

Social and Behavioral Sciences*	3
Total	15

SPRING	HOURS
CSCE 3020, Fundamentals of Communication Theory	3
CSCE 3730, Reconfigurable Logic	3
EENG 3510, Electronics I (Devices and Materials)	3
PSCI 1050, American Government*	3
CSCE Specialty Area (advanced)	3
Total	15

SENIOR YEAR	HOURS
FALL	
CSCE 4910, Computer Engineering Design I	3
CSCE Specialty Area (advanced)	3
Mathematics or Science Elective (advanced)	3
Visual and Performing Arts (MUMH 3000, Nineteenth-Century Music, recommended)*	3
CSCE Option (advanced)	3
Total	15

SPRING	HOURS
CSCE 4010, Engineering Ethics	2
CSCE 4915, Computer Engineering Design II	3
CSCE Specialty Area Elective	3
Understanding the Human Community*	3
Humanities*	3
Total	14

\*See the University Core Curriculum section of this catalog for approved list of course options.

\*\* See College of Engineering degree requirements section of this catalog for approved list of course options.

Actual degree plans may vary depending on availability of courses in a given semester.

Some courses may require prerequisites not listed.

## Minor in Computer Science

A minor in computer science consists of a minimum of 18 semester hours of computer science courses, including 6 advanced hours. Required courses are CSCE 1030, 1040 and 2050. Six hours of advanced courses must be taken at UNT.

## Graduate Degrees

The Department of Computer Science and Engineering offers degree programs leading to the Master of Science and Doctor of Philosophy. Graduate minors in computer science may be selected at introductory and advanced levels. For information, consult the *Graduate Catalog*.

## 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.

# Department of Electrical Engineering

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**Murali Varanasi, Chair**

## Faculty

Professors Garcia, Varanasi. Assistant Professors Deng, Fu, Guturu, Li.

## Introduction

The Department of Electrical Engineering at the University of North Texas provides an innovative program in electrical engineering, combining cognitive skills, industry-university joint projects and business skills with courses that form the foundation of electrical engineering discipline. Combining theory and practice, the curriculum is designed to serve the citizens and industries in Texas, particularly the North Texas region, and the nation.

The department is housed in a new facility designed to promote intellectual and scholarly endeavors of faculty and students. The department currently offers a Bachelor of Science degree and a Master of Science degree. There are currently six faculty members, and the department is actively recruiting several additional outstanding faculty. Research interests of the faculty include digital signal processing, radar and image processing, pattern recognition and wireless sensor networks.

The department received support from the National Science Foundation to offer an "Innovative Design- and Project-Oriented Electrical Engineering Program" under the Department-Level Reform initiative.

## Mission

The mission of the Department of Electrical Engineering conforms to the mission of the College of Engineering through commitment to innovation and excellence in teaching, research and service. In order to meet this objective, the primary goals of the department are:

- to provide high quality innovative educational programs at the undergraduate and graduate level to foster learning, ethical standards, and leadership qualities;
- to pursue excellence in scholarly research at the frontiers of electrical engineering; and
- to facilitate access through our faculty expertise and our modern facilities to serve the industry, the profession, and other constituents in North Texas, the state and the nation.

Our strategy to introduce innovations in undergraduate education is based on the following major features:

- partnership between industry and the university,
- focus on active learning and “learning to learn,” and
- emphasis on teams and laboratory activities applied to real-world problems and introduction of business practices and concepts at the undergraduate and graduate levels.

Our innovative bachelor’s program is designed to satisfy the ABET criteria for accreditation of engineering programs. In order to accomplish the educational objectives for the program our students develop:

1. An ability to apply knowledge of business principles, mathematics, science, and engineering.
2. An ability to design and conduct experiments, as well as to analyze and interpret data.
3. 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.
4. An ability to function on multi-disciplinary teams.
5. An ability to identify, formulate, and solve engineering problems.
6. An understanding of professional and ethical responsibility.
7. An ability to communicate effectively.
8. An understanding of the impact of engineering solutions in a global, economic, environmental, and societal context.
9. A recognition of the need for, and an ability to engage in, life-long learning.
10. A knowledge of contemporary issues.

11. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

We ensure that our undergraduate courses satisfy one or more of the above criteria in addition to enriching our students’ educational experience at UNT.

In order to accomplish the objectives in pursuing excellence in scholarly and applied research, the faculty of the department is committed to:

- establishing high standards for research and scholarship,
- fostering excellence and diversity in research,
- creating an inspiring academic environment for the students through integration of research and education, and
- serving the society and the profession through technological advances in basic and applied research.

## Programs of Study

The department currently offers undergraduate and graduate programs in the following area:

- Bachelor of Science, and
- Master of Science, both with a major in electrical engineering.

## Bachelor of Science with a Major in Electrical Engineering

The Bachelor of Science degree with a major in electrical engineering is an innovative undergraduate program designed to combine the best practices in electrical engineering education. This design- and project-oriented program integrates concepts, analysis, design and development of state-of-the-art electrical and electronic systems. Through course work, students have “learning-to-learn” experiences and projects that are taught jointly by industry and university personnel. This active learning experience emphasizes knowledge and skills so that students can solve real-world electrical engineering problems. The one-year sequence of business and marketing courses encourages students to develop a global markets outlook.

The course work in electrical engineering covers broad areas in electronics, communication systems, computer systems, VLSI design, electromagnetics and signal processing. The design projects are integrated into the course work so that students can learn to solve practical engineering problems in a creative and relevant setting. In addition, the course work ensures that students have an opportunity to solve multidisciplinary engineering problems by working in teams and to develop effective oral and written communication skills.

The program also puts a strong emphasis on studies in art, business, management, humanities, physics and chemistry, social sciences, professionalism and engineering ethics, which fulfill objectives appropriate to the electrical engineering profession.

The bachelor of science degree with a major in electrical engineering is designed to meet ABET criteria. Accreditation for this degree will be sought as soon as the program graduates its first class of students.

### Degree Requirements

- Hours Required and General/College Requirements:** A minimum of 128 semester hours, of which 42 must be advanced in electrical engineering area, and fulfillment of degree requirements for the Bachelor of Science degree as specified in the "General University Requirements" in the Academics section of this catalog and the College of Engineering requirements.
- Major Requirements:** A minimum of 36 semester hours, including EENG 2610, 2620, 2710, 3410, 3510, 3520, 3710, 3810, 4710 and 4810; two elective courses, EENG 4010 and 4020; completion of 18 semester hours of project courses, EENG 1910, 1920, 2910, 2920, 3910, 3920, 4910 and EENG 4990.
- Other Required Courses:**
  - MATH 1710, 1720, 2700, 2730, 3310 and 3680.
  - CHEM 1410/1430, PHYS 1710/1730, PHYS 2220/2240.
  - CSCE 1020.
  - MGMT 3830, 3850.
- Minor:** Optional.
- Electives:** See four-year plan.
- Other Requirements:** A grade point average of at least 2.5 is required for all electrical engineering courses.

### BS with a Major in Electrical Engineering

*Following is one suggested four-year degree plan. Students are encouraged to see their advisor each semester for help with program decisions and enrollment. Students are responsible for meeting all course prerequisites.*

#### FRESHMAN YEAR

FALL	HOURS
CHEM 1410, General Chemistry for Science Majors	3
CHEM 1430, General Chemistry Laboratory	1
CSCE 1020, Program Development	4
EENG 1910, Project I: Learning to Learn	2
ENGL 1310, College Writing I or ENGL 1313, Computer Assisted College Writing I*	3

MATH 1710, Calculus I	4
Total	17

#### SPRING

	HOURS
EENG 1920, Project II: Introduction to Electrical Engineering	2
EENG 2710, Digital Logic Design	3
ENGL 2700, Technical Writing**	3
MATH 1720, Calculus II	3
PHYS 1710, Mechanics	3
PHYS 1730, Laboratory in Mechanics	1
MGMT 3830, Operations Management	3
Total	18

