emeritus of Animal Science. (1977, 2002)
- Green, Robert A.**, Professor Emeritus of Veterinary Pathobiology. (1979, 2004)
- Greenhut, Melvin L.**, Distinguished Professor Emeritus of Economics. (1966, 1992)
- Grider, Sylvia**, Associate Professor Emerita of Anthropology. (1976, 2007)
- Grumbles, Leland C.**, Professor Emeritus of Veterinary Microbiology and Parasitology. (1949, 1986)
- Gunn, Clare A.**, Professor Emeritus of Recreation and Parks. (1966, 1985)
- Haden, C. Roland**, Emeritus of Vice Chancellor and Dean of Engineering, Director of TEES, and Professor of Electrical Engineering. (1993, 2002)
- Hall, Charles F.**, Professor Emeritus of Veterinary Microbiology and Parasitology. (1959, 1985)
- Hall, Charles Lynn**, Associate Professor Emeritus of Veterinary Small Animal Medicine and Surgery. (1967, 1995)
- Hall, Wayne Clark**, Academic Vice President and Dean of the Graduate College Emeritus. (1999)
- Halliwell, Robert S.**, Professor Emeritus of Plant Pathology and Microbiology. (1962, 1994)
- Halverson, Jacque**, Associate Professor Emerita of Texas A&M University Libraries. (1984, 2007)
- Ham, Joe S.**, Professor Emeritus of Physics. (1956, 2003)
- Haney, Joe T.**, Colonel, Director Emeritus of the Fightin' Texas Aggie Band. (1972, 1989)
- Hanna, J. Dan**, Associate Professor Emeritus of Horticultural Sciences. (1981, 1993)
- Harper, William Weston, AIA**, Professor Emeritus of Architecture. (1964, 1993)
- Harris, William J., Jr., P.E.**, Distinguished Professor Emeritus of Civil Engineering. (1985, 1995)
- Hart, Gary E.**, Professor Emeritus of Soil and Crop Sciences. (1966, 1999)
- Hart, Ron R., P.E.**, Professor Emeritus of Nuclear Engineering. (1975, 2006)
- Hartfiel, Darald J.**, Professor Emeritus of Mathematics. (1969, 2005)
- Hartman, Roy A., P.E.**, Associate Professor Emeritus of Engineering Technology and Industrial Distribution. (1978, 1998)
- Hawkins, Harold L.**, Professor Emeritus of Educational Administration. (1967, 1989)
- Hawkins, Leslie V.**, Professor Emeritus of Industrial Education. (1954, 1976)
- Hazen, Edward E., Jr.**, Professor Emeritus of Chemistry. (1972, 1992)
- Heath, Edward H.**, Senior Lecturer Emeritus in Recreation, Park and Tourism Sciences. (1979, 1995)
- Heck, Fred C.**, Professor Emeritus of Veterinary Microbiology and Parasitology. (1958, 1991)
- Heidelbaugh, Norman D.**, Professor Emeritus of Veterinary Anatomy and Public Health. (1973, 1994)

Hellriegel, Don, Professor Emeritus of Management. (1975, 2006)

Herbich, John B., P.E., Professor Emeritus of Civil Engineering and of Ocean Engineering. (1967, 1994)

Herring, Don R., Professor Emeritus of Agricultural Education. (1969, 1997)

Herron, Mary A., Professor Emerita of Veterinary Anatomy and Public Health. (1973, 2001)

Herron, Michael R., Professor Emeritus of Small Animal Medicine and Surgery. (1968, 2001)

Hiebert, John C., Professor Emeritus of Physics. (1965, 2000)

Hilde, Thomas W. C., Professor Emeritus of Geology and Geophysics. (1977, 2005)

Hiler, Edward A., P.E., Professor Emeritus of Biological and Agricultural Engineering. (1966, 2008)

Hill, Larry D., Associate Professor Emeritus of History. (1967, 2000)

Hinojosa, Jesus H., Professor Emeritus of Landscape Architecture and Urban Planning. (1960, 2000)

Hirsch, Teddy James, P.E., Professor Emeritus of Civil Engineering. (1956, 1992)

Hix, Charles M., Jr., P.E., Professor Emeritus of Civil Engineering. (1969, 1997)

Hoadley, Irene B., Professor Emerita of Library Science. (1974, 1996)

Hoag, Edwin, Associate Professor Emeritus of Landscape Architecture and Urban Planning. (1980, 2000)

Hocking, Ronald R., Professor Emeritus of Statistics. (1980, 1994)

Holcomb, Robert M., P.E., Professor Emeritus of Civil Engineering. (1947, 1987)

Holditch, Stephen A., P.E., Professor Emeritus of Petroleum Engineering. (1976, 2001)

Holdredge, Edwin S., Professor Emeritus of Mechanical Engineering. (1939, 1980)

Holland, Charles D., Professor Emeritus of Chemical Engineering. (1952, 1987)

Holt, Ethan C., Professor Emeritus of Agronomy. (1948, 1984)

Hope, Lannes H., Professor Emeritus of Educational Psychology. (1961, 1993)

Hopgood, M. T. "Ted", Major General, Commandant Emeritus, Corps of Cadets. (2002)

Hoskins, Earl R., Professor Emeritus of Geology and Geophysics. (1977, 1996)

Hossner, Lloyd R., Professor Emeritus of Soil and Crop Sciences. (1968, 2003)

Huebner, George L., Jr., Professor Emeritus of Meteorology. (1958, 1988)

Hunting, Claudine, Professor Emerita of Modern and Classical Languages. (1973, 1995)

Huson, Frederick R., Professor Emeritus of Physics. (1984, 1997)

Hutchinson, Joseph M., Professor Emeritus of Architecture. (1974, 2005)

Ivey, Don L., P.E., Professor Emeritus of Civil Engineering. (1964, 1994)

James, Mike E., Jr., P.E., Associate Professor Emeritus of Civil Engineering. (1969, 1992)

James, Robert K., Professor Emeritus of Teaching, Learning and Culture. (1984, 2004)

James, Wesley P., P.E., Associate Professor Emeritus of Civil Engineering. (1971, 1998)

Jenkins, Omer C., Associate Professor Emeritus of Statistics. (1965, 1998)

Jennings, James W., P.E., Professor Emeritus of Petroleum Engineering. (1976, 1992)

Johnson, Brann, Associate Professor Emeritus of Geology and Geophysics. (1975, 2008)

Johnson, Bryan H., Professor Emeritus of Animal Science. (1993, 2007)

Johnson, Donald C., Associate Professor Emeritus of Journalism. (1977, 1989)

Johnson, Glenn R., Professor Emeritus of Educational Curriculum and Instruction. (1967, 1997)

Jones, Lonnie L., Professor Emeritus of Agricultural Economics. (1967, 2005)

Jordan, Wayne R., Professor Emeritus of Soil and Crop Sciences. (1968, 2003)

Juliff, Walter F., Executive Director Emeritus of Government Professional Development Office. (1975, 2004)

