College of Engineering

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Introduction

Engineering is the application of science and mathematics to the solution of relevant societal needs and problems. The current standard of living is due in large part to efforts of engineers and technologists. Technological development has created a demand for qualified engineers and technologists who maintain the momentum of innovation and who extend and direct its course. The expanding population, with its increased demand for goods and services, has imposed challenges to provide a diversity of new and better products with minimized adverse side effects. Engineers and technologists recognize that long-term solutions are found in careful, thorough planning and study.

The University of North Texas College of Engineering strives to educate and train engineers and technologists who have the vision to recognize and solve the problems of society. The College of Engineering comprises five degree-granting departments of instruction and research. The Department of Computer Science and Engineering, the Department of Electrical Engineering, the Department of Engineering Technology, the Department of Materials Science and Engineering, and the Department of Mechanical and Energy Engineering offer programs of study and research leading to bachelor's, master's and doctoral degrees; some offer programs in one or more majors. Undergraduate programs include computer engineering, computer science, construction engineering technology, electrical engineering, electronics engineering technology, information technology, mechanical engineering technology, manufacturing engineering technology, materials science and engineering, mechanical and energy engineering, and nuclear engineering technology.

Most of the programs in the College of Engineering are accredited by the Accreditation Board for Engineering and Technology (ABET) [111 Market Place, Suite 1050, Baltimore, MD 21202; 410-347-7700].

Each program provides some flexibility through elective course opportunities to permit program individualism while meeting basic requirements.

Mission

The mission of the UNT College of Engineering — the newest college of engineering in North Texas — is to capitalize on the opportunity for innovation and excellence in teaching, research and service. This will be achieved by a strategic alliance among all of the college's constituencies in the region, the state of Texas and the nation. The constituencies involved include foremost our undergraduate and graduate students as well as academic units and industry,

particularly in North Texas, so as to foster economic development and promote an academically diverse environment.

Vision

The vision of the College of Engineering is to have the highest quality and most innovative teaching and research programs in North Texas and beyond:

- in strategically selected areas of engineering and computer science that service the community, industry, and the profession;
- in an intellectually stimulating and diverse environment; and
- in support of industry and economic development.

Academic Advising

Information about academic matters is available from various sources within the College of Engineering. Undergraduate academic advising is available through the Dean's Office and in the major departments. Advisors assist students in the selection of courses and answer questions about selecting a major, degree audits, application of transfer credit, general academic requirements, and policies and procedures.

Degree Audit and College of Engineering Core Requirements

1. Students must request an official degree audit through the departmental faculty advisor prior to successful completion of 45 credit hours. Transfer students must request an official degree audit through the departmental advisor during the first long term/semester attended.

2. Freshman and transfer students in the lower divisions must complete all College of Engineering core curriculum requirements before entering their junior year.

3. Transfer students who are entering their junior year must complete the College of Engineering core curriculum requirements in the first semester of their junior year.

Students should take a complete evaluated transcript of all college work to their faculty advisors for conferences to fill out advisory sheets. After the advisory sheets have been signed by both the faculty advisor and the department chair, the department should send all materials to the College of Engineering Undergraduate Academic Advising Office, where official degree audits will be prepared. Graduation checks should be requested during the term/semester before graduation.

Programs of Study

The college offers the following undergraduate degrees:

- Bachelor of Science with a major in computer science.
- Bachelor of Arts, with a major in information technology.
- Bachelor of Science with a major in computer engineering.
- Bachelor of Science with a major in electrical engineering.
- Bachelor of Science in Engineering Technology with majors in construction engineering technology, electronics engineering technology, manufacturing engineering technology, mechanical engineering technology and nuclear engineering technology.
- Bachelor of Science with a major in materials science and engineering.
- Bachelor of Science with a major in mechanical and energy engineering.

Nuclear engineering technology is available at the TXU Comanche Peak Steam Electric Station.

Candidates for the Bachelor of Science degree must satisfy all general requirements for the bachelor's degree listed in the Academics section of this catalog, and all requirements of the engineering degree requirements as listed below.

Degree Requirements and the University Core Curriculum

Occasionally a course required for a degree may also satisfy a requirement of the University Core Curriculum. In addition to taking the required course, a student may elect to take a different course from among those available to fulfill that core requirement; doing so, however, may add to the total number of hours required for the degree. Students who have questions regarding degree requirements and core requirements should consult an academic advisor.

Bachelor of Science Degree Requirements

Candidates for the Bachelor of Science must meet the following requirements.

1. **Hours Required for the Degree:** Completion of a minimum of 120–128 total semester hours; 42 must be advanced.

2. **General University Requirements:** See "General University Requirements" in the Academics section of this catalog.

3. **College of Engineering Requirements:** See "College of Engineering Required Core Courses" in the College of Engineering section of this catalog for specific requirements and a list of approved courses. See specific degree audit for exact hours.

4. **Major Requirements:** A major of at least 24 semester hours; 12 hours of advanced work in the major must be completed at UNT.

5. **Minor (optional):** A minor is at least 18 hours, of which a minimum of 6 hours must be advanced, from a field outside the major. Minors are chosen with faculty advisors for selected majors. For some majors the minor is specified, but for most majors a minor field is optional. Consult major requirements.

6. **Electives:** See individual major.

7. **Other Course Requirements**: See individual major.

8. **Other Requirements:** Completion of all other requirements for a major and a minor as specified by the respective departments.

Bachelor of Arts Degree Requirements

Candidates for the Bachelor of Arts must meet the following requirements.

1. **Hours Required for the Degree:** Completion of a minimum of 121 semester hours; 42 must be advanced.

