work may be done outside the computer science and engineering department.

Academic Standards

If a student's GPA on all graduate and/or deficiency courses falls below 3.0, the student will be placed on probation the following term/semester. Students who cannot raise their GPA above 3.0 during that term/semester will be dropped from the program.

Graduate Minor in Computer Science

A graduate minor in computer science requires 9 to 12 hours of graduate credit. CSCE 5011-5013 are service courses designed for students who are not computer science majors. Since these are introductory courses, only one of these courses is allowed in the 9-hour minor option, and no more than two of these courses may be included in the 12-hour minor option.

Doctor of Philosophy

The program of study for the doctoral degree with a major in computer science includes formal course work, independent study and research. The purpose of the degree is to produce a professional capable of directing and conducting research within the discipline of computer science.

Admission Requirements

Students seeking admission to the doctoral program must meet all general requirements for doctoral candidates at UNT and must have completed all of the requirements (or equivalent work) for the master's degree as defined in the previous section. Additional requirements are delineated below:

1. an acceptable score on the Graduate Record Examination (GRE); contact the department or the Toulouse School of Graduate Studies for information concerning acceptable admission test scores;
2. a 3.5 GPA on the most recent 30 hours of course work;
3. for applicants whose native language is not English, a TOEFL score of at least 580 for the written test or 237 for the computer test is required; and
4. three letters of recommendation.

An overall evaluation of the student's credentials is used as a basis for admission. Admission is competitive, and satisfaction of the minimum requirements does not guarantee admission.

Degree Requirements

In addition to satisfying the general requirements for all UNT doctoral degrees, a student must satisfactorily complete the following:

1. a minimum of 12 hours of 6000-level organized courses in computer science;
2. the residence requirement, consisting of two consecutive terms/semesters of enrollment in at least 9 semester hours;
3. satisfactory completion of a written comprehensive examination prior to submitting a proposal for dissertation research; and
4. submission and successful defense of the doctoral dissertation.

More detailed information on degree requirements is available upon request from the Department of Computer Science and Engineering.

Language or Tool-Subject Requirements

Consult the graduate adviser, Department of Computer Science and Engineering, for requirements.

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

Main Departmental Office
UNT Research Park, B270

P.O. Box 310470
Denton, TX 76203-0470
(940) 891-6872

Fax: (940) 891-6881

Web site: *www.ee.unt.edu*

Murali Varanasi, Chair

Graduate Faculty: Deng, Fu, Garcia, Guturu, Li, Varanasi, Yang.

Introduction

The Department of Electrical Engineering at the University of North Texas commits to achieving excellence in research and graduate education in all major electrical engineering areas. Our primary goals include: (1) to provide high quality innovative educational programs at the undergraduate and graduate levels to foster learning, ethical standards, and leadership

qualities; (2) to pursue excellence in scholarly research at the frontiers of electrical engineering; and (3) 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.

Research

Research areas within the department include the following.

RF and sensing areas: Research in this area focuses on the general topics related to advanced RF sensing systems over a wide range of frequencies. The RF sensing systems include radio-frequency identification (RFID) systems, radar systems, remote sensing systems, medical imaging systems, underground penetrating systems and wireless sensing networking systems.

Computer-Aided Design (CAD) and VLSI: The research interests in this area include innovative algorithms for VLSI testing, low-power VLSI design, innovative ASIC and computer architecture, nano-scale logic device modeling, design and simulation, VLSI interconnect modeling and simulation, and VLSI physical design.

Intelligent signal processing: Research in this area is dedicated to the design and development of advanced signal processing algorithms and systems for industrial, space electronic systems and defense technology. The specific research areas include signal detection and estimation, space-time signal processing, signal design and diversity for sensor systems, information fusion from various sensor sources, infrared and microwave imaging, robust signal processing, pattern recognition, and target identification.

Wireless systems: The research interests in this area focus on system-level issues that are critical for the design of high-performance wireless networks and sensor networks. Research topics include measurement and modeling of wireless channels, experimental and theoretical system performance study, integrated communications and positioning, real-time signal processing, and optimum network deployment.

Industrial Tomography: Industrial tomography provides an innovative and powerful tool for measurement and control by generating cross-sectional images of industrial processes. The research in this area focuses on tomographic sensor design, finite element simulation, sensing and signal conditioning circuits, data acquisition, computer interface, data processing, image reconstruction algorithms, image processing and display, and applications in the oil and gas, pharmaceutical, food, chemical engineering, power and nuclear industries, as well as homeland security.

Other research areas in the department include: innovative wireless imaging systems, analog and mixed-signal IC design, semiconductor device modeling and design, wireless sensor network design, sensor and sensor interface design, bioinformatics, artificial intelligence, speech-driven animation, and cognitively based learning-to-learn education.

