Erik Jonsson School of Engineering and Computer Science

Department of Electrical Engineering

Electrical Engineering (BSEE)

The Electrical Engineering Department offers a bachelor's degree in Electrical Engineering. The Electrical Engineering program offers students an opportunity to acquire a solid foundation in the broad areas of electrical engineering and emphasizes advanced study in digital systems, digital signal processing, communications, analog systems, RF/microwave, and microelectronics.

The Electrical Engineering program offers students a solid educational foundation in the areas of electrical networks, electronics, electromagnetics, computers, digital systems, and communications and is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET). Mastery of these areas provides students with the ability to adapt and maintain leadership roles in their post-baccalaureate pursuits through the application of fundamental principles to a rapidly changing and growing discipline.

Students in the Electrical Engineering program a broad general program in electrical engineering and can then take advanced courses in computer hardware and software; the analysis and design of analog and digital communication systems; analog and digital signal processing; the analysis, design, and fabrication of microelectronic components and systems; and guided and unguided wave propagation. A broad choice of electives (within and external to electrical engineering) allows students to broaden their education as well as develop expertise in areas of particular interest. In keeping with the role of a professional, students are expected to develop communication skills and an awareness of the relationship between technology and society.

The Electrical Engineering program is based on a solid foundation of science and mathematics coursework. Students in this program are given an opportunity to learn and extend their abilities to analyze and solve complex problems and to design new uses of technology to serve today's society. The engineering programs at UT Dallas provide an integrated educational experience directed toward the development of the ability to apply pertinent knowledge to the identification and solution of practical problems in Electrical and other related engineering fields. These programs ensure that the design experience, which includes both analytical and experimental studies, is integrated throughout the curriculum in a sequential development leading to advanced work. Design problems are frequently assigned in both lecture and laboratory courses. Each student is required to complete a major design project during the senior year. In addition, established cooperative education programs with area industry serve to further supplement design experiences.
Mission of the Electrical Engineering Program

The focus of the Electrical Engineering degree is to provide excellent education in modern electrical engineering practice. Our graduates are uniquely qualified for rewarding and successful careers in materials, devices, circuits, digital systems, signal processing, and communications. In the spring of 2005 the EE faculty adopted a new set of Program Educational Objectives that refined the prior objectives and established measurements and benchmarks to monitor progress. A feedback mechanism using Alumni Surveys (by the ECS Office of Assessment) and other tools are used to measure progress toward these objectives.

Program Educational Objectives for Electrical Engineering

One broad goal for the Erik Jonsson School is an excellent education for our students.

Within a few years of graduation, graduates of the Electrical Engineering program should:

• Have a successful, long-lived engineering based career path.
• Meet the needs of industry.
• Contribute to, and/or lead engineering based teams.
• Actively pursue continuing (lifelong) learning.

High School Preparation

Engineering education requires a strong high school preparation. Pre-engineering students should have high school preparation of at least one-half year in trigonometry and at least one year each in elementary algebra, intermediate and advanced algebra, plane geometry, chemistry, and physics, thus developing their competencies to the highest possible levels and preparing to move immediately into demanding college courses in calculus, calculus-based physics, and chemistry for science majors. It is also essential that pre-engineering students have the competence to read rapidly and with comprehension, and to write clearly and correctly.

Lower-Division Study

All lower-division students in Electrical Engineering concentrate on mathematics, science, and introductory engineering courses, building competence in these cornerstone areas for future application in upper-division engineering courses. The following requirements apply both to students seeking to transfer to UT Dallas from other institutions as well as to those currently enrolled at UT Dallas, whether in another school or in the Erik Jonsson School of Engineering and Computer Science.

ABET Accreditation

The BS program in Electrical Engineering is accredited by the Engineering Accreditation Commission
of ABET, [www.abet.org](http://www.abet.org).

### Academic Progress in Electrical Engineering

In order to make satisfactory academic progress as an Electrical Engineering major, a student must meet all University requirements for academic progress, and must earn a grade of C- or better in each of the "major requirements" courses. No "Major Requirements" course (as listed under Section II of the BSEE degree requirement) may be taken until the student has obtained a grade of C- or better in each of the prerequisites (if a higher grade requirement is stated for a specific class, the higher requirement applies).

