

## Degree Requirements

The MSEE degree requires successful completion of 30 graduate credits as approved by the student's graduate advisor. This can be done using one of three options: (a) the thesis option, where the student completes 9 credit hours of thesis ([ECGR 6991](#)) and 21 credit hours of coursework, (b) the project option, where the student completes 3 credit hours of individual study and projects ([ECGR 6890](#)) and 27 credit hours of coursework, and (c) comprehensive examinations option, where students complete 30 credit hours of coursework and pass a comprehensive written examination.

At least 12 credit hours must be at the 6000-level or above courses, with at least 3 credit hours at the 6000-level or above in the chosen Technical Area of Focus. No more than 6 credit hours may be in Individual Study. No more than 6 credit hours may be from courses outside of the Electrical and Computer Engineering Department, unless approved by the student's graduate advisor.

The 30 credit hours must be completed in accordance with three criteria: 1. Technical Area of Focus, 2. Breadth of Knowledge, and 3. Advanced Knowledge. Requirements based on the three criteria are described below.

### 1. Technical Area of Focus Requirement (9 credit hours)

*Select three courses from a single technical area of focus. The technical area Special topic courses (ECGR 6080/8090) may also be counted towards this requirement, as approved by the student's graduate advisor.*

#