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- Kay, Ronald D., Professor Emeritus of Agricultural Economics. (1972, 1997)
- Keeley, Larry L., Professor Emeritus of Entomology. (1966, 2004)
- Kemler, Arden, Professor Emeritus of Veterinary Anatomy. (1959, 1984)
- Kenefick, Robert A., Professor Emeritus of Physics. (1965, 2008)
- Kettleborough, Charles Fred, P.E., Distinguished Professor Emeritus of Mechanical Engineering. (1964, 2004)
- Kieffer, Nat M., Professor Emeritus of Animal Science. (1965, 1987)
- Kim, Cheung Hun, P.E., Professor Emeritus of Civil Engineering and of Ocean Engineering. (1986, 2005)
- Kim, Hyeong L., Associate Professor Emeritus of Veterinary Physiology and Pharmacology. (1969, 1998)
- Kimber, Clarissa T., Professor Emerita of Geography. (1968, 1997)
- King, Gene T., Professor Emeritus of Animal Science. (1953, 1986)
- Kirchman, Susan, Associate Professor Emerita of Architecture. (1985, 2007)
- Kleerekoper, Herman, Professor Emeritus of Biology. (1968, 1978)
- Klussmann, Wallace G., Professor Emeritus and Extension Specialist Emeritus of Wildlife and Fisheries Sciences. (1963, 1993)
- Knauer, Kenneth W., Professor Emeritus of Small Animal Medicine and Surgery. (1966, 1999)
- Knutson, Ronald D., Professor Emeritus of Agricultural Economics. (1975, 2001)
- Koenig, Karl J., Professor Emeritus of Geology and Geophysics. (1955, 1994)
- Koepke, Wulf, Distinguished Professor Emeritus of Modern and Classical Languages. (1971, 1995)
- Koldus, John J. III, Vice President Emeritus for Student Services. (1973, 1993)
- Konzen, Richard Bernard, P.E., Associate Professor Emeritus of Nuclear Engineering. (1970, 1992)
- Koppa, Rodger J., P.E., Associate Professor Emeritus of Industrial Engineering. (1979, 2001)
- Korhonen, Lloyd J., Professor Emeritus of Educational Administration and Human Resource Development. (1991, 2005)
- Kozik, Thomas J., Professor Emeritus of Mechanical Engineering. (1963, 1999)
- Krise, George M., Professor Emeritus of Biology. (1958, 1982)
- Kroitor, Harry Peter, Professor Emeritus of English. (1958, 1990)
- Krueger, Willie F., Professor Emeritus of Poultry Science. (1953, 2007)
- Kunkel, Harriott Orren, Professor Emeritus of Animal Science and Dean Emeritus of the College of Agriculture and Life Sciences. (1951, 1998)
- Kunze, George W., Dean Emeritus of the Graduate College and Professor Emeritus of Soil and Crop Sciences. (1952, 1984)
- Kunze, Otto R., Professor Emeritus of Agricultural Engineering. (1956, 1990)
- Kuvlesky, William Peter, Professor Emeritus of Sociology. (1964, 1997)
- Lacey, H. Elton, Professor Emeritus of Mathematics. (1980, 2002)
- Lacey, Robert A., Registrar Emeritus. (1962, 1988)
- Lafield, W. C., Director Emeritus of the Computing Services Center. (1970, 1988)
- Lamb, Charles E., Professor Emeritus of Teaching, Learning and Culture. (1994, 2002)
- Landers, Roger Q. (Jake), Professor and Extension Specialist Emeritus of Rangeland Ecology and Management. (1979, 1994)
- Landiss, Carl Wilson, Professor Emeritus of Health and Kinesiology. (1943, 1979)
- Landphair, Harlow C., Professor Emeritus of Landscape Architecture and Urban Planning. (1975, 2006)
- LePori, Wayne A., Professor Emeritus of Biological and Agricultural Engineering. (1973, 2005)
- Lewis, Donald H., Professor Emeritus of Veterinary Pathobiology. (1967, 2003)
- Limbacher, Philip C., Professor Emeritus of Educational Curriculum and Instruction. (1969, 1981)
- Linton, Thomas L., Senior Lecturer Emeritus of Wildlife and Fisheries Sciences. (1981, 2002)
- Litterst, Frank C., Senior Lecturer Emeritus of Animal Science. (1975, 1989)
- Little, Mildred J., Professor Emerita of Physical Education. (1971, 1989)
- Loan, Raymond W., Professor Emeritus of Veterinary Pathobiology. (1978, 2004)
- Logan, John Merle, Professor Emeritus of Geology and Geophysics. (1967, 1995)
- Lou, Y.K., P.E., Professor Emeritus of Civil Engineering and of Ocean Engineering. (1974, 1995)

- Lunsford, Jack Horner, Distinguished Professor Emeritus of Chemistry. (1966, 2000)
- Lutes, Loren D., P.E., Professor Emeritus of Civil Engineering. (1988, 2002)
- Luttbegg, Norman R., Professor Emeritus of Political Science. (1978, 2007)
- Lyda, Stuart D., Professor Emeritus of Plant Pathology and Microbiology. (1967, 1994)
- Maffei, Gerald, Professor Emeritus of Architecture. (1969, 2007)
- Mansell, K. Joanne, Clinical Professor Emerita of Veterinary Pathobiology. (1994, 2006)
- Marsh, James H. III, P.E., Professor Emeritus of Construction Science. (1957, 1991)
- Martin, J. Rod, Visiting Professor Emeritus of Agricultural Economics. (1965, 1992)
- Mason, Paul M., Associate Professor Emeritus of Civil Engineering. (1946, 1989)
- Matis, James Henry, Professor Emeritus of Statistics. (1970, 2000)
- Maxson, Carlton J., Professor Emeritus of Mathematics. (1969, 2002)
- Mayer, John E., Jr., Professor Emeritus of Engineering Technology and Industrial Distribution. (1988, 2004)
- McArthur, Margaret A., Senior Lecturer Emerita of Music. (1974, 1992)
- McBee, George G., Professor Emeritus of Soil and Crop Sciences. (1954, 1989)
- McCarthy, Michael M., Professor Emeritus of Landscape Architecture and Urban Planning. (1988, 2004)
- McConnell, Stewart, Professor Emeritus of Veterinary Microbiology and Parasitology. (1968, 1985)
- McCrary, James D., Professor Emeritus of Veterinary Physiology and Pharmacology. (1958, 1991)
- McCree, Keith J., Professor Emeritus of Soil and Crop Sciences. (1968, 1989)
- McCully, Wayne G., Professor Emeritus of Rangeland Ecology and Management. (1948, 1992)
- McDonald, Donald, P.E., Professor Emeritus of Civil Engineering and Provost and Vice President for Academic Affairs Emeritus. (1973, 1991)
- McFarland, Marshall J., Professor Emeritus of Agricultural Engineering. (1980, 2001)
- McGrann, James M., Professor and Extension Specialist Emeritus of Agricultural Economics. (1975, 2004)
- McGraw, Joseph J., Professor Emeritus of Environmental Design. (1958, 1987)
- McGuire, John Gilbert, P.E., Professor Emeritus of Engineering. (1933, 1975)
- McGuirk, James P., Professor Emeritus of Meteorology. (1977, 2003)
- McIntyre, John A., Professor Emeritus of Physics. (1963, 1996)
- McKittrick, Thomas L., FAIA, Professor Emeritus of Architecture. (1990, 2002)
- McLain, Milton E., Jr., Professor Emeritus of Nuclear Engineering. (1984, 1995)
- McLeod, Jr., Raymond, Professor Emeritus of Information and Operations Management. (1980, 2000)
- McMullan, Charles D., Associate Professor Emeritus of Construction Science. (1980, 1999)
- McNiel, Norbert Arthur, Professor Emeritus of Plant Sciences. (1957, 1979)
- McWilliams, Edward L., Professor Emeritus of Horticultural Sciences. (1972, 2006)
- Mercer, M. Ray, P.E., Professor Emeritus of Electrical and Computer Engineering. (1995, 2006)
- Merkle, Morris G., Professor Emeritus of Soil and Crop Sciences. (1966, 1992)
- Merrifield, Robert G., Professor Emeritus of Forest Science. (1967, 1996)
- Messer, Carroll Joe, P.E., Professor Emeritus of Civil Engineering. (1969, 2004)
- Meyer, Edgar F., Professor Emeritus of Biochemistry and Biophysics. (1967, 2003)
- Meyers, Edward A., Professor Emeritus of Chemistry. (1956, 1995)
- Mies, William L., Professor Emeritus of Animal Science. (1987, 2001)
- Miles, Bruce R., Director Emeritus of Texas Forest Service. (1959, 1996)
- Milford, Murray H., Professor Emeritus of Soil and Crop Sciences. (1968, 2001)
- Miller, Elena (Jeannie) Posadas, Professor Emerita of Library Science. (1990, 2005)
- Miller, Frederick R., Professor Emeritus of Soil and Crop Sciences. (1974, 1994)
- Miller, Jarvis E., President Emeritus. (1958, 1999)
- Mobley, William H., President Emeritus. (1980, 1999)

