The program provides advanced level instruction emphasizing engineering practice. The focus is on electrical engineering design, system operation, and management in all the courses and through the independent study requirement. The program also stresses oral and written communication. The opportunity exists in one of the following options:

- **Electrical Engineering**: Students may concentrate their studies in Electrical Power, Controls, Microelectronics, Communications and/or Signal Processing, and Embedded applications by selecting appropriate courses from the list of courses.

- **Excellence in Engineering and Management (E²M)**: Receive a Master’s degree in Electrical Engineering and an MBA. (See enclosed sheet on the E²M program.) Note: The department is working on introducing a degree in computer engineering.

### Unique Specialties

- **VLSI Laboratory**: where research is conducted in the area of neural network based VLSI circuit optimization, miniaturization trends in ID technology, and reduction of electromagnetic interference in VLSI interconnects.

- **State-of-the-art Industry Funded Research Facility for Real-Time Fault Diagnostics of Power Transformers**: where research is conducted on accurately locating a partial discharge inside a transformer while it is on-line.

- **NSF Funded Digital Signal Processing Simulations and Hardware Laboratory**: where MATLAB and the latest Texas Instruments products such as TM53206711 are utilized to detect signals, design filters, etc.

- **NSF Funded Instructional Design Laboratory** provides state-of-the-art facilities for conducting design and simulation projects. It also has facilities for multimedia presentation and Web-based educational technology tools.

- **A new Field Programmable Gate Arrays (FPGA) Laboratory** provides a complete TTL parts cabinet within a single chip.

- **The department oversees eight laboratories**: Electronics, Digital, Microprocessor, FPGA, Communications, VLSI, Power, System/Machinery, and DSP Simulations and Hardware.

- New courses in **VHDL** and **Embedded Microprocessors** have been introduced recently along with the software/hardware support.
Requirements for the Master of Engineering Degree

**Electrical Engineering (30 credits)**

*Core Courses (15 credits required)*

- ECE 521 Communications Theory
- ECE 540 DSP Hardware
- ECE 543 Digital Control Systems
- ECE 544 State Variable Control Systems
- ECE 565 Digital VLSI Design I
- ECE 567 Analog VLSI Design I
- ECE 572 Power Systems Analysis
- ECE 573 Power Electronics
- ECE 5xx VHDL & Applications
- ECE 5xx Embedded Microprocessors
- ECE 641 Digital Signal Processing
- ECE 642 Advanced Linear Discrete and Continuous Control Systems
- ECE 643 Advanced Digital Control Systems
- ECE 644 Estimation and Filtering Theory
- ECE 671 Transformers – Theory and Practice
- ECE 672 Protective Relaying
- ECE 674 Small Power Electrodynamics
- ECE 675 Surge Processes in Power Engineering

**Mathematics (3 credits required)**

- M515 Methods of Applied Mathematics I

**Engineering Management (3 credits required)**

- EM 601 Engineering Program Management

**Independent Studies (6 credits required)**

ECE 600 Independent Studies in Electrical Engineering (3 to 9 credits) – Independent Study cannot begin until the student has completed 12 credits of course work toward the degree.
**Elective Course (3 credits required)**

A professional elective may be selected from the following categories:

1) Any other ECE graduate course listed above under core courses and also listed under core courses for Electrical Power Specialty or special topics.

2) ECE 600 Independent Studies in Electrical Engineering may be increased to 9 credits.

3) M 516 Methods of Applied Mathematics II
   - M 517 Applied Engineering Statistics
   - EM 600 Engineering and the Corporation

4) An additional graduate management course

5) An approved engineering graduate course in another department
Research Topics and Projects

- **Research Projects:**
  - Comparison of Deterministic and Random Sampling Techniques for Quality Analysis of Integrated Circuits
  - Application of Data Acquisition Techniques to Electric Machinery
  - Cost-effective CAD for Robust Design of Integrated Circuits Using Artificial Neural Networks
  - Multi-target Tracking: Recent Advances and Development
  - Real-Time Fault Diagnostics of Power Transformers
  - Active Noise Control

- **Recent Student Projects:**
  - Crosstalk Minimization & Investigation of Shielding Structures
  - Analyze, Develop and Improvise network configuration of devices in Building HVAC systems using RFID technology, RF technology and Handheld computing technology
  - Performance of Turbo Coded Signals Over Fading Channels
  - Investigation of layout techniques for minimizing Latch-Up problems in CMOS VLSI
  - Active Noise Control of a Loudspeaker.
  - An Investigation of Electrical Fast Transient Noise Coupling between Power and Data Cables Located in Common Raceways
  - Acoustic-Phonetic Approach to Speech Recognition