#### SOPHOMORE YEAR

FALL	HOURS
EENG 2610, Circuit Analysis	3
EENG 2910, Project III: Digital System Design	2
HIST 2610, United States History to 1865*	3
MATH 3310, Differential Equations for Engineering Majors	3
PHYS 2220, Electricity and Magnetism	3
PHYS 2240, Laboratory in Wave Motion, Electricity, Magnetism and Optics	1
Total	15

#### SPRING

	HOURS
EENG 2620, Signals and Systems	3
EENG 2920, Project IV: Analog Circuit Design	2
HIST 2620, United States History Since 1865*	3
MATH 3680, Applied Statistics	3
MGMT 3850, Entrepreneurship	3
PSCI 1040, American Government I*	3
Total	17

#### JUNIOR YEAR

FALL	HOURS
EENG 3410, Engineering Electromagnetics	3
EENG 3510, Electronics I	3
EENG 3910, Project V: DSP System Design	2
ENGR 2060, Professional Presentations (may be used to satisfy a portion of the Understanding the Human Community requirement*)	3
MATH 2700, Linear Algebra and Vector Geometry	3
PSCI 1050, American Government II*	3
Total	17

#### SPRING

	HOURS
EENG 3520, Electronics II (Circuits and Applications)	3
EENG 3710, Computer Organization	3
EENG 3810, Communication Systems	3
EENG 3920, Project VI: Modern Communication System Design	2
MATH 2730, Multivariable Calculus	3
Total	14

**SENIOR YEAR**

<b>FALL</b>	<b>HOURS</b>
EENG 4010, Technical Elective I - Advanced Topics	3
EENG 4710, VLSI Design	3
EENG 4910, Project VII: Senior Design I	3
Visual and Performing Arts*	3
Understanding the Human Community*	<u>3</u>
<b>Total</b>	<b>15</b>
<b>SPRING</b>	<b>HOURS</b>
EENG 4020, Technical Elective II - Advanced Topics	3
EENG 4810, Computer Networks	3
EENG 4990, Project VIII: Senior Design II	3
Humanities*	3
Social and Behavioral Sciences*	<u>3</u>
<b>Total</b>	<b>15</b>

*\*See the University Core Curriculum section of this catalog for approved list of course options.  
 \*\* See College of Engineering degree requirements section of this catalog for approved list of course options.  
 Actual degree plans may vary depending on availability of courses in a given semester.  
 Some courses may require prerequisites not listed.*

**Dual Degree Program**

**Bachelor of Science with a Major in Electrical Engineering and Bachelor of Science with a Major in Mathematics**

The dual degree program in mathematics and engineering combines the strengths of Texas Woman’s University (TWU) and University of North Texas to permit students to earn two degrees simultaneously while preparing for a professional career in engineering.

Undergraduate students attend TWU for three years as mathematics majors in the Department of Mathematics and Computer Science, then continue their education in the College of Engineering at UNT for approximately two additional years. After completion of the program, students receive the Bachelor of Science degree with a major in mathematics from TWU and the Bachelor of Science degree with a major in electrical engineering from UNT.

The following outline of courses is designed to satisfy the requirements of the TWU undergraduate core curriculum and of a Bachelor of Science degree in mathematics. Additional courses will be required by UNT. For the TWU degree, a total of at least 124 hours is required, including 36 advanced

hours. Certain course work completed at UNT will be taken in transfer to complete the TWU degree. Interested students should consult the current undergraduate catalog for details regarding the TWU Undergraduate Core Curriculum. The minor suggested in the mathematics degree at TWU is computer science. However, the engineering major selected at UNT may serve as the minor for the TWU degree. If the degree in engineering at UNT is not completed, the student may complete the TWU degree in mathematics with appropriate additional work.