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- Monroe, Haskell, Dean of Faculties Emeritus. (1959, 1997)
- Moore, Gladys Joan, Associate Professor Emerita of Architecture. (1969, 1992)
- Morgan, Daryle W., Professor Emeritus of Engineering Technology and Industrial Distribution. (1966, 1999)
- Morgan, Page W., Professor Emeritus of Soil and Crop Sciences. (1961, 2003)
- Morris, John E., Professor Emeritus of Educational Curriculum and Instruction. (1976, 1999)
- Murphy, Karen L., Associate Professor Emerita of Educational Psychology. (1993, 2003)
- Nagyvary, Joseph, Professor Emeritus of Biochemistry and Biophysics. (1967, 2004)
- Nelson, Bardin H., Professor Emeritus of Sociology. (1950, 1984)
- Nelson, Paul, Jr., Professor Emeritus of Computer Science, Nuclear Engineering and Mathematics. (1987, 2003)
- Newton, Ronald J., Professor Emeritus of Forest Science. (1974, 1998)
- Niles, George A., Professor Emeritus of Agronomy. (1953, 1986)
- Norton, Donna E., Professor Emerita of Teaching, Learning and Culture. (1976, 2004)
- Nowlin, Worth D., Jr., Distinguished Professor Emeritus of Oceanography. (1962, 2007)
- Noyes, Theodore A., P.E., Professor Emeritus of Mechanical Engineering. (1954, 1985)
- O'Brien, Daniel Harold, Associate Professor Emeritus of Chemistry. (1967, 1997)
- Padberg, Daniel I., Professor Emeritus of Agricultural Economics. (1984, 1995)
- Page, Robert H., Professor Emeritus of Mechanical Engineering. (1979, 1994)
- Paprock, Kenneth E., Associate Professor Emeritus of Educational Administration and Human Resource Development. (1987, 2005)
- Parish, Theodore A., Professor Emeritus of Nuclear Engineering. (1978, 2002)
- Parrish, Linda H., Regents Professor Emerita of Educational Psychology. (1978, 2006)
- Patton, Alton D., Professor Emeritus of Electrical Engineering. (1983, 2005)
- Peck, Larry, Professor Emeritus of Chemistry. (1974, 2006)
- Pedulla, Albert, Professor Emeritus of Construction Science. (1974, 2002)
- Peirce, James F., Professor Emeritus of English. (1946, 1983)
- Pejovich, Svetozar, Professor Emeritus of Economics. (1975, 2001)
- Pennington, Campbell W., Professor Emeritus of Geography. (1974, 1984)
- Perry, John V., Professor Emeritus of Mechanical Engineering. (1948, 1996)
- Perry, Linda, Senior Lecturer Emerita of Accounting. (1983, 2007)
- Perry, William L., Dean of Faculties and Associate Provost Emeritus and Professor Emeritus of Mathematics. (1971, 2007)
- Peters, William H., Professor Emeritus of Teaching, Learning and Culture. (1981, 2005)
- Petrillo, Raymond E., Associate Professor Emeritus of Modern and Classical Languages. (1989, 2003)
- Pettit, Robert E., Associate Professor Emeritus of Plant Pathology and Microbiology. (1966, 1992)
- Pfannstiel, Daniel C., Director Emeritus of the Texas Agricultural Extension Service. (1959, 1991)
- Phillips, Clinton A., Dean of Faculties, Associate Provost Emeritus, and Professor Emeritus of Finance. (1967, 1990)
- Phillips, Lee J., Senior Lecturer Emeritus of Industrial Engineering. (1988, 1994)
- Pierce, Kenneth R., Professor Emeritus of Veterinary Pathobiology. (1957, 1998)
- Pike, Leonard M., Professor Emeritus of Horticulture. (1968, 2006)
- Plapp, Frederick W., Professor Emeritus of Entomology. (1969, 1994)
- Pledger, Roy C., Associate Professor Emeritus of Architecture. (1965, 1995)
- Plum, Charles W., Professor Emeritus of Accounting. (1976, 1989)
- Ponder, Leonard D., Professor Emeritus of Health and Kinesiology. (1992, 2001)
- Portis, Edward B., Professor Emeritus of Political Science. (1978, 2005)
- Poston, Steven W., Professor Emeritus of Petroleum Engineering. (1981, 1994)

- Potter, Gary D., Professor Emeritus of Animal Science. (1968, 2005)
- Powell, Donald B., Director Emeritus of Business Services. (1973, 1998)
- Prescott, John Mack, Professor Emeritus of Biochemistry and Biophysics and of Medical Biochemistry and Genetics and Vice President for Academic Affairs Emeritus. (1952, 1985)
- Presley, Bobby Joe, Professor Emeritus of Oceanography. (1970, 2004)
- Priesmeyer, Larry L., Associate Professor Emeritus of Architecture. (1967, 2000)
- Priest, Susanna L., Associate Professor Emeritus of Journalism. (1989, 2004)
- Prior, David B., Executive Vice President and Provost Emeritus and Dean of Geosciences Emeritus. (1996, 2007)
- Pu, Hwang-Wen, Professor Emeritus of Mathematics. (1969, 2001)
- Puckett, Russell E., Associate Professor Emeritus of Engineering Technology. (1977, 1992)
- Pugh, David L., Associate Professor Emeritus of Landscape Architecture and Urban Planning. (1976, 2004)
- Ragsdale, Bobby J., Professor and Extension Specialist Emeritus of Rangeland Ecology and Management. (1958, 1990)
- Ramge, John C., Professor Emeritus of Veterinary Large Animal Medicine and Surgery. (1959, 1985)
- Ransdell, Clifford H., Professor Emeritus of Engineering Design Graphics. (1937, 1976)
- Ray, Eugene H., Director Emeritus of Grounds Maintenance. (1973, 1998)
- Read, William Kay, Professor Emeritus of Veterinary Pathobiology. (1967, 2002)
- Reddell, Donald L., Professor Emeritus of Biological and Agricultural Engineering. (1969, 2002)
- Reed, Raymond D., AIA, Professor Emeritus of Architecture. (1985, 1995)
- Reid, Leslie M., Professor Emeritus of Recreation, Park and Tourism Sciences. (1965, 1994)
- Reid, Robert O., Distinguished Professor Emeritus of Oceanography. (1951, 1987)
- Reilly, Robert R., Professor Emeritus of Educational Psychology. (1968, 1973)
- Reynolds, Morgan O., Professor Emeritus of Economics. (1974, 2003)
- Rhomberg, Edward J., P.E., Professor Emeritus of Civil Engineering. (1978, 2000)
- Rice, Don A., Professor Emeritus of Engineering Technology. (1969, 1997)
- Richards, Katharine C., Associate Professor Emerita of Modern and Classical Languages. (1970, 1990)
- Richards, Rulon Malcolm, Professor and Director Emeritus of Finance and Real Estate Center. (1974, 2006)
- Richter, Ronald L., Professor Emeritus of Animal Science. (1978, 2005)
- Ringer, Larry J., Professor Emeritus of Statistics. (1965, 2004)
- Roach, Arthur J., Professor Emeritus of Educational Psychology. (1966, 1993)
- Robertson, Dan H., Professor Emeritus of Marketing. (1981, 2005)
- Rodenberger, Charles A., P.E., Professor Emeritus of Aerospace Engineering. (1960, 1982)
- Rodriguez-Iturbe, Ignacio, Distinguished Professor Emeritus of Civil Engineering. (1993, 2002)
- Roenigk, William M., Professor Emeritus of Veterinary Large Animal Medicine and Surgery. (1975, 1991)
- Rogers, Bob G., Professor Emeritus of Journalism. (1974, 1995)
- Rollins, James T., Professor Emeritus of Petroleum Engineering. (1980, 1992)
- Rose, Pete S., Professor Emeritus of Finance. (1971, 2000)
- Rose, Werner G., Professor Emeritus of Performance Studies. (1988, 2004)
- Ross, Hayes E., Jr., P.E., Professor Emeritus of Civil Engineering. (1970, 2001)
- Rowan, Neilon Joyce, P.E., Professor Emeritus of Civil Engineering. (1959, 1997)
- Runge, Edward C. A., Professor Emeritus of Soil and Crop Sciences. (1980, 2006)
- Runkles, Jack R., Professor Emeritus of Soil and Crop Sciences. (1964, 1984)
- Russell, James E., P.E., Professor Emeritus of Petroleum Engineering. (1978, 2005)
- Samson, Charles H., P.E., Professor Emeritus of Civil Engineering. (1960, 1994)
- Sanchez, David A., Professor Emeritus of Mathematics. (1993, 2002)
- Sauer, Helmut W., Professor Emeritus of Biology. (1981, 2007)

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Sawyer, Donald T., Distinguished Professor Emeritus of Chemistry. (1985, 1995)

Saylak, Donald, P.E., Professor Emeritus of Civil Engineering. (1972, 2003)

Schaffer, Albert, Professor Emeritus of Sociology. (1971, 1996)

Schaffner, Joseph C., Professor Emeritus of Entomology. (1963, 1999)

Schink, David R., Professor Emeritus of Oceanography. (1972, 1999)

Schmedemann, Ivan W., Professor Emeritus of Agricultural Economics. (1977, 1996)

Schmidt, N. Gayle, Associate Professor Emerita of Health and Kinesiology. (1969, 1998)

Schmitt, Richard P., Professor Emeritus of Chemistry. (1979, 2005)

Schuster, Joseph L., Professor Emeritus of Rangeland Ecology and Management. (1972, 1997)

Scoggins, James Roy, Professor Emeritus of Meteorology. (1967, 1992)

Scott, William W., Jr., Lecturer Emeritus of Civil Engineering. (1966, 1993)

Scrutchfield, W. Leon, Professor Emeritus of Veterinary Large Animal Clinical Sciences. (1975, 2005)

Seaman, Don F., Professor Emeritus of Educational Administration and Human Resource Development. (1971, 2002)

Seymour, Richard J., P.E., Professor Emeritus of Civil Engineering and of Ocean Engineering. (1991, 1998)

Shaddock, John A., Dean Emeritus of College of Veterinary Medicine. (1988, 1998)

Shafer, Carl Ewing, Professor Emeritus of Agricultural Economics. (1962, 1998)

Shafer, Harry J., Professor Emeritus of Anthropology. (1972, 2002)

Shannon, Robert E., Professor Emeritus of Industrial Engineering. (1982, 2003)

Shapiro, Bernard L., Professor Emeritus of Chemistry. (1968, 1987)

Shelton, George C., Dean Emeritus of the College of Veterinary Medicine and Professor Emeritus of Veterinary Microbiology and Parasitology. (1973, 1988)

Shelton, James M., Professor Emeritus of Animal Science. (1950)

