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 society.

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 the course of these developments. The ever-expanding population and the increased demands for goods and services have imposed new challenges to provide effective solutions while minimizing unwanted side effects. Engineers recognize that all actions taken have their respective costs, and that solutions to long-standing societal problems are found 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 the current environment are such that all resources must be used in the best possible manner. Thus, the 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 an engineering program will be technically trained and socially educated, thereby being well prepared to make a significant contribution to the world in which he or she works.

The mission of the College of Engineering is to serve Texas, the nation and the 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 of Engineering 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 courses, leadership programs, study-abroad programs and research.

A student engineer can pursue any one of several degree plans, according to personal ambitions, interests and abilities. The student may choose the traditional BS degree and consider advanced research-oriented graduate programs leading to the MS and PhD degrees. Alternatively, the student may select the Doctor of Engineering program which is directed toward professional engineering.

Within the College of Engineering, the undergraduate programs in aerospace, biological and agricultural, biomedical, chemical, civil, computer, electrical, industrial, mechanical, nuclear, ocean, and petroleum engineering are accredited by the Engineering Accreditation Commission of ABET, www.abet.org. The electronic systems engineering technology program, and manufacturing and mechanical engineering technology program are accredited by the Engineering Technology Accreditation Commission of ABET, www.abet.org. The Computer Science program is accredited by the Computing Accreditation Commission of ABET, www.abet.org.

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 of Engineering 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 MATH 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, the college recommends a more conservative decision about accepting advanced placement credits in math. Students who earn a 4 or 5 on the Calculus AB exam or a 3 or 4 on the BC exam are recommended to begin in MATH 151. Students who score a 5 on the Calculus BC exam are recommended to begin in MATH 151 or MATH 152. These conservative recommendations help ensure students have thoroughly mastered the content that is fundamental to the engineering curriculum. Students should discuss their choice with their assigned undergraduate academic advisor before registering for mathematics classes. New Student Conferences and associated Credit by
Examination tests provide information to advisors so that students begin at a level which may differ from the printed curriculum, but is appropriate to their aptitudes and background. All freshmen admitted into engineering are required to complete the Math Placement Exam (MPE) before the New Student Conferences and should review algebra, trigonometry and geometry prior to taking the MPE.

Because of the importance of computing in the disciplines housed within the College of Engineering, all entering students are required to possess a portable, network-ready personal computer capable of running software appropriate to their academic program, effective Fall 2014. Details about the personal computer needed to meet the requirement can be found on our website. No student will be denied admission to Texas A&M University based on an inability to purchase a computer.

Freshmen in General Engineering, Engineering at Galveston, or Engineering Academy programs have a common first year engineering curriculum to allow time for students to learn about the 17 engineering degree granting majors. It is recognized that in most cases students are not made aware of all of our engineering majors while in high school. Students are introduced to the different engineering majors in the first year engineering courses, ENGR 111 and ENGR 112. Students are encouraged to leverage additional resources, including the career center, faculty, as well as advisors to get career advice. Students must complete the following courses in at least two semesters before applying to an engineering major: two engineering courses, two math courses, and two science courses in the freshman year engineering curriculum. Exceptions will be made as needed for students entering with credit for the required courses. The entry-to-a-major process is designed for students to take ownership of their future to identity at least three majors that are a good match for their career goals and academic performance. The entry-to-a-major process is designed to place students in the highest rank major possible based upon capacity and student performance. Students are encouraged to be in a major as early as possible. Students in the General Engineering and Engineering at Galveston programs must be in a major by the end of the third semester in engineering. Students in the Engineering Academy program must be in a major by the end of the fourth semester in engineering.

Transfer students are admitted directly to a major degree granting program through the admissions process.

Freshman Curriculum

The freshman year is identical for degrees in aerospace engineering, biomedical engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, industrial distribution, industrial engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering. The freshman year is slightly different for chemical engineering in that students take CHEM 101/ CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112. Biomedical Engineering also requires a two semester sequence of chemistry courses consisting of CHEM 101/CHEM 111 or CHEM 107/ CHEM 117 and CHEM 102/112. Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.

Bring Your Own Device (BYOD)

Just as students are required to have specific textbooks and supplies in order to gain the highest quality engineering educational experience, the College of Engineering requires students to purchase a computer to complement the course instruction. The vast majority of the students entering the College already bring some form of desktop or laptop computer with them when they begin school. Unfortunately, the variation in the types of computers makes it next to impossible for instructors to routinely ask students to use their own computers in the classroom. A computer designated by the College and purchased by entering students will provide students the convenience to explore course content anytime, anywhere.

While there are many computers available, the College can only guarantee performance and provide support for the specific computers identified by the College of Engineering. These computers will accommodate most of the needs of an engineering student throughout a four-year degree plan, balancing performance, cost and expected life of the computer. The computers have been negotiated with the various vendors, which are external to Texas A&M University, at a price point that is lower than what an individual would likely be able to negotiate. The price for each computer includes up to a four-year warranty.