Degree Program

The department offers a graduate program leading to the following degree:

- Master of Science with a major in electrical engineering.

Master of Science

Program Objectives

1. Graduates will achieve master's-level proficiency in electrical engineering subjects that include digital integrated circuit design, analog design, adaptive and statistical signal processing, coding theory, control system design, and computer vision and image analysis.
2. Graduates will attain a broad background in electrical engineering that provides them with a number of choices for future specialization, if needed.
3. Graduates will attain proficiency in both oral and written communication that is needed for achieving success in their future careers.
4. Graduates will learn how to learn and thereby attain the ability to pursue life-long learning and continued professional development.
5. Graduates will have experience in project-based learning and hence will be ready to engage in high-tech careers upon their graduation.

Admission Requirements

The student must satisfy all the general admission requirements of the Toulouse School of Graduate Studies as well as the admission requirements of the electrical engineering department as outlined below:

1. An acceptable score on the Graduate Record Examination (GRE); contact the department or the Toulouse School of Graduate Studies for information concerning acceptable admission test scores.
2. For applicants whose native language is not English, a TOEFL score of at least 580 for the written test or 237 on the computer-based test is required.
3. A GPA of at least 3.0 on the last 60 hours of undergraduate course work.
4. Completion of a sufficient amount of prior course work in the field of electrical engineering, including courses equivalent to EENG 3520, EENG 3710 and EENG 3810.
5. At least 15 hours of mathematics, including differential and integral calculus, probability, linear algebra and differential equations.

Students not satisfying conditions 1 through 3 will not be admitted to the electrical engineering program, nor will they be allowed to enroll in graduate

electrical engineering courses. Those students who satisfy conditions 1 through 3 but who lack some of the electrical engineering background may be provisionally admitted to the program.

Admission to Candidacy

After removal of all deficiencies and upon completion of all the leveling courses (as described below), the student is required to submit a formal degree plan to his or her adviser and the dean of the School of Graduate Studies. Failure to fulfill these requirements may prevent a student from enrolling the following term/semester. Admission to candidacy is granted by the Dean of Graduate Studies after the degree plan has been approved.

Leveling Courses

- Mathematics through multivariable calculus
- Physics including mechanics, electricity and magnetism
- EENG 2620, Signals and Systems
- EENG 2710, Digital Logic Design
- EENG 3520, Electronics II
- EENG 3810, Communications Systems

All entering students must demonstrate knowledge of the material covered in these courses. An entering student may demonstrate the knowledge by:

- Completing the courses at UNT
- Completing similar courses at another recognized institution
- Evidence based on employment experience.

A student may be required to pass a placement examination to demonstrate his or her knowledge.

Degree Requirements

Option A: Thesis option with 24 semester hours of organized course work excluding undergraduate prerequisites and leveling courses, in addition to 6 hours of EENG 5950, Master's Thesis.

Option B: Non Thesis option with 30 semester hours of organized course work and 3 semester hours of EENG 5890, Directed Study.

Course Selection

- At least 12 hours of graduate electrical engineering courses.
- No more than 6 semester hours of special problems or directed study courses.
- Leveling courses: Students whose undergraduate majors were not electrical engineering must take additional leveling courses that will be determined by the EE graduate adviser on an individual basis.

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 Engineering Technology

Main Departmental Office
UNT Research Park, F115

P.O. Box 310679
Denton, TX 76203-0679
(940) 565-2022
Fax (940) 565-2666

Web site: *www.etec.unt.edu*

Albert Bill Grubbs Jr., Chair

Graduate Faculty: Foster, Grubbs, Kougianos, Kozak, McNeill, Mirshams, Nasrazadani, Plummer, Vaidyanathan, Wang, Yu.

The department serves two basic roles. In the broader sense, it provides exposure to technology for general understanding and interpretation of industry founded in theory and practice. In a more practical sense, the department provides technology-based education that results in professional careers in industry. Career opportunities for graduates are in industry/business.

Research

The research interests of the Department of Engineering Technology are focused on technological systems and processes with specific industrial applications. This research represents the university's desire to effect the transfer of theoretical knowledge from the laboratory to the industrial sector (technology transfer).

Specific interests in mechanical engineering include product design and development, quality assurance, composite materials, materials testing, production planning and management, manufacturing processes, computer-aided design (CAD), computer-aided manufacturing (CAM), computer numerical control (CNC), part programming, electromechanical design, robotics, liquid nitrogen automobile, nano-indentation, field emissions, corrosion and nano crystalline materials, and