Sheppard, Sallie V., Professor Emerita of Computer Science. (1977, 1998)

Shumway, C. Richard, Professor Emeritus of Agricultural Economics. (1974, 1998)

Simmons, Dick, P.E., Professor Emeritus of Computer Science. (1970, 2008)

Simpson, Russell B., Professor Emeritus of Veterinary Pathobiology. (1969, 2005)

Sippel, William L., Executive Director Emeritus of the Texas Veterinary Medical Diagnostic Laboratory. (1968, 1980)

Skowronek, Richard P., P.E., Associate Professor Emeritus of Engineering Technology and Industrial Distribution. (1979, 2006)

Smith, Edward J., Associate Professor Emeritus of Journalism. (1981, 2002)

Smith, James W., Jr., Professor Emeritus of Entomology. (1970, 2005)

Smith, Roberta Hawkins, Professor Emerita of Horticulture. (1975, 2003)

Smith, William B., Professor Emeritus of Statistics. (1966, 2003)

Soltes, Ed J., Professor Emeritus of Forest Science. (1976, 1996)

Sonnenfeld, Joseph, Professor Emeritus of Geography. (1968, 1993)

Sorenson, Jerome Wallace, P.E., Professor Emeritus of Agricultural Engineering. (1946, 1978)

Southerland, J. Malon, Vice President Emeritus for Student Affairs. (1968, 2003)

Spencer, Terry W., Professor Emeritus of Geology and Geophysics. (1966, 1998)

Stallings, Jane A., Professor Emerita of Educational Curriculum and Instruction. (1990, 1999)

Stanton, Robert James, Jr., Professor Emeritus of Geology and Geophysics. (1967, 1998)

Stark, Stephen L., Professor Emeritus of Educational Administration and Human Resource Development. (1973, 2006)

Startzman, Richard A., P.E., Professor Emeritus of Petroleum Engineering. (1982, 2007)

Stavenhagen, Lee, Associate Professor Emeritus of Modern and Classical Languages. (1976, 1995)

Steele, D. Gentry, Professor Emeritus of Anthropology. (1979, 2002)

Steffy, J. Richard, Professor Emeritus of Anthropology. (1976, 1991)

Steinbach, Don W., Professor and Extension Specialist Emeritus of Wildlife and Fisheries Sciences. (1970, 2000)

Stenning, Walter F., Professor Emeritus of Educational Administration and Human Resource Development. (1972, 2005)

Sterling, Winfield L., Professor Emeritus of Entomology. (1969, 1993)

- Stewart, David H., Professor Emeritus of English. (1975, 1996)
- Stinson, James C., Professor Emeritus of Pathology and Laboratory Medicine. (1977, 1988)
- Stolle, Carlton, Professor Emeritus of Accounting. (1965, 2007)
- Storey, James Benton, Professor Emeritus of Horticultural Sciences. (1957, 2001)
- Storts, Ralph W., Professor Emeritus of Veterinary Pathobiology. (1966, 2006)
- Stott, George G., Professor Emeritus of Veterinary Anatomy and Public Health. (1972, 1997)
- Stout, Bill A., Professor Emeritus of Agricultural Engineering. (1981, 1999)
- Stout, Janis P., Professor Emerita of English. (1987, 2002)
- Stover, Vergil G., P.E., Professor Emeritus of Civil Engineering and of Urban Planning. (1966, 1994)
- Strawn, Robert Kirk, Professor Emeritus of Wildlife and Fisheries Sciences. (1959, 1992)
- Stribling, James C., Extension Specialist Emeritus of Recreation, Park and Tourism Sciences. (1971, 1996)
- Stukhart, George, P.E., Associate Professor Emeritus of Civil Engineering. (1980, 1993)
- Sullivan, Arthur, Professor Emeritus of Landscape Architecture and Urban Planning. (1992, 2000)
- Suter, Dwayne A., Professor Emeritus of Agricultural Engineering. (1972, 2000)
- Swank, Wendell G., Professor Emeritus of Wildlife and Fisheries Sciences. (1975, 1988)
- Sweat, Vincent E., P.E., Professor Emeritus of Biological and Agricultural Engineering. (1977, 2002)
- Sweet, Merrill H., Professor Emeritus of Biology. (1963, 2003)
- Taber, Ruth A., Senior Lecturer Emerita of Plant Pathology and Microbiology. (1964, 1992)
- Tanksley, Thomas D., Jr., Professor Emeritus of Animal Science. (1965, 1985)
- Tatum, Michael E., Professor Emeritus of Veterinary Anatomy and Public Health. (1983, 2000)
- Taylor, Thomas H., Associate Vice President Emeritus for Finance. (1970, 2005)
- Teer, James G., Professor Emeritus of Wildlife and Fisheries Sciences. (1962, 1999)
- Teetes, George L., Professor Emeritus of Entomology. (1970, 2001)
- Templeton, Joe W., Professor Emeritus of Veterinary Pathobiology. (1975, 2008)
- Thomas, Norman D., Associate Professor Emeritus of Anthropology. (1973, 1990)
- Thomas, Richard E., P.E., Professor Emeritus of Aerospace Engineering. (1964, 1993)
- Thompson, Herbert G., Professor Emeritus of Marketing. (1951, 1985)
- Thompson, Louis J., P.E., Professor Emeritus of Civil Engineering. (1966, 1991)
- Thornton, H. Richard, P.E., Professor Emeritus of Mechanical Engineering. (1967, 1998)
- Tieh, Thomas T., Professor Emeritus of Geology and Geophysics. (1966, 1999)
- Tielking, John Thomas, P.E., Associate Professor Emeritus of Civil Engineering. (1975, 1995)
- Toler, Ray E., Director of Bands Emeritus. (1992, 2002)
- Toler, Robert W., Professor Emeritus of Plant Pathology and Microbiology. (1966, 1994)
- Tolson, Homer, Professor Emeritus of Health and Kinesiology. (1968, 2007)
- Torres, Cruz, Associate Professor Emerita of Recreation, Park and Tourism Sciences. (1998, 2007)
- Treybig, Leon Bruce, Professor Emeritus of Mathematics. (1968, 2002)
- Turner, James William, Professor Emeritus of Animal Science. (1987, 2001)
- Unterberger, Betty M., Professor Emerita of History. (1968, 2004)
- Unterberger, Robert R., Professor Emeritus of Geophysics. (1968, 1986)
- Uselton, Gene, Professor Emeritus of Finance. (1979, 1994)
- van Bavel, C. H. M., Professor Emeritus of Soil and Crop Sciences. (1967, 1987)
- van Buijtenen, Johannes P., Professor Emeritus of Forest Science. (1960, 1994)
- Van Cleave, Horace W., Professor Emeritus of Entomology. (1964, 1997)
- Van Domelen, John E., Professor Emeritus of English. (1970, 1996)

