



**DOCTOR OF PHILOSOPHY IN ELECTRICAL ENGINEERING
DEPARTMENT OF ELECTRICAL ENGINEERING
PRAIRIE VIEW A&M UNIVERSITY
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PROGRAM OBJECTIVES

The Doctor of Philosophy (Ph.D.) program in Electrical Engineering is a research oriented degree program. Its purpose is to advance the knowledge in the fields of Electrical Engineering and enable students of exceptional ability to undertake advanced study and original research. It prepares students for a research and/or teaching career in industry, research institutions, universities, and government. The program has a focus on state-of-art technology issues that cross boundaries of Computer Engineering, Microelectronics, and Communications & Signal Processing.

AREAS OF SPECIALIZATION

The Department of Electrical Engineering (EE) offers the Ph.D. Degree in the following three areas of core concentration:

- Computer Engineering
- Communications/Signal Processing
- Microelectronics

The Ph.D. program builds upon strengths of the Master of Science in Electrical Engineering and the Master of Science in Engineering programs.

DEGREE REQUIREMENTS

Category	Semester Credit Hours
a. Courses required for all students Graduate Seminar (2 SCH) Stochastic Processes (3 SCH) Doctoral Research (12SCH) Doctoral Dissertation (12SCH)	29
b. Elective courses prescribed for students (6000 or 7000 level Electrical Engineering courses and in the area of concentration)	9
c. Free Electives (5000 to 7000 level graduate courses, with a max. of 9 SCH at the 5000 level)	15
Total (After Master's Degree)	53

ADMISSION REQUIREMENTS

The candidate must:

- Hold a Masters of Science degree in Electrical Engineering or one of the related disciplines, conferred by a regionally accredited institution with a 3.2 GPA on a four-point scale in all completed graduate work.
- Hold a baccalaureate degree in engineering, mathematics or the physical sciences conferred by a regionally accredited institution with a 3.0 GPA on a four-point scale in all completed undergraduate course work.
- Submit original transcripts for all academic work completed at the undergraduate and graduate levels.
- Have a minimum score of 500 in the verbal section and 600 in quantitative section of the Graduate Record Examination (GRE).
- Submit three letters of recommendation from faculty or individual sufficiently acquainted with the student to comment on the student's potential to successfully complete the doctoral program.
- Submit personal statement describing the candidate's academic or professional accomplishments, research interest and professional goals.
- Foreign students are required to take the Test of English as a Foreign Language (TOEFL); a score of 550, or higher, is required.

FACILITIES

Electrical Engineering Ph.D. students will have a wide range of facilities available to support their study and research. The Department of Electrical Engineering has the following labs available for research: Tellabs & Hewlett Packard Communications Lab, Texas Instruments Analog and Mixed Signal Lab, Design and Simulation Lab, Solid State Lab (Clean Room), the Sprint Broadband Telecommunications Lab, and the Texas Instruments DSP Solutions Lab.

There are several centers of excellence in the university where students will have opportunities to work with the faculty on their research. The following are research centers within the EE Department:

- The NASA Center for Applied Radiation Research (CARR) is a comprehensive research center focused on studies related to fundamental understanding of space radiation effects on humans, devices and

materials. CARR research emphasizes emerging technologies related to human space flight in conjunction with the missions and strategic plans of NASA for human space flight. CARR research is fundamentally inter-disciplinary in nature and beneficial to all of NASA, since all aerospace activities take place in a potentially hostile radiation environment.

- The Center of Excellence for Communications Systems Technology Research (CECSTR). Part of the Center's mission is to establish a comprehensive research program with the capabilities of seeking an understanding of selected aspects of communication systems, DSP Solutions, Image Processing, Mixed Signal Systems, and High Speed (Broadband) Communication Systems by way of algorithm developments, modeling, simulation, analysis, design, testing, and performance evaluation. The Center's laboratories are equipped with state-of-the-art equipment and instruments. The students work on projects that have direct relevance to government agencies and to industry, such as Texas Instruments, Sprint, Northrop Grumman, and NASA.

RESEARCH and DEVELOPMENT

The faculty and students are involved with many research and development projects. These research projects focus on a variety of topics including:

- Real time high accuracy algorithms for position and location of moving targets in ad hoc wireless networks.
- Highly reliable and controlled end-to-end QoS provisioning for multi-service applications.
- Design of security management system for intrusion detection and prevention for wireless and wired networks.
- Design and analysis of ATM network architectures for self-similar traffic.
- Dynamic Spectrum Management for Asymmetric Digital Subscriber Line.
- Design and Implementation of MPLS Virtual Private Networks.
- Algorithm Development Study of a Wavelet-Based Adaptive Smart Scheme for vibration detection of an Aerodynamic System.
- Wavelet-Based Algorithms Development for Mixed Signal Systems Testing.
- Real time Detection, Discrimination and Parameter Estimation of Radar Signals Using Wavelet Transform Techniques.
- Design of radiation-tolerant circuits.
- Radiation Effects on Quantum Devices.
- Process & Radiation-Induced Defects.

CORPORATE COLLABORATIONS AND PARTNERSHIPS

Prairie View A&M University is committed to maintaining strong relationships with business, industry, educational and research institutions. Research and development with government agencies, private industries and universities include:

- NASA
- UNITED STATES ARMY
- DEPARTMENT OF ENERGY
- TEXAS INSTRUMENTS
- SPRINT
- RAYTHEON
- NORTHROP GRUMMAN
- TEXAS A&M UNIVERSITY
- VANDERBILT UNIVERSITY
- OHIO STATE UNIVERSITY
- UNIVERSITY OF HOUSTON
- TEXAS TECH UNIVERSITY

ELECTRICAL ENGINEERING COURSES

Computer Engineering Track

- ELEG 6103 Advanced Computer Systems Design
- ELEG 6113 Computer Arch. & Adv. Logic Design
- ELEG 6123 The Internet: Design & Implementation
- ELEG 6133 Fault Tolerant Computing
- ELEG 6143 Modeling & Perf. of Computer Arch.
- ELEG 6153 Information Networks
- ELEG 7103 Advanced Topics in Computer Eng.

Communication and Signal Processing Track

- ELEG 6203 Wireless Networks
- ELEG 6213 Digital Communications
- ELEG 6223 Network Management
- ELEG 6233 Coding Theory
- ELEG 6243 Adv. Broadband Comm. Systems
- ELEG 6253 Telecommunications Network Security
- ELEG 6303 Signal Detection and Estimation
- ELEG 6313 Stochastic Processes
- ELEG 6323 DSP Hardware Systems Design
- ELEG 6333 Wavelets and Their Applications
- ELEG 6343 Advanced Signals and Systems
- ELEG 6353 Advanced Digital Signal Processing
- ELEG 7123 Adv. Topics in Telecomm. & Sig. Proc.

Microelectronics Track

- ELEG 6403 Solid State Devices
- ELEG 6413 Integrated Circuits Fabrication
- ELEG 6423 VLSI and ULSI Design
- ELEG 6433 Semiconductor Devices
- ELEG 6503 Adv. Photonic Materials & Devices
- ELEG 6513 Advanced Quantum Devices
- ELEG 6523 Adv. Charac. of Materials & Devices
- ELEG 6533 Advanced VLSI Design
- ELEG 6543 Advanced Solid State
- ELEG 6553 Advanced Mixed Signal
- ELEG 7143 Advanced Topics in Microelectronics