### Bachelor of Science in Electrical Engineering

*Degree Requirements (128 semester credit hours)¹*

#### Faculty


**Professors Emeritus:** Louis R. Hunt, William J. Pervin, Don Shaw

**Research Professors:** Walter Duncan, Andrew Marshall, Hisashi (Sam) Shichijo

**Associate Professors:** Gerald O. Burnham, Yun Chiu, Rashaunda Henderson, Wenchuang (Walter) Hu, Roozbeh Jafari, Hoi Lee, Dongsheng (Brian) Ma, Issa M. S. Panahi, Siavash Pourkamali

**Assistant Professors:** Bilal Akin, Taylor Barton, Carlos A. Busso-Recabarren, Joseph Callenes-Sloan, Nicholas Gans, Myoungsoo Jung, Chadwin D. Young

**Research Assistant Professors:** Hynek Boril, Abhijeet Sangwan

**Senior Lecturers:** Paul Deignan, James Florence, Jung Lee, Randall E. Lehmann, P. K. Rajasekaran, Ricardo E. Saad, William (Bill) Swartz, Marco Tacca

**UT Dallas Affiliated Faculty:** Larry P. Ammann, Leonidas Bleris, Yves J. Chabal, Bruce E. Gnade, Matthew J. Goecckner, Robert D. Gregg, Jiyoung Kim, Moon J. Kim, David J. Lary, Yang Liu, Robert L. Rennaker II, Mario A. Rotea, Mathukumalli Vidyasagar, Robert M. Wallace, Steve Yurkovich

#### I. Core Curriculum Requirements: 42 semester credit hours²

**Communication:** 6 semester credit hour
RHET 1302 Rhetoric

ECS 3390 Professional and Technical Communication

Mathematics: 3 semester credit hours

MATH 2417 Calculus I

Life and Physical Sciences: 6 semester credit hours

PHYS 2325 Mechanics

PHYS 2326 Electromagnetism and Waves

Language, Philosophy and Culture: 3 semester credit hours

Select any 3 semester credit hours from Language, Philosophy and Culture core courses (see advisor)

Creative Arts: 3 semester credit hours

Select any 3 semester credit hours from Creative Arts core courses (see advisor)

American History: 6 semester credit hours

Select any 6 semester credit hours from American History core courses (see advisor)

Government / Political Science: 6 semester credit hours

GOVT 2305 American National Government

GOVT 2306 State and Local Government

Social and Behavioral Sciences: 3 semester credit hours

ECS 3361 Social Issues and Ethics in Computer Science and Engineering

Component Area Option: 6 semester credit hours

MATH 2417 Calculus I

MATH 2419 Calculus II

PHYS 2125 Physics Laboratory

II. Major Requirements: 76 semester credit hours

Major Preparatory Courses: 22 semester credit hours beyond Core Curriculum

CHEM 1111 General Chemistry Laboratory I
CHEM 1311 General Chemistry I
CS 1325 Introduction to Programming
EE 1100 Introduction to Electrical Engineering
ECS 1100 Introduction to Engineering and Computer Science
EE 1202 Introduction to Electrical Engineering II
ENGR 2300 Linear Algebra for Engineers
EE 2310 Introduction to Digital Systems
MATH 2417 Calculus I
MATH 2419 Calculus II
MATH 2420 Differential Equations with Applications
PHYS 2125 Physics Laboratory I
PHYS 2126 Physics Laboratory II
PHYS 2325 Mechanics
PHYS 2326 Electromagnetism and Waves

Major Core Courses: 45 semester credit hours beyond Core Curriculum

ECS 3361 Social Issues and Ethics in Computer Science and Engineering
ECS 3390 Professional and Technical Communication
EE 3101 Electrical Network Analysis Laboratory
EE 3102 Signals and Systems Laboratory
EE 3110 Electronic Devices Laboratory
EE 3111 Electronic Circuits Laboratory
EE 3120 Digital Circuits Laboratory
EE 3150 Communications Systems Laboratory
ENGR 3300 Advanced Engineering Mathematics
EE 3301 Electrical Network Analysis
EE 3302 Signals and Systems
EE 3310 Electronic Devices
EE 3311 Electronic Circuits
EE 3320 Digital Circuits
ENGR 3341 Probability Theory and Statistics
EE 3350 Communications Systems
EE 4301 Electromagnetic Engineering I
EE 4310 Systems and Controls
EE 4368 RF Circuit Design Principles
EE 4388 Senior Design Project I
EE 4389 Senior Design Project II

Major Guided Electives: 9 semester credit hours

Students pursuing the general program take 9 semester credit hours from any other 4000 level or higher Electrical Engineering courses. Independent Study in Electrical Engineering (EE 4V97), Undergraduate Research in Electrical Engineering (EE 4V98), or Senior Honors in Electrical Engineering (EE 4399) may be used for up to 6 of these hours.