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- van Doorninck, Frederick H., Professor Emeritus of Anthropology. (1977, 1996)
- Van Doren, Carlton Stevens, Professor Emeritus of Recreation, Park and Tourism Sciences. (1968, 1996)
- Van Riper, Paul Pritchard, Professor Emeritus of Political Science. (1970, 1981)
- Vance, John M., P.E., Professor Emeritus of Mechanical Engineering. (1978, 2007)
- Var, Turgut, Professor Emeritus of Recreation, Park and Tourism Sciences. (1987, 2004)
- Vestal, Howard L., Vice President for Business Affairs Emeritus. (1965, 1983)
- Vinson, Gerald E., Senior Lecturer Emeritus of Engineering Technology and Industrial Distribution. (1981, 2007)
- Volz, Richard A., P.E., Professor Emeritus of Computer Science. (1988, 2004)
- Walker, James Knox, Professor Emeritus of Entomology. (1968, 1993)
- Walterscheidt, Michael, Professor Emeritus of Forest Science. (1978, 1995)
- Ward, Donald T., P.E., Professor Emeritus of Aerospace Engineering. (1981, 2000)
- Wardlaw, Frank H., Director Emeritus of the Texas A&M University Press. (1974, 1981)
- Watkins, Joel S., Professor Emeritus of Geology and Geophysics. (1985, 2002)
- Watt, Carson E., Professor and Extension Specialist Emeritus of Recreation, Park and Tourism Sciences. (1974, 2002)
- Weaver, Richard W., Professor Emeritus of Soil and Crop Sciences. (1970, 2007)
- Weese, John A., Regents Professor Emeritus of Mechanical Engineering. (1986, 2005)
- Welch, Finis, Distinguished Professor Emeritus of Economics. (1991, 2003)
- Welch, Tommy G., Professor and Extension Specialist Emeritus of Rangeland Ecology and Management. (1974, 1995)
- Wenck, Robert W., Associate Professor Emeritus of Performance Studies. (1968, 2002)
- West, Philip T., Professor Emeritus of Educational Administration. (1974, 1997)
- Whetten, Clifford L., Associate Professor Emeritus of Educational Administration and Human Resource Development. (1986, 2005)
- White, Charles W., Associate Professor Emeritus of Architecture. (1979, 2007)
- White, Larry D., Professor and Extension Specialist Emeritus of Rangeland Ecology and Management. (1971, 2004)
- Wiatt, Robert E., Director Emeritus of Security and University Police. (1983, 2004)
- Wichern, Dean W., Professor and Department Head Emeritus of Information and Operations Management. (1984, 2006)
- Wiersig, Donald O., Professor Emeritus of Veterinary Physiology and Pharmacology. (1967, 1985)
- Wiggins, Charles W., Professor Emeritus of Political Science. (1981, 1999)
- Wilding, Lawrence P., Professor Emeritus of Soil and Crop Sciences. (1976, 2003)
- Wilkes, Lambert, P.E., Professor Emeritus of Agricultural Engineering. (1948, 1987)
- Williams, John D., Associate Professor Emeritus of Veterinary Pathobiology. (1955, 1999)
- Wolfenden, Alan, Professor Emeritus of Mechanical Engineering. (1982, 2002)
- Wood, Randall, Professor Emeritus of Biochemistry and Biophysics. (1976, 1999)
- Woode, Gerald N., Professor Emeritus of Veterinary Pathobiology. (1985, 1998)
- Woods, Calvin E., P.E., Professor Emeritus of Civil Engineering. (1972, 2000)
- Woods, Donald L., P.E., Professor Emeritus of Civil Engineering. (1963, 1997)
- Wooten, Alvin B., Director Emeritus of the Texas Real Estate Research Center. (1954, 1981)
- Workman, Michael E., Associate Professor Emeritus of Engineering Technology and Industrial Distribution. (1972, 1999)
- Worley, Willard P., P.E., Professor Emeritus of Electrical Engineering. (1956, 1988)
- Yao, James T. P., P.E., Professor Emeritus of Civil Engineering. (1988, 2003)
- Zingaro, Ralph A., Professor Emeritus of Chemistry. (1954, 1995)
- Zingery, Wilbur L., Senior Lecturer Emeritus of Agricultural Engineering. (1975, 1994)
- Zwolinski, Bruno J., Professor Emeritus of Chemistry. (1961, 1991)

Appendix A

Rules and Regulations for Determining Residence Status

According to Texas Higher Education Coordinating Board Bulletin and Pursuant to Title 3, Texas Education Code Effective Spring 2007

Your status as a resident, nonresident or international (foreign) student will be determined in the Office of Admissions prior to your enrollment. The determination is based on state statutes and rules and regulations promulgated by the Texas Higher Education Coordinating Board. You must be prepared to pay tuition and other required fees by specified due dates.

If you have knowledge of an error in your residency status for tuition purposes, it is your responsibility to notify the Office of Admissions immediately. You may do so by submitting a residence questionnaire which is available for download on the Web site admissions.tamu.edu/registrar.

Any questions should be directed to the Residency Officer at (979) 845-1076 or email residency@tamu.edu. You may also find the complete rules and regulations on the Web site www.collegefortexans.com/residency.

Appendix B

Texas Common Course Numbering System

The Texas Common Course Numbering System (TCCNS) has been designed for the purpose of aiding students in the transfer of general academic courses between colleges and universities throughout Texas. Common courses are freshman and sophomore academic credit courses that have been identified as common by institutions that are members of the common course numbering system. The system ensures that if the student takes the courses the receiving institution designates as common, then the courses will be accepted in transfer and the credit will be treated as if the courses had actually been taken on the receiving institution's campus.

The table below lists the courses Texas A&M University has identified as common and their TCCNS equivalents. Before using this table students should be sure that the institution they attend employs the TCCNS.

This table is revised quarterly in January, March, June and September. The most recent version may be obtained from the Office of Admissions and Records.

The current version of this document may be found on the Office of Admissions and Records Web site at www.tamu.edu/admissions/undergrad/tccns.shtml.

Texas A&M Course			TCCNS Equivalent Course	
ACCT	229	Intro. Accounting	ACCT	2301
ACCT	229	Intro. Accounting	ACCT	2401
ACCT	230	Intro. Accounting	ACCT	2302
ACCT	230	Intro. Accounting	ACCT	2402
AGEC	105	Intro. to Agri. Economics	AGRI	2317
AGLS	101	Mod. Agri. Systems and Ren. Nat. Res.	AGRI	1131
AGLS	101	Mod. Agri. Systems and Ren. Nat. Res.	AGRI	1231
AGLS	201	Computer Applications in Agri.	AGRI	1309
AGRO	105	World Food and Fiber Crops	AGRI	1307
AGRO	105	World Food and Fiber Crops	AGRI	1407
AGSM	201	Farm Tractors and Power Units	AGRI	2301
ANSC	107	General Animal Science	AGRI	1319
ANSC	107 & 108	General Animal Science	AGRI	1419
ANTH	201	Intro. to Anthropology	ANTH	2346
ANTH	202	Intro. to Archaeology	ANTH	2302
ANTH	210	Social and Cultural Anthropology	ANTH	2351
ARTS	103	Design I	ARTS	1311
ARTS	111	Drawing I	ARTS	1316
ARTS	112	Drawing II	ARTS	1317
ARTS	149	Art History Survey I	ARTS	1303
ARTS	150	Art History Survey II	ARTS	1304
BIOL	101	Botany	BIOL	1311 & 1111
BIOL	101	Botany	BIOL	1411
BIOL	107	Zoology	BIOL	1313 & 1113
BIOL	107	Zoology	BIOL	1413
BIOL	111	Intro. Biology I	BIOL	1406
BIOL	111	Intro. Biology I	BIOL	1306 & 1106
BIOL	112	Intro. Biology II	BIOL	1407

Texas A&M Course			TCCNS Equivalent Course	
BIOL	112	Intro. Biology II	BIOL	1307 & 1107
BIOL	206	Intro. Microbiology	BIOL	2421
CHEM	101 & 111	Fund. of Chemistry I	CHEM	1411
CHEM	102 & 112	Fund. of Chemistry II	CHEM	1412
CHEM	106	Molecular Science for Citizens	CHEM	1305
CHEM	106 & 116	Molecular Science for Citizens and Lab.	CHEM	1405
CHEM	116	Molecular Science for Citizens Lab.	CHEM	1105
CHEM	227	Organic Chemistry I	CHEM	2323
CHEM	227 & 237	Organic Chemistry I and Organic Chemistry Lab.	CHEM	2423
CHEM	228	Organic Chemistry II	CHEM	2325
CHEM	228 & 238	Organic Chemistry II and Organic Chemistry Lab.	CHEM	2425
CHEM	237	Organic Chemistry I Lab.	CHEM	2123
CHEM	237	Organic Chemistry I Lab.	CHEM	2223
CHEM	238	Organic Chemistry II Lab.	CHEM	2125
CHEM	238	Organic Chemistry II Lab.	CHEM	2225
CLAS	101	Beginning Classical Greek I	GREE	1411
CLAS	102	Beginning Classical Greek II	GREE	1412
CLAS	121	Beginning Latin I	LATI	1411
CLAS	122	Beginning Latin II	LATI	1412
CLAS	221	Intermediate Latin	LATI	2311
COMM	101	Intro. to Speech Communication	SPCH	1311
COMM	203	Public Speaking	SPCH	1315
COMM	243	Argumentation and Debate	SPCH	2335
COMM	290	Speech Practicum	SPCH	1144
COMM	290	Speech Practicum	SPCH	1145
COMM	290	Speech Practicum	SPCH	2144
COMM	290	Speech Practicum	SPCH	2145
COSC	253	Const. Materials and Methods I	ARCH	2312
CPSC	203	Intro. to Computing	COSC	1317
CPSC	203	Intro. to Computing	COSC	1417
CPSC	206	Structured Prog. in C	BCIS	1420
CPSC	206	Structured Prog. in C	COSC	1420*
CPSC	210	Data Structures	COSC	2315
CPSC	210	Data Structures	COSC	2415
CVEN	201	Plane Surveying	ENGR	1307 & 1407
DASC	202	Dairying	AGRI	1311
ECON	202	Principles of Microeconomics	ECON	2302
ECON	203	Principles of Macroeconomics	ECON	2301
ENDS	101	Design Process	ARCH	1311
ENDS	105	Design Foundations I	ARCH	1403
ENDS	115	Design Communication Foundations	ARCH	1407
ENDS	149	Survey of Architectural History I	ARCH	1301
ENDS	150	Survey of Architectural History II	ARCH	1302
ENGL	104	Composition and Rhetoric	ENGL	1301
ENGL	203	Intro. to Literature	ENGL	1302
ENGL	210	Scientific and Technical Writing	ENGL	2311
ENGL	221	World Literature	ENGL	2332
ENGL	222	World Literature	ENGL	2333
ENGL	227	American Literature: Colonial to Amer. Renaissance	ENGL	2327
ENGL	228	American Literature: Civil War to Present	ENGL	2328