Financial Aid

For financial aid recipients, purchase of the a computer device can be considered in the cost of attendance. To request this, please complete the Request to Change Cost of Attendance form (http://financialaid.tamu.edu/Forms-(1).aspx) for Scholarships & Financial Aid. Submission of documentation does not guarantee additional aid will be awarded. In certain situations students may not be eligible for additional funding.

Undergraduate students entering the College are required to follow the BYOD policy of purchasing one of the configured devices designated by the College. No student will be denied admission to Texas A&M University based on an inability to purchase a computer.

For more information, including specific requirements, visit the Bring Your Own Device (BYOD) web page (http://engineering.tamu.edu/easa/areas/academics/byod).

College Prerequisite Policy

The following prerequisite policy applies to any student in a College of Engineering undergraduate degree program and to any student who seeks admission to an undergraduate degree program in the College of Engineering. This policy is in addition to prerequisite policies imposed by the University (Texas A&M University Student Rules). For complete details concerning this policy, students should contact their Undergraduate Advising Office.

Students must earn a grade of C or better in all courses identified in each College of Engineering undergraduate degree program 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 their department. 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 ensure 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 may be administratively dropped by their 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.

**Fast Track Program**

Each participating department in the 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 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 coursework. 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 and Professional 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.

**The Texas A&M Engineering Academies**

The Texas A&M Engineering Academies are co-enrollment programs between the College of Engineering and selected two-year institutions. Students in the Engineering Academy program are engineering students, who take their math, science, and core courses at the two-year institutions and the engineering courses from the College of Engineering. The admission process for the Engineering Academies is unique to each partner institution, with the offer of admission to the Engineering Academy made by Texas A&M University. Texas A&M Engineering Academy students, who satisfy the program GPA requirements, apply for entry to a major as early as the end of the first year.

Eligible students receive financial aid based upon their combined credit hours from both institutions.

For more information, including specific requirements for each of the partner institutions, visit Texas A&M Engineering Academies Texas A&M Engineering Academies (https://engineering.tamu.edu/academies).

**Majors**

**College of Engineering**

- Bachelor of Science in Biological and Agricultural Engineering

**Department of Aerospace Engineering**

- Bachelor of Science in Aerospace Engineering

**Department of Biomedical Engineering**

- Bachelor of Science in Biomedical Engineering

**Artie McFerrin Department of Chemical Engineering**

- Bachelor of Science in Chemical Engineering

**Zachary Department of Civil Engineering**

- Bachelor of Science in Civil Engineering
- Bachelor of Science in Civil Engineering, Coastal and Ocean Engineering Track
- Bachelor of Science in Civil Engineering, Construction Engineering and Management Track
- Bachelor of Science in Civil Engineering, Environmental Engineering Track
- Bachelor of Science in Civil Engineering, General Civil Engineering Track
- Bachelor of Science in Civil Engineering, Geotechnical Engineering Track
- Bachelor of Science in Civil Engineering, Structural Engineering Track
• Bachelor of Science in Civil Engineering, Transportation Engineering Track
• Bachelor of Science in Civil Engineering, Water Resources Engineering Track

Department of Computer Science and Engineering
• Bachelor of Science in Computer Engineering, Computer Science Track
• Bachelor of Science in Computer Science

Department of Electrical and Computer Engineering
• Bachelor of Science in Computer Engineering, Electrical Engineering Track
• Bachelor of Science in Electrical Engineering

Department of Engineering Technology and Industrial Distribution
• Bachelor of Science in Electronic Systems Engineering Technology
• Bachelor of Science in Industrial Distribution
• Bachelor of Science in Manufacturing and Mechanical Engineering Technology
• Bachelor of Science in Multidisciplinary Engineering Technology

Department of Industrial and Systems Engineering
• Bachelor of Science in Industrial Engineering

Department of Mechanical Engineering
• Bachelor of Science in Mechanical Engineering

Department of Nuclear Engineering
• Bachelor of Science in Nuclear Engineering
• Bachelor of Science in Radiological Health Engineering

Department of Ocean Engineering
• Bachelor of Science in Ocean Engineering

Harold Vance Department of Petroleum Engineering
• Bachelor of Science in Petroleum Engineering

Minors

College of Engineering
• Cybersecurity Minor
• Engineering Project Management Minor

Department of Aerospace Engineering
• Aerospace Engineering Minor

Department of Biomedical Engineering
• Biomedical Engineering Minor

Artie McFerrin Department of Chemical Engineering
• Chemical Engineering Minor

Department of Computer Science and Engineering
• Computer Science Minor
• Game Design and Development Minor

Department of Electrical and Computer Engineering
• Electrical Engineering Minor

Department of Engineering Technology and Industrial Distribution
• Embedded Systems Integration Minor

Department of Industrial and Systems Engineering
• Industrial Engineering Minor

Department of Materials Science and Engineering
• Materials Science and Engineering Minor

Department of Mechanical Engineering
• Analysis, Design and Management of Energy Conversion Systems Minor
• Control of Mechanical Systems Minor
• Design and Simulation of Mechanical Systems Minor