2. **General University Requirements:** See "General University Requirements" in the Academics section of this catalog.

3. **College of Engineering Requirements**: See "College of Engineering Required Core Courses" in the College of Engineering section of this catalog for specific requirements and a list of approved courses. See specific degree audit for exact hours.

4. **Major Requirements:** A major of at least 30 semester hours; 12 hours of advanced work in the major must be completed at UNT.

5. **Minor (optional):** A minor is at least 18 hours, of which a minimum of 6 hours must be advanced, from a field outside the major. Minors are chosen with faculty advisors for selected majors. For some majors the minor is specified, but for most majors a minor field is optional. Consult major requirements.

6. **Electives:** See individual major.

7. **Other Course Requirements:** See individual major.

8. **Other Requirements:** Completion of all other requirements for a major and minor as specified by the respective departments.

Core Curriculum

Candidates for the Bachelor of Science degrees in the College of Engineering must complete the University Core Curriculum and the College of Engineering required core courses. Students should see the departmental faculty advisor for their major for more information.

College of Engineering Required Core Courses

The following requirements are in addition to or a specification of the University Core Curriculum requirements for bachelor's degrees in the College of Engineering. The requirement of the engineering core courses should be met prior to enrollment in upper-division courses.

Students must achieve a grade of C or better and maintain a minimum GPA of 2.5 in each group of the following courses:

1. **Mathematics:** A minimum of 6 hours (may also be used to satisfy the Mathematics requirement of the University Core Curriculum; some majors require specific and/or additional courses; contact a departmental advisor for more information) selected from the following: MATH 1710, 1720, 1780, 2700, 2730, 2770, or 3310. **Note:** Students may not elect to take both MATH 2770 and MATH 3410 (which may be required for the major) to fulfill this requirement; contact a departmental advisor for more information.

2. **Science:** Three courses including two laboratories (may also be used to satisfy the Natural Sciences requirement of the University Core Curriculum; some majors require specific and/or additional courses; contact a departmental advisor for more information) selected from the following: PHYS 1710/1730, 2220/2240; CHEM 1410/1430, 1415/1435; BIOL 1710/1730, 1720/1740.

3. **Oral and Advanced Written Communication (6 hours):** ENGL 2700 (may also be used to satisfy part of the English Composition and Rhetoric requirement of the University Core Curriculum) and ENGR 2060 (may also be used to satisfy a portion of the Understanding the Human Community requirement of the University Core Curriculum).

Major and Minor

For requirements in the major and minor, students should consult "General University Requirements" in the Academics section, and department or division sections of this catalog.

Other Requirements

Elective hours as needed at either the lower level or advanced level to meet the minimum of 120–128

semester hours for graduation, including the 42 advanced. Electives should be chosen in consultation with an advisor.

Courses of Instruction

All Courses of Instruction are located in one section at the back of this catalog.

Course and Subject Guide

The "Course and Subject Guide," found in the Courses of Instruction section of this book, serves as a table of contents and provides quick access to subject areas and prefixes.

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Krishna M. Kavi, Chair

Faculty

Professors Buckles, Kavi, Parberry, Renka, Shahrokhi, Swigger. *Associate Professors* Brazile, Jacob, Mikler, Sweany, Tarau. *Assistant Professors* Akl, Dantu, Huang, Li, Mihalcea, Mohanty, Oh, Yuan. *Visiting Assistant Professor* Garlick. *Lecturers* Keathly, Retzlaff.

Introduction

The Department of Computer Science and Engineering at the University of North Texas provides very high quality educational programs by maintaining a balance between theoretical and experimental aspects of computer science, as well as a balance between software and hardware issues, and by providing curricula that serve the citizens and industrial organizations of Texas in general, and those in North Texas in particular. The department facilitates a collegial atmosphere that is conducive to intellectual and scholarly pursuits of the faculty and students. The department strongly encourages interdisciplinary research.

At present, the department offers a bachelor of arts with a major in information technology; bachelor of science and master of science, both with a major in computer science; bachelor of science and master of science degrees, both with a major in computer engineering; and a doctoral degree in computer science and engineering. Current research interests of the faculty include theoretical computer science, databases, game programming, wired and wireless networks, computer security, artificial intelligence, natural language processing, computer systems architecture, agent based systems, collaborative learning, parallel and distributed processing, numerical analyses, wireless communication, image understanding, sensor fusion, data mining, evolutionary computation, computational epidemiology, VLSI design, medical imaging, compilers, algorithm analyses, human factors, cryptography, image processing, and bioinformatics. The departmental research is supported by federal and state agencies as well as industrial concerns.

Vision and Mission

The vision of the Department of Computer Science and Engineering is to be a recognized leader for quality education and research in selected areas in information technology, computer science and engineering. The vision will be achieved by recruiting high caliber faculty and students, and by continuously improving on the curricula and teaching methods. The department aims to establish research and educational collaborations with international institutions of higher education. The department facilitates a collegial atmosphere that is conducive to intellectual and scholarly pursuits of the faculty and students. The department strongly encourages interdisciplinary research.

The mission of the Department of Computer Science and Engineering is to provide high quality education through its undergraduate and graduate degree programs in information technology, computer science and computer engineering, as well as to conduct nationally recognized research in selected areas of computer science and engineering. The BA with a major in information technology provides a high quality education in a liberal arts setting that is responsive to the needs in the surrounding business community. The BS with a major in computer science and the BS with a major in computer engineering provide very high quality education by maintaining a balance between theoretical and experimental aspects of computer science and computer engineering, as well as a balance between software and hardware issues,