Texas A&M Course			TCCNS Equivalent Course	
ENGL	231	Survey of English Literature I	ENGL	2322
ENGL	232	Survey of English Literature II	ENGL	2323
ENGL	235	Intro. to Creative Writing: Prose	ENGL	2307
ENGL	236	Intro. to Creative Writing: Poetry	ENGL	2308
FINC	201	Personal Finance	BUSI	1307
FREN	101	Beginning French I	FREN	1411
FREN	102	Beginning French II	FREN	1412
FREN	201	Intermediate French I	FREN	2311
FREN	202	Intermediate French II	FREN	2312
FSTC	201	Food Science	AGRI	1329
GEOG	201	Intro. to Human Geography	GEOG	1302
GEOG	202	Geography of Global Village	GEOG	1303
GEOL	101	Principles of Geology	GEOL	1303 & 1103
GEOL	101	Principles of Geology	GEOL	1403
GEOL	106	Historical Geology	GEOL	1304 & 1104
GEOL	106	Historical Geology	GEOL	1404
GERM	101	Beginning German I	GERM	1411
GERM	102	Beginning German II	GERM	1412
GERM	201	Intermediate German I	GERM	2311
GERM	202	Intermediate German II	GERM	2312
HIST	101	Western Civilization to 1660	HIST	2311
HIST	102	Western Civilization since 1660	HIST	2312
HIST	103	World History to 1500	HIST	2321
HIST	104	World History since 1500	HIST	2322
HIST	105	History of the United States	HIST	1301
HIST	106	History of the United States	HIST	1302
HIST	213	History of England	HIST	2313
HIST	214	History of England	HIST	2314
HIST	226	History of Texas	HIST	2301
HLTH	216	First Aid	PHED	1206
HLTH	216	First Aid	PHED	1306
HLTH	231	Healthy Lifestyles	PHED	1304
HORT	201	General Horticulture	AGRI	1315
HORT	201	General Horticulture	AGRI	1415
HORT	201	General Horticulture	HORT	1301
HORT	201	General Horticulture	HORT	1401
ITAL	101	Beginning Italian I	ITAL	1411
ITAL	102	Beginning Italian II	ITAL	1412
ITAL	201	Intermediate Italian I	ITAL	2311
ITAL	202	Intermediate Italian II	ITAL	2312
JAPN	101	Beginning Japanese I	JAPN	1411
JAPN	102	Beginning Japanese II	JAPN	1412
JAPN	201	Intermediate Japanese I	JAPN	2311
JAPN	202	Intermediate Japanese II	JAPN	2312
JOUR	102	American Mass Media	COMM	1307
JOUR	203	Media Writing I	COMM	2311
KINE	199	Required Physical Activity	PHED	1151
KINE	199	Required Physical Activity	PHED	1152
KINE	199	Required Physical Activity	PHED	2155
KINE	199	Required Physical Activity	PHED	2255
KINE	199	Required Physical Activity	PHED	(Any activity course)
KINE	213	Foundations of Kinesiology	PHED	1301
MATH	102	Algebra	MATH	1314

Texas A&M Course			TCCNS Equivalent Course	
MATH	103	Plane Trigonometry	MATH	1316
MATH	141	Business Math. I	MATH	1324
MATH	142	Business Math. II	MATH	1325
MATH	150	Functions, Trigonometry and Linear Systems	MATH	2412
MATH	151	Engineering Math. I	MATH	2413
MATH	152	Engineering Math. II	MATH	2414
MATH	253	Engineering Math. III	MATH	2415
MGMT	105	Intro. to Business	BUSI	1301
MGMT	211	Legal and Social Environment of Business	BUSI	2302
MGMT	212	Business Law	BUSI	2301
MUSC	201	Music and the Human Experience	MUSI	1306
MUSC	250	Individual Performance—Piano I	MUSI	1181
MUSC	250	Individual Performance—Piano I	MUSI	1182
MUSC	250	Individual Performance—Piano I	MUSI	2181
MUSC	250	Individual Performance—Piano I	MUSI	2182
NUTR	202	Fundamentals of Human Nutrition	BIOL	1322
NUTR	202	Fundamentals of Human Nutrition	HECO	1322
PHIL	111	Contemporary Moral Issues	PHIL	2306
PHIL	240	Intro. to Logic	PHIL	2303
PHIL	251	Intro. to Philosophy	PHIL	1301
PHYS	201	College Physics	PHYS	1301 & 1101
PHYS	201	College Physics	PHYS	1401
PHYS	202	College Physics	PHYS	1302 & 1102
PHYS	202	College Physics	PHYS	1402
PHYS	218	Mechanics	PHYS	2325 & 2125
PHYS	218	Mechanics	PHYS	2425*
PHYS	219	Electricity	PHYS	2326 & 2126
PHYS	219	Electricity	PHYS	2426*
POLS	206	American National Government	GOVT	2305
POLS	207	State and Local Government	GOVT	2306
POLS	209	Intro. to Political Science Research	GOVT	2304
POSC	201	General Avian Science	AGRI	1327
PSYC	107	Intro. to Psychology	PSYC	2301
RPTS	201	Foundations of Recreation and Parks	PHED	1336
RUSS	101	Beginning Russian I	RUSS	1411
RUSS	102	Beginning Russian II	RUSS	1412
RUSS	201	Intermediate Russian I	RUSS	2311
RUSS	202	Intermediate Russian II	RUSS	2312
SOCI	205	Intro. to Sociology	SOCI	1301
SPAN	101	Beginning Spanish I	SPAN	1411
SPAN	102	Beginning Spanish II	SPAN	1412
SPAN	201	Intermediate Spanish I	SPAN	2311
SPAN	202	Intermediate Spanish II	SPAN	2312
STAT	201	Elementary Statistical Inference	MATH	1342
STAT	201	Elementary Statistical Inference	MATH	1442
THAR	101	Intro. to Western Theatre	DRAM	1310
THAR	110	Acting I: Fundamentals	DRAM	1351
THAR	115	Voice and Articulation	SPCH	1342
THAR	135	Technical Theatre	DRAM	1330
THAR	210	Acting II: Characterization	DRAM	1352
THAR	250	Theatrical Makeup	DRAM	1341
THAR	255	Costume Construction	DRAM	1342
THAR	280	History of the Theatre I	DRAM	2361

Texas A&M Course			TCCNS Equivalent Course	
THAR	281	History of the Theatre II	DRAM	2362
THAR	290	Theatre Practicum	DRAM	1120
THAR	290	Theatre Practicum	DRAM	1121
THAR	290	Theatre Practicum	DRAM	1220
THAR	290	Theatre Practicum	DRAM	1221
THAR	290	Theatre Practicum	DRAM	1320
THAR	290	Theatre Practicum	DRAM	1321
THAR	290	Theatre Practicum	DRAM	2120
THAR	290	Theatre Practicum	DRAM	2121
THAR	290	Theatre Practicum	DRAM	2220
WFSC	201	Wildlife Conservation and Management	AGRI	2330

* Must include a lab.

Appendix C

Family Educational Rights and Privacy Act of 1974

Annually, Texas A&M University informs students of the Family Educational Rights and Privacy Act of 1974. This Act, with which the University intends to comply fully, is intended to protect the privacy of education records, to establish the rights of students to inspect and review their education records and to provide guidelines for the correction of inaccurate or misleading data through informal and formal hearings. Students also have the right to file complaints with the Family Educational Rights and Privacy Act Office of the Department of Education in Washington, D.C. concerning alleged failures by the University to comply with the Act.

The Family Educational Rights and Privacy Act of 1974 (FERPA) is a federal law which provides minimum standards for the management of student education records for universities receiving funds made available under any federal program administered by the U.S. Commissioner of Education. The Act provides, among other things, that an institution will maintain the confidentiality of student education records and students will have the right to inspect most education records an institution maintains on them.

This Policy and the procedures included within it are designed to meet the FERPA provisions. Texas A&M University is committed to the good faith implementation of this Policy. Copies of the policy may be obtained at www.tamu.edu/registrar. Questions may be emailed to registrar@tamu.edu.

In case a student, the parent of a student or any other individual has a complaint that an official of the University is violating FERPA, and the complaint cannot be satisfactorily resolved within the University, that person has the right to file a complaint with the Department of Education by contacting:

Family Policy Compliance Office
U.S. Department of Education
400 Independence Ave., S.W.
Washington, D.C. 20202-4605
(202) 260-3887

For the purposes of this Policy, Texas A&M University has used the following definitions of terms:

Student. Person who attends or has attended a program of instruction sponsored by Texas A&M University. The term does not include an individual who has not been in actual attendance at the University.

Education Records. Any records (in handwriting, print, tapes, film or other medium) maintained by the University, an employee of the University or agent of the University which is related to the student.