Department of Nuclear Engineering
• Nuclear Engineering Minor
• Radiological Health Engineering Minor

Harold Vance Department of Petroleum Engineering
• Petroleum Engineering Minor

Certificates

The College of Engineering has designed the following certificate programs to offer ambitious students the opportunity to go beyond the traditional curriculum and gain specific knowledge in a concentration area. Students are required to consult with their academic advisor prior to submitting an application for a certificate. Enrolling and being accepted into a certificate program does not guarantee registration into required courses. Each certificate, with the exception of the Business Management Certificate, will be recognized on the candidate’s transcript. A coordinator reviews each student’s coursework via a certificate worksheet and requirements met prior to certification. Certificate coordinators are given the discretion to determine the eligibility of students in other colleges and/or majors to pursue College of Engineering certificates. For specific information on each certificate available, visit the College of Engineering website.
**College of Engineering**
- Business Management Certificate for Engineering Students
- Engineering Honors Certificate
- International Engineering Certificate
- Polymer Specialty Certificate
- Safety Engineering Certificate

**Department of Biomedical Engineering**
- Engineering Therapeutics Manufacturing Certificate
- Quality Engineering for Regulated Medical Technologies Certificate

**Department of Industrial and Systems Engineering**
- Data Center Operations Engineering Certificate
- Engineering Systems Management Certificate

**Harold Vance Department of Petroleum Engineering**
- Energy Engineering Certificate

**Masters**

**College of Engineering**
- Master of Engineering in Engineering
- Master of Engineering in Systems Engineering
- Master of Science in Interdisciplinary Engineering
- Master of Science in Safety Engineering

**Department of Aerospace Engineering**
- Master of Engineering in Aerospace Engineering
- Master of Science in Aerospace Engineering

**Department of Biomedical Engineering**
- Master of Engineering in Biomedical Engineering
- Master of Science in Biomedical Engineering

**Artie McFerrin Department of Chemical Engineering**
- Master of Engineering in Chemical Engineering
- Master of Science in Chemical Engineering

**Zachry Department of Civil Engineering**
- Master of Engineering in Civil Engineering
- Master of Science in Civil Engineering

**Department of Computer Science and Engineering**
- Master of Computer Science in Computer Science
- Master of Engineering in Computer Engineering, Computer Science
- Master of Science in Computer Engineering, Computer Science
- Master of Science in Computer Science

**Department of Electrical and Computer Engineering**
- Master of Engineering in Computer Engineering, Electrical Engineering
- Master of Engineering in Electrical Engineering
- Master of Science in Computer Engineering, Electrical Engineering
- Master of Science in Electrical Engineering

**Department of Engineering Technology and Industrial Distribution**
- Master of Industrial Distribution in Industrial Distribution

**Department of Industrial and Systems Engineering**
- Master of Engineering in Industrial Engineering
- Master of Science in Engineering Systems Management
- Master of Science in Industrial Engineering

**Department of Materials Science and Engineering**
- Master of Engineering in Materials Science and Engineering
- Master of Science in Materials Science and Engineering

**Department of Mechanical Engineering**
- Master of Engineering in Mechanical Engineering
- Master of Science in Mechanical Engineering

**Department of Nuclear Engineering**
- Master of Engineering in Nuclear Engineering
- Master of Science in Nuclear Engineering

**Department of Ocean Engineering**
- Master of Engineering in Ocean Engineering
- Master of Science in Ocean Engineering

**Harold Vance Department of Petroleum Engineering**
- Master of Engineering in Petroleum Engineering
- Master of Science in Petroleum Engineering

**Doctoral**

**College of Engineering**
- Doctor of Engineering in Engineering
- Doctor of Philosophy in Interdisciplinary Engineering

**Department of Aerospace Engineering**
- Doctor of Philosophy in Aerospace Engineering

**Department of Biomedical Engineering**
- Doctor of Philosophy in Biomedical Engineering
Artie McFerrin Department of Chemical Engineering  
• Doctor of Philosophy in Chemical Engineering

Zachry Department of Civil Engineering  
• Doctor of Philosophy in Civil Engineering

Department of Computer Science and Engineering  
• Doctor of Philosophy in Computer Engineering, Computer Science  
• Doctor of Philosophy in Computer Science

Department of Electrical and Computer Engineering  
• Doctor of Philosophy in Computer Engineering, Electrical Engineering  
• Doctor of Philosophy in Electrical Engineering

Department of Industrial and Systems Engineering  
• Doctor of Philosophy in Industrial Engineering

Department of Materials Science and Engineering  
• Doctor of Philosophy in Materials Science and Engineering

Department of Mechanical Engineering  
• Doctor of Philosophy in Mechanical Engineering

Department of Nuclear Engineering  
• Doctor of Philosophy in Nuclear Engineering

Department of Ocean Engineering  
• Doctor of Philosophy in Ocean Engineering

Harold Vance Department of Petroleum Engineering  
• Doctor of Philosophy in Petroleum Engineering