Scholarships and/or summer employment are available for the academically able student. Through TWU’s Cooperative Education program, students may earn academic credit and income while gaining on-the-job experience related to engineering.

A 2.5 grade point average (GPA) is the minimum criterion for transfer admission consideration into most UNT engineering programs after completion of the first three years of work at TWU. Those applicants who have completed all foundation courses for engineering (see UNT catalog), have a 2.5 GPA in the foundation course work and a 2.5 GPA in all transferable work, will be admitted upon application to UNT. No grade lower than C is accepted in any mathematics or computer science courses at TWU. While a 2.0 GPA is the UNT requirement for admission after completion of 60 semester credit hours at TWU, a 2.5 is required for admission into UNT College of Engineering degree programs. Students may apply for concurrent enrollment at UNT prior to completion of their work at TWU by using the appropriate application and following the admissions procedure listed in the UNT catalog.

**Suggested Courses**

The courses listed below will be accepted by the College of Engineering at University of North Texas for those students who successfully transfer from Texas Woman’s University into Electrical Engineering within the College of Engineering, provided the student has duly received credit for the courses at TWU. The student should work closely with academic advisors at TWU and UNT to assure that he or she has satisfied core curriculum at both universities.

At TWU, students take a broad range of courses in mathematics, computer science, humanities, and social and natural sciences, as well as the basic introductory courses needed to enter studies in engineering.

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**BS with a Major in Electrical Engineering/  
BS with a Major in Mathematics**

*Following is one suggested five-year degree plan. Students are encouraged to see their advisor each semester for help with program decisions and enrollment. Students are responsible for meeting all course prerequisites.*

**FIRST YEAR (TWU)\***

FALL	HOURS
Total	17

SPRING	HOURS
Total	18

**SECOND YEAR (TWU)\***

FALL	HOURS
Total	15

SPRING	HOURS
Total	19

**THIRD YEAR (TWU)\***

FALL	HOURS
Total	18

SPRING	HOURS
Total	18

**FOURTH YEAR (UNT)**

FALL	HOURS
ENGL 2700, Technical Writing	3
EENG 1910, Project I – Learning to Learn	2
EENG 2610, Circuit Analysis	3
EENG 2910, Project III - Digital System Design	3
MGMT 3830, Operations Management	<u>3</u>
Total	14

SPRING	HOURS
EENG 1920, Project II – Introduction to Electrical Engineering	2
EENG 2620, Signals and Systems	3
EENG 2920, Project IV - Analog Circuit Design	3
EENG 3410, Engineering Electromagnetics	3
EENG 3510, Electronics I	<u>3</u>
Total	14

SUMMER	HOURS
EENG 3910, Project V - DSP System Design	3
ENGR 2060, Professional Presentations	<u>3</u>
Total	6

**FIFTH YEAR (UNT)**

FALL	HOURS
EENG 3520, Electronics II	3
EENG 3710, Computer Organization	3
EENG 3810, Communication Systems	3
EENG 3920, Project VI - Modern Communication System Design	3
MGMT 3850, Entrepreneurship	<u>3</u>
Total	15

SPRING	HOURS
EENG 4010, Technical Elective I - Advanced Topics	3
EENG 4020, Technical Elective II - Advanced Topics	3
EENG 4710, VLSI Design	3
EENG 4810, Computer Networks	3
EENG 4910, Project VII - Senior Design I	<u>3</u>
Total	15

SUMMER	HOURS
EENG 4920, Project VIII	<u>3</u>
Total	3

*\*See the Texas Woman's University catalog for degree requirements for the Bachelor of Science with a major in mathematics.*

*\*\*Confer with academic advisor for specific course.*

*Actual degree plans may vary depending on availability of courses in a given semester.*

*Some courses may require prerequisites not listed.*

## Graduate Degrees

The Department of Electrical Engineering offers a degree program leading to the Master of Science. For information, consult the *Graduate Catalog*.

## Courses of Instruction

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

## Course and Subject Guide

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