Directory Information. Under the “Family Educational Rights and Privacy Act of 1974 (FERPA),” the following directory information may be made public unless the student desires to withhold any or all of this information: the student’s name, local address, permanent address, email address, local telephone number, permanent telephone number, program of study, classification, dates of attendance, participation in officially recognized activities and sports, degrees received, academic honors and awards received, and previous institution(s) attended.

Currently enrolled students wishing to withhold any or all directory information items may do so by:

- Going to myrecord.tamu.edu, clicking on Hold Directory Information and submitting a completed form.
- Going to admissions.tamu.edu/Registrar/Current/FerpaNotice.aspx and clicking on “Hold the Directory.” Print the form, complete it and bring it to the Office of the Registrar, General Services Complex, 750 Agronomy Road, Suite 1501, College Station, Texas or mail it to the Office of the Registrar, P.O. Box 30018, College Station, TX 77842-3018.
- Filling out a form available at the Office of the Registrar, General Services Complex, 750 Agronomy Road, Suite 1501, College Station, Texas.

Information on a student may be released unless a Hold Directory Information form is completed by the student and submitted to the Records section by the 12th class day of a fall or spring semester or by the 4th class day of a summer term (the official census day). The Hold Directory request remains in effect until the student revokes it or is deceased. Only currently enrolled students may request directory information be withheld.

Statement of Rights

Texas A&M University encourages students to exercise all of their rights under the Family Educational Rights and Privacy Act. 20 U.S.C. 1232g. Operating under the premise that the educational process is a cooperative venture between a student and the University, we emphasize the following rights of eligible students:

1. the right to inspect and review, with certain limited exceptions, the student’s educational records, including the right to receive explanations and interpretations of the records and to obtain copies of the records when such are needed to allow the student to effectively exercise his/her right of inspection and review;
2. the right to consent to disclosures of personally identifiable information contained in the student’s education records, except to the extent that FERPA authorizes disclosure without consent.

One exception which permits disclosure without consent is disclosure to school officials with legitimate educational interests. A *school official* is a person or entity: (a) employed by the university or the university system in an administrative, supervisory, academic or research, or support staff position; (b) serving on a university governing body or duly authorized panel or committee; or (c) employed by or under contract to the university to perform a special task, function, or service for the university.

A school official has a *legitimate educational interest* if the information requested is necessary for that official to (a) perform appropriate tasks that are specified in his/her position description or in the performance of regularly assigned duties by a lawful supervisor; (b) fulfill the terms of a contractual agreement; (c) perform a task related to a student's education; (d) perform a task related to the discipline of a student; or (e) provide a service or benefit relating to the student or student's family, such as health care, counseling, financial aid, job placement, or former student-related activities.

Disclosure to a school official having a legitimate educational interest does not constitute university authorization to transmit, share, or disclose any or all information received to third parties unless such disclosure is permitted or required by law.

3. the right to correct a student's education records when the records are inaccurate, misleading or otherwise in violation of FERPA;
4. the right to report violations of FERPA to the Department of Education;
5. the right to be informed about FERPA rights.

All the rights and protections given students under FERPA belong to the student. However, information in student records may be provided to parents/legal guardians without the written consent of the student if the eligible student is a financial dependent of his or her parents/legal guardians as defined under Section 152 of the Internal Revenue Code of 1954.

Records Not Available for Information and Review

Students shall have access to all education records concerning them maintained by the University with the exception of the following:

1. A personal record kept by a university faculty or staff member which meets the following tests:
 - a. It is in the personal possession of the individual who made it.
 - b. Information contained in it has never been revealed or made available to any other person except the maker's temporary substitute.
2. An employment record which is used in relation to a student's employment by the University.
3. Records relating to a student which are created or maintained by a physician, psychiatrist, psychologist or other recognized professional or para-professional acting in his or her professional or para-professional capacity or assisting in that capacity which are used in connection with the provision of treatment to a student and are not disclosed to anyone other than the individuals providing the treatment.
4. Financial records and statements of a student's parents.
5. Confidential letters and statements of recommendation which were placed in the education records of a student prior to January 1, 1975.

6. Confidential letters and statements of recommendation which were placed in the education records of a student on or after January 1, 1975, if the student has waived his or her right to inspect and review the letters or statements.
7. Records concerning admissions to an academic component of the University which the student has never attended.

Any questions concerning FERPA should be directed to the Office of the Registrar.

Appendix D

International Agreements

To create an environment conducive to the broadening and strengthening of its programs, Texas A&M University has active, formal agreements with foreign institutions as follows:

Argentina

Universidad Catolica Argentina (1997)

Armenia

Armenian Agricultural Academy (1996)

Australia

Queensland University of Technology (2001)

University of Western Australia (2001)

Austria

Johannes Kepler Universitat – Linz (1986)

Universitaet Leoben (2001)

Wirtschaftsuniversitat Wien (2001)

Bangladesh

Bangladesh Agricultural University (2001)

Belgium

Katholieke Universiteit Leuven (2003)

Benin

Universite D'Abomey-Calavi (2004)

Bolivia

The Government of the Republic of Bolivia (2002)

Brazil

Fundacao Museu do Homen Armericano & Pos-graduacao em Arqueologia e Conservacao da Unversidade Federal de Pernambuco (2003)

Fundo de Apoia a Cultura do Algodao (FACUAL) (2007)

Universidad de Sao Paulo (1990)

Universidade de Campinas (UNICAMP) (2005)

Universidade Estadual de Campinas (2005)

Universidade Federal De Santa Maria and Universidade Federal De Minas Gerais (2002)

Universidade Federal Do Rio Grande Do Norte (2001)

Universidade Federal Fluminense (2006)

Universidad Federal Rural de Pernambuco (2007)

Universidade Guarulhos (2004)

University of Vale do Itajai-UNIVALI (2006)

Canada

University of Saskatchewan (2001)

Chile

Universidad de Chile (2005)

Universidad Tecnica Federico Santa Maria (2003)

China

China University of Geosciences (2006)
Harbin Engineering University (2006)
Hong Kong University of Science and Technology (2001)
Institute of Oceanology Chinese Academy of Sciences (2006)
Ocean University of China (2006)
Peking University (1992)
Shanghai Jiao Tong University (1985)
Tianjin University (2004)
Tongji University (1997)
Tsinghua University (2004)

Colombia

Universidad EAFIT (2007)
Universidad Industrial de Santander (2005)
Consortium
North American Mobility in Higher Ed (PIECE) (2003)
Trans-Atlantic Science Student Exchange Program (TASSEP) (2001)

Costa Rica

Centro Panamericano De Idiomas (2002)

Denmark

Royal Veterinary and Agricultural University (2004)

Dominican Republic

Instituto Agrario Dominicano (2003)
The Secretariat of Agriculture (2002)

Ecuador

Escuela Superior Politecnica del Litoral (ESPOL) (2005)
National Polytechnical University (2003)
Oceanographic Institute of the Ecuadorian Navy (INOCAR) (2001)
Universidad San Francisco de Quito (2004)

Egypt

Zagazig University (2003)

Ethiopia

Alemaya University (2001)
Fund for the Improvement of Post-Secondary Education (FIPSE)
FIPSE (European Institutions/Education) (2003)
FIPSE (North American Institutions/Vet. Med) (2003)

France

Ecole De Management De Lyon (2003)
Ecole Special des Travaux Publics du Batiment Et de l'Industrie &
Ecole Nationale Superieure D'Arts et Metiers (2002)
Ecole Superieure de Plasturgie (2003)
EDHEC Business School (2003)
Federation Des Ecoles Superieures D'Ingenieurs en Agriculture (FESIA) (1998)
HEC School of Management (2003)
Universite Louis Pasteur (2003)
Universite Robert Schuman (1999)
Universite Sorbonne Nouvelle – Paris III (2006)
University of Caen (2004)

Georgia

- Caucasus School of Business (2005)
- Georgia State Agricultural University – Batumi (2006)
- Georgia State Agricultural University – Tbilisi (2006)

Germany

- Asko Europa Stiftung (2002)
- Eberhard-Karls University – Tübingen (2001)
- Leipzig Graduate School of Management (1999)
- Ruhr Universität (2004)
- Stuttgart Institute of Management and Technology (SIMT) (2001)
- Technische Universität Darmstadt (2007)
- Technische Universität Dresden (2003)
- Universität Ulm (1998)
- University of Applied Sciences (2005)
- University of Kaiserslautern (2004)
- University of Karlsruhe (2003)
- WHU – Koblenz (1985)

Greece

- National and Kapodistrian University of Athens (2003)
- University of Thessaly (2005)

Guatemala

- Universidad del Valle de Guatemala (1991)
- Universidad Francisco Marroquín (1989)

Honduras

- Escuela Agrícola Panamericana (1986)

India

- Indian Institute of Management Bangalore (IIMB) (2001)
- Mangalore University (2007)
- University of Agricultural Sciences – Dharwad (2003)

Indonesia

- Institute Pertanian Bogor (2003)

Italy

- Castiglione Fiorentino Library Agreement (2003)
- Politecnico di Torino (2001)
- University of Rome (2005)