Students pursuing a concentration in Microelectronics take 3 of the following courses:

EE 4302 Electromagnetic Engineering II
EE 4304 Computer Architecture
EE 4325 Introduction to VLSI Design
EE 4330 Integrated Circuit Technology
EE 4340 Analog Integrated Circuit Analysis and Design
EE 4391 Technology of Plasma

Students pursuing a concentration in Telecommunications take 3 of the following courses:

EE 4360 Digital Communications
EE 4361 Introduction to Digital Signal Processing
EE 4365 Introduction to Wireless Communication
EE 4367 Telecommunications Networks
EE 4390 Computer Networks
EE 4392 Introduction to Optical Systems

III. Elective Requirements: 10 semester credit hours

Free Electives: 10 semester credit hours

Both lower- and upper-division courses may count as free electives but students must complete at least 51 semester credit hours of upper-division courses to qualify for graduation.
Degree programs in the Erik Jonsson School of Engineering and Computer Science are governed by various accreditation boards that place restrictions on classes used to meet the curricular requirements of degrees they certify. For this reason, not all classes offered by the University can be used to meet elective requirements. Please check with your academic advisor before enrolling in classes you hope to use as free electives.

Fast Track Baccalaureate/Master's Degrees

In response to the need for advanced education in electrical engineering, a Fast Track program is available to well-qualified UT Dallas undergraduate students. Qualified seniors may take up to 15 graduate semester credit hours that may be used to complete the baccalaureate degree and also to satisfy the requirements for the master's degree. This is accomplished by (1) taking courses (typically electives) during one or more summer semesters, and (2) beginning graduate coursework during the senior year. Details are available from the Associate Dean for Undergraduate Education.

Honors Program

The Department of Electrical Engineering offers Departmental Honors for outstanding students in the BS Electrical Engineering degree program. Admission to the Honors programs requires that the student meet the following qualifications:

- Has repeated no more than 3 courses at UT Dallas and has repeated no course more than once.

Graduation with Honors requires a 3.500 or better GPA and completion of either Senior Honors in Electrical Engineering (EE 4399) or Undergraduate Research in Electrical Engineering (EE 4V98). A Senior Honors Thesis must be completed within one of those two classes. (While the topics may be related, the Senior Thesis does not replace the need for the student to complete a regular Senior Design Project).

Departmental Honors with Distinction may be awarded to students whose Senior Honors Thesis is judged by a faculty committee to be of exemplary quality. Only students graduating with Departmental Honors are eligible. Thesis/projects must be submitted by the deadline that applies to MS Theses in the graduating semester to allow for proper evaluation. Students interested in Honors with Distinction are encouraged to start working on their thesis/project a year prior to graduation.

Minors

The Department of Electrical Engineering does not offer minors at this time.

1. Incoming freshmen must enroll and complete requirements of UNIV 1010 and the corresponding school-related freshman seminar course. Students, including transfer students, who complete their core curriculum at UT Dallas must take UNIV 2020.

2. Curriculum Requirements can be fulfilled by other approved courses. The courses listed are recommended as the most efficient way to satisfy both Core Curriculum and Major Requirements at UT Dallas.

3. Semester credit hours fulfill the communication component of the Core Curriculum.
4. Three semester credit hours of Calculus are counted under Mathematics Core, and five semester credit hours of Calculus are counted as Component Area Option Core.

5. Six semester credit hours of Physics (PHYS 2325 and PHYS 2326) are counted under Science Core and one semester credit hour (PHYS 2125) is counted under the Component Area Option Core.

6. Semester credit hours contribute to the Social and Behavioral Sciences component of the Core Curriculum.

7. Students must pass each of the EE, CS, Math and Science courses listed in this degree plan and each of their prerequisites, with a grade of C- or better.

8. Transfer students with sufficient background may petition to substitute upper-division semester credit hours in the major for this class.

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