

College of Engineering

Engineers are people who harness creativity, math, and science to design, build, and innovate products and services for the betterment of mankind and their environment. Engineers create solutions that improve our world, people's living standards, and address the needs of society. Engineers are educated to contribute to what the National Academy of Engineering labels the "four broad realms of human concern" in the 21st century: sustainability, health, vulnerability, and the joy of living. The College's accomplished education programs and research will likewise, through well-informed investment and implementation strategies, contribute solutions to these concerns at the local and national level. Our UTEP engineers learn to use artistic, scientific, mathematical, economic, social, and practical knowledge to design and build the fabric and infrastructure of today's global society. We build the technologies, systems, structures, machines, devices, materials and processes that safely enable us to live a high quality of life in a sustainable environment. Every modern practical invention, be it a machine, mobile device, structure, computer, jet aircraft, power-generating plant, communication system, or new transportation design is a lasting testimonial to the engineers responsible for it. Thus, to a great extent, current standards of living and high levels of technology are results of the diligent and innovative efforts of engineers. Future accomplishments could help increase energy and food supplies, develop more contamination-free power plants, aid in medical science's fight against disease, and expand humans' computational and design skills beyond imagination. A noted researcher once summarized the engineer's career satisfaction by pointing out that while scientists "explore what is," engineers "create what never has been."

The future for engineering graduates remains very bright. The rapid pace of technological and industrial developments has established an ever-increasing need for highly talented and qualified professional engineers. In addition, the increasing demand for goods and services has imposed new challenges to present and future engineers. To provide these things and, at the same time, conserve resources and minimize environmental impact, engineers must recognize that solutions to long-standing societal problems are found only by thorough planning and study. With a capacity for problem solving, engineers might be the best-qualified persons to address society's problems.

The complexities of today's economy and environment are such that all resources must be used in an optimal manner. Thus, the College of Engineering, through its curricula, strives to educate and train engineers who have the desire to learn and the breadth of vision to formulate and solve the problems of today and tomorrow. There is a strong emphasis on innovation, entrepreneurship, creativity, teamwork and enterprise. It is expected that a student who applies himself or herself and successfully completes one of the engineering or computer science programs will be both technically prepared and broadly educated, and thus ready to make significant contributions.

The College offers many programs of study that should be selected on the basis of personal ambitions, interests, and abilities. The undergraduate programs in civil, electrical, industrial, mechanical, and metallurgical and materials engineering are accredited by the Engineering Accreditation Commission of ABET, Inc. (<http://www.abet.org>) The undergraduate program in computer science is accredited by the Computing Accreditation Commission of ABET, Inc. In addition to the traditional bachelor's degree, the high-achieving student can also consider fast-track programs that lead to master's and Ph.D. degrees.

Engineering students are strongly encouraged to participate in pre-professional experiences, such as internships, cooperative appointments, research assistantships, and community outreach activities. These experiences help engineering students to develop strong professional practice portfolios. To recognize outstanding achievement and to encourage professional activities, the College of Engineering and each computer science and engineering program has one or more active student sections of the appropriate professional and honor societies. Additionally, there are campus chapters of professional societies that cover all fields of engineering. Participation in these groups provides a valuable educational and professional experience and students are strongly encouraged and supported to participate to the extent of their eligibility.

Vision

The UTEP College of Engineering will **change the face of engineering** as a national model for urban institutions in engineering education innovation and in the integration of education, research, and engineering practice and entrepreneurship as a potent economic stimulator for the institution's service region.

Mission

The UTEP College of Engineering will serve the region, the nation, and the world by providing **access and excellence** through:

- Innovative educational programs that contribute to effective learning for our students, and that prepare graduates to be leaders and innovators in a variety of fields,
- Pioneering research programs that foster the creation of knowledge and invention of new technologies,
- Implementation and commercialization of knowledge and technologies to solve critical engineering and computing problems, and
- Active partnerships and collaborations with educational, government, non-profit, and commercial organizations, maintaining a commitment to diversity..

Core Beliefs

Diversity Drives Innovation. Our nation's future depends on its ability to be a global leader in innovation, and diversity is a key to innovation. Diversity has already developed into an economic asset for corporations, universities, and other organizations that hire engineers and computer scientists. The innovation advantage created by a diverse workforce includes a diverse set of cognitive tools, and identity diversity (e.g., race and ethnicity) contributes

significantly to this cognitive tool set. Moreover, the looming engineering workforce shortage crisis, caused by a combination of baby-boomer retirements and flat engineering enrollments, can be solved by tapping into segments of the population currently underrepresented in engineering.

Collaboration Creates Opportunities. The success of our College depends critically on our ability to create opportunities for our faculty, students, staff, and other stakeholders. These opportunities will present themselves through collaborations at the individual and organizational level. Collaborations that we will promote include those among individual faculty members within and external to the College, among departments within and external to the College, between the College and other colleges/units at UTEP, and between the College and external corporations, universities and other organizations.