Japan

- Obihiro University of Agriculture & Veterinary Med (2005)
- Osaka University (2001)
- Tokyo Keizai University (2005)
- Japan Agency for Marine-Earth Science & Technology – JAMSTEC (2007)

Korea

- Cheju National University (2006)
- Daegu National University of Education (2005)
- Gyeongsang National University (2003)
- Korea Research Institute of Bioscience and Biotechnology (2003)
- Kyonggi University (2001)
- Pai Chai University (2002)
- Soonchunhyang University (1999)

Mexico

- Consejo Nacional de Ciencia y Tecnologia (CONACYT) (1996)
- Instituto Nacional de Investigaciones Nucleares (2003)
- Instituto Tecnológico Y de Estudios Superiores de Monterrey (1979)
- State of Coahuila (2003)
- Universidad de Guadalajara (2004)
- Universidad de las Americas (UDLA) (2002)
- Universidad la Salle (2001)
- Universidad Iberoamericana (1988)
- Universidad Nacional Autonoma de Mexico (1983)

Netherlands

- Universiteit Maastricht (1998)

Norway

- Stavanger University College (2001)

Panama

- International Maritime University in Panama (2006)

Peru

- Pontificia Universidad Catolica del Peru (1985)
- Universidad Peruana Cayetano Heredia (2007)

Portugal

- Camara Municipal de Lagos (2006)

Qatar

- University of Qatar (2005)

Romania

- University "Politechnica" of Bucharest (2007)

Singapore

- National University of Singapore (2005)

South Africa

- University of Natal (2002)

Spain

- Universidad Carlos III de Madrid (1998)
- Universidad Castilla La Mancha/Cervantes project (2003)
- Universidad de Cantabria (2003)
- Universidad de Cordoba (2006)
- Universidad Complutense de Madrid (2006)
- Universitat Pompeu Fabra (1998)

Switzerland

- Universite De Lausanne (2000)

Taiwan

- National Chiao Tung University (2007)
- National Cheng Kung University (2001)

Thailand

- Chiang Mai University (2003)

Tunisia

- The 7th November University of Carthage (2002)

Turkey

Izmir University of Economics (2005)

Ukraine

Chernivtsi National University (2004)

United Arab Emirates

American University of Sharjah (2002)

United Kingdom

Lancaster University (2002)

Oxford University (1999)

University of Cambridge (2004)

University of Leicester (2007)

University of Nottingham (2002)

University of Salford (2007)

Venezuela

La Universidad del Zulia (1998)

Scholastic Honor Societies

Alpha Epsilon Delta — Premedical/Pre dental
Alpha Eta Mu Beta — Bioengineering
Alpha Kappa Delta — Sociology
Alpha Pi Mu — Industrial Engineering
Alpha Zeta — Agriculture
Beta Alpha Psi — Accounting
Beta Beta Beta — Biology
Beta Gamma Sigma — Business Administration
Cap and Gown — Seniors
Chi Epsilon — Civil Engineering
Eta Kappa Nu — Electrical Engineering
Eta Sigma Gamma — Health
Financial Management Association Honor Society — Finance
Gamma Theta Upsilon — Geography
Golden Key — Juniors and Seniors
Kappa Delta Pi — Education
Kappa Theta Epsilon — Cooperative Education
Lambda Sigma — Sophomores
Lambda Pi Eta — Communication
Omega Chi Epsilon — Chemical Engineering
Phi Alpha Theta — History (international)
Phi Beta Kappa — Juniors, Seniors and Graduate Students
Phi Eta Sigma — Freshmen
Phi Kappa Phi — Juniors, Seniors and Graduate Students
Phi Sigma Tau — Philosophy
Pi Alpha Xi — Floriculture
Pi Epsilon Tau — Petroleum Engineering
Pi Gamma Mu — Social Sciences
Pi Mu Epsilon — Mathematics
Pi Sigma Alpha — Political Science
Pi Tau Sigma — Mechanical Engineering
Psi Chi — Psychology
Sigma Delta — Industrial Distribution

Sigma Delta Pi — Hispanic

Sigma Iota Epsilon — Business Management

Sigma Lambda Chi — Construction Science

Sigma Tau Delta — English

Tau Alpha Pi — Engineering Technology

Tau Beta Pi — Engineering

Tau Kappa — Juniors

Tau Sigma Delta — Architecture

Upsilon Pi Epsilon — Computer Science

Xi Sigma Pi — Forest Science

Appendix F

Oak Ridge Associated Universities (ORAU)

Since 1950, students and faculty of Texas A&M University have benefited from its membership in Oak Ridge Associated Universities (ORAU). ORAU is a consortium of 98 colleges and universities and a contractor for the U.S. Department of Energy (DOE) located in Oak Ridge, Tennessee. ORAU works with its member institutions to help their students and faculty gain access to federal research facilities throughout the country; to keep its members informed about opportunities for fellowship, scholarship and research appointments; and to organize research alliances among its members.

Through the Oak Ridge Institute for Science and Education (ORISE), the DOE facility that ORAU operates, undergraduates, graduates, postgraduates, as well as faculty enjoy access to a multitude of opportunities for study and research. Students can participate in programs covering a wide variety of disciplines including business, earth sciences, epidemiology, engineering, physics, geological sciences, pharmacology, ocean sciences, biomedical sciences, nuclear chemistry and mathematics. Appointment and program length range from one month to four years. Many of these programs are especially designed to increase the numbers of underrepresented minority students pursuing degrees in science- and engineering-related disciplines. A comprehensive listing of these programs and other opportunities, their disciplines, and details on locations and benefits can be found in the *ORISE Catalog of Education and Training Programs*, which is available at www.ornl.gov/orise/educ.htm, or by calling either of the contacts below.

ORAU's Office of Partnership Development seeks opportunities for partnerships and alliances among ORAU's members, private industry, and major federal facilities. Activities include faculty development programs, such as the Ralph E. Powe Junior Faculty Enhancement Awards, the Visiting Industrial Scholars Program, consortium research funding initiatives, faculty research and support programs as well as services to chief research officers.

For more information about ORAU and its programs, visit www.ornl.gov or contact:

James A. Calvin
Interim Vice President for Research
ORAU Councilor for Texas A&M University
(979) 845-8585

Monnie E. Champion
ORAU Corporate Secretary
(865) 576-3306; or

Visit the ORAU Home Page at ornl.gov.

Appendix G

Student Right to Know and Campus Security Act

In compliance with the Federal Right to Know and Campus Security Act of 1990, the following information is maintained and available upon request through the appropriate offices listed below.

Campus Crime Statistics

In compliance with the Jeanne Clery Disclosure of Campus Security Policy and Campus Crime Statistics Act, the University Police Department produces an annual security report. This report includes information on campus security and safety resources, policies and procedures for safety (reporting crimes and emergencies, crime awareness and prevention, security of campus facilities and residence halls), alcohol, drugs and weapons, and crime information and statistics.

For a copy of this report, contact University Police Department, (979) 845-2345, upd.tamu.edu.

Chief of Security and University Police
University Police Department
(979) 845-8058

Graduation Rates of Athletes
Office of Associate Athletic Director for Academic Affairs
(979) 845-3945

Graduation Rates of Undergraduate Students
Office of Institutional Studies
(979) 845-7838

Appendix H

Education Code § 51.936 requirement to publish a summary of *Education Code Ch. 37, subchapter F. Hazing in the University Catalog*

The following is a summary of Chapter 37, subchapter F. (§§ 37.151-157) of the Texas Education Code, which prohibits hazing in Texas public or private high schools. Texas Education Code §51.936 applies Ch. 37's prohibition on hazing to institutions of higher education. This summary of Chapter 37 is provided as required by § 51.936(d).

Summary

Hazing is a criminal violation under Texas law. A person may be found guilty of criminal conduct for hazing, encouraging hazing, permitting hazing, or having knowledge of the planning of hazing incidents and failure to report in writing his/her knowledge to the Dean of Students.

Both failing to report hazing and hazing that does not result in serious bodily injury are Class B misdemeanors. Hazing that results in serious bodily injury is a Class A misdemeanor. Hazing resulting in a death is a state jail felony. An organization found guilty of hazing may be fined \$5,000 to \$10,000 or, for incident causing personal injury or property damage, an amount double the loss or expenses incurred because of the hazing incident. It is not a defense to prosecution that the person hazed consented to the hazing activity.

Any person reporting a specific hazing incident to the Dean of Students or other appropriate institutional official is immune from civil and criminal liability unless the report is in bad faith or malicious.

The state law does not limit or affect an educational institution's right to enforce its own penalties against hazing.

The Education Code defines hazing as "any intentional, knowing, or reckless act occurring on or off the campus of an educational institution, by one person or acting with others, directed against a student, that endangers the mental or physical health or safety of a student for the purpose of pledging, being initiated into, affiliating with, holding office in, or maintaining membership in an organization." The statute contains a list of conduct which constitutes hazing.

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