Research Fuels Preeminence. The College seeks to be among the national leaders in several key niche areas. Research is the necessary fuel to ignite the growth and further development of our programs. Rigorous research, funded through competitive and peer-reviewed processes, in education and targeted interdisciplinary areas of science and engineering, will ensure the effectiveness of our programs, and will enable the wide dissemination and implementation of our ideas and inventions.

Balance Secures Sustainability. A balanced investment portfolio ensures long term growth and sustainability by buffering potential losses in one sector with gains in another. Likewise, the College must invest its time, effort, and resources in an appropriately balanced set of activities that will optimize outcomes by expanding the opportunities available to our faculty, staff, and students. The College will therefore strive to maintain an appropriate balance among teaching, research, and service activities; between opportunities for student learning within and beyond the classroom; and in our funding portfolio of basic, peer-reviewed research relative to commercial-driven applied research and engineering services.

Mathematics Preparation

In addition to the usual preparatory work, applicants to the College of Engineering are expected to have at least two years of Algebra, one year of Geometry, and one semester of Trigonometry or Pre-Calculus in preparation for their freshman year.

Transfer Course Work

A student can transfer a maximum of 66 semester credit hours, limited to lower-division courses, from two-year junior or community colleges. The maximum number of semester credit hours transferable from accredited U.S. colleges and universities depends on the number of credit hours required to complete a specific degree program, and may be calculated as described in the ACADEMIC REGULATIONS section of this catalog. Transfer credit for engineering courses is restricted to ABET-accredited curricula or is awarded on the basis of departmental recommendation. Transfer students might be required to take competency exams and/or take specified courses that the department feels they must have to establish the quality of their degree. Credit for upper-division engineering courses will be given only on the basis of departmental recommendation.

The academic records of all transfer students are reviewed by the College of Engineering to determine eligibility for admission into an engineering program. International students must meet the additional requirement of an overall minimum GPA of 3.0 in mathematics, chemistry, physics, and engineering for all institutions attended.

All transfer credit that is to be applied toward undergraduate engineering degree requirements must be approved by the Dean of Engineering. Transfer credit evaluation should be completed when the student transfers to the College or before completion of the lower-division requirements.

Change of Major

All students enter the College of Engineering through Engineering Edge Center, the Dean's Office program for entering students. Engineering Edge Center has lower division majors, one for every degree program in the College of Engineering. Specifically, Civil Engineering (CE) majors enter the College as Lower-Division-Civil Engineering (LDCE) majors, and Computer Science (CS) majors enter the College as Lower-Division-Computer Science majors. All other majors in the College, Electrical Engineering (EE), Industrial Engineering (IE), Engineering Leadership (EL), Mechanical Engineering (MECH), and Metallurgical & Materials Engineering (MME) follow suit with their Lower Division major counterparts. Lower Division students must petition for a change of major in order to join the department that offers their engineering discipline or computer science when they are enrolled in Calculus I (MATH 1411). Any student enrolled in a program in the College of Engineering can change majors if he or she has a minimum overall GPA of 2.0. The change of major form must be submitted to the Engineering Edge Center Office.

College of Engineering Entering Students Office: Engineering Edge Center

Engineering Edge Center is a comprehensive retention center targeting first-time freshman and first-time transfer students in engineering. Engineering Edge Center goals are to increase retention, to improve academic performance, and to enhance a student's education through the creation of an environment in which students obtain holistic advising and comprehensive support services.

Students wishing to major in engineering or computer science will be advised by Engineering Edge Center Advisors, who specialize in engineering programs of study, and have experience in engineering. Upon enrollment in a calculus course (MATH 1411 (<http://catalog.utep.edu/search/?P=MATH%201411>) or above), students may transfer to the department that offers the degree they are seeking, in order to be advised in the department. Students who are not yet enrolled in MATH 1411 (<http://catalog.utep.edu/search/?P=MATH%201411>) must be advised by the Engineering Edge Center advisors.

Limit on Engineering Course Enrollments

The maximum number of times an Engineering or Computer Science course can be taken is three (3). All enrollments in a course, regardless of grade received, will be counted. Once a student has obtained a C or better in an Engineering or Computer Science course, that course should not be repeated for credit.

Enrollment in Engineering/Computer Science Courses by Non-Majors

Enrollment in nearly all Engineering and Computer Science courses is restricted to students with the appropriate majors, and corresponding minors, if applicable. Students from outside the engineering college wishing to take engineering/computer science courses should request permission from the head of the program offering the course.

Pre-Professional Experiences

Pre-Professional Experiences are commonly known as internships, co-ops, undergraduate research experiences, and service learning. These experiences typically integrate a student's formal academic study with special periods of practical work experience in business, industry, government, or professional or service organizations. These work experiences are an integral part of the student's education, supplementing academic knowledge and promoting and encouraging personal development and professional preparation. The academic value of work completed in pre-professional assignments is recognized by allowing credit to be earned which can be utilized for degree requirements. Contact the Program Head for specific information on academic credit for pre-professional assignments.

Five-Year Bachelor/Master of Science Program

The College of Engineering provides an opportunity for qualified students to participate in a fast-track five-year bachelor/master of science degree program. The program is structured to allow qualified engineering students to enter a graduate research or design program during the senior year of the bachelor's degree. Both the bachelor's and master's degrees can be completed in five academic years.

Graduate Study

The College of Engineering offers a variety of Master of Science (MS) degrees, and Doctor of Philosophy (Ph.D.) degrees. Students who rank high in their undergraduate class should give serious consideration to developing their full intellectual potential in engineering by continuing with advanced studies at the graduate level. Graduate programs are discussed fully in the *Graduate Catalog*.

Interim Dean

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College of Engineering (Dean's Office)

Programs

Minor

- Minor in Biomedical Engineering (<http://catalog.utep.edu/undergrad/college-of-engineering/metallurgical-materials-engineering/minor-biomedical-engineering/>)

Aerospace Studies

Go to information for this department. (<http://catalog.utep.edu/undergrad/college-of-engineering/aerospace-studies/>)

Aerospace and Mechanical Engineering

Go to information for this department. (<http://catalog.utep.edu/undergrad/college-of-engineering/mechanical-engineering/>)

Civil Engineering

Go to information for this department. (<http://catalog.utep.edu/undergrad/college-of-engineering/civil-engineering/>)

Programs

Bachelor of Science in Civil Engineering

- BS in Civil Engineering (<http://catalog.utep.edu/undergrad/college-of-engineering/civil-engineering/>)

Bachelor of Science in Construction Engineering and Management

- BS in Construction Engineering and Management (<http://catalog.utep.edu/undergrad/college-of-engineering/civil-engineering/construction-engineering-and-management-bs/>)

Computer Science

Go to information for this department. (<http://catalog.utep.edu/undergrad/college-of-engineering/computer-science/>)

Programs

Bachelor of Science in Computer Science

- BS in Computer Science (<http://catalog.utep.edu/undergrad/college-of-engineering/computer-science/computer-science-bs/>)

Minor

- Minor in Computer Science (<http://catalog.utep.edu/undergrad/college-of-engineering/computer-science/computer-science-minor/>)

Electrical and Computer Engineering

Go to information for this department. (<http://catalog.utep.edu/undergrad/college-of-engineering/electrical-computer-engineering/>)

Programs

Bachelor of Science in Electrical Engineering

- BS in Electrical Engineering (<http://catalog.utep.edu/undergrad/college-of-engineering/electrical-computer-engineering/electrical-engineering-bs/>)

Minor

- Minor in Electrical Engineering (<http://catalog.utep.edu/undergrad/college-of-engineering/electrical-computer-engineering-minor/>)
- Minor in Computer Engineering (<http://catalog.utep.edu/undergrad/college-of-engineering/electrical-computer-engineering/computer-engineering-minor/>)
- Minor in Robotics and Autonomous Systems (<http://catalog.utep.edu/undergrad/college-of-engineering/electrical-computer-engineering/robotics-autonomous-systems-engineering-minor/>)

Engineering Education & Leadership

Bachelor of Science in Engineering Leadership

- B.S. in Engineering Innovation and Leadership (<http://catalog.utep.edu/undergrad/college-of-engineering/engineering-education-leadership/engineering-innovation-leadership-bs/>)

Industrial, Manufacturing, and Systems Engineering

Go to information for this department. (<http://catalog.utep.edu/undergrad/college-of-engineering/industrial-manufacturing-systems-engineering/>)

Programs

Bachelor of Science in Industrial Engineering

- BS in Industrial & Systems Engineering (<http://catalog.utep.edu/undergrad/college-of-engineering/industrial-manufacturing-systems-engineering/industrial-engineering-bs/>)

Programs

Bachelor of Science

- BS in Mechanical Engineering (<http://catalog.utep.edu/undergrad/college-of-engineering/mechanical-engineering/mechanical-engineering-bs/>)
- BS in Aerospace and Aeronautical Engineering (<http://catalog.utep.edu/undergrad/college-of-engineering/mechanical-engineering/aerospace-aeronautical-engineering-bs/>)

Metallurgical, Materials and Biomedical Engineering

Go to information for this department. (<http://catalog.utep.edu/undergrad/college-of-engineering/metallurgical-materials-engineering/>)

Programs

Bachelor of Science in Metallurgical and Materials Engineering

- BS in Metallurgical and Materials Engineering (<http://catalog.utep.edu/undergrad/college-of-engineering/metallurgical-materials-engineering/metallurgical-materials-engineering-bs/>)

Minor

- Minor in Materials Science and Engineering (<http://catalog.utep.edu/undergrad/college-of-engineering/metallurgical-materials-engineering/materials-science--engineering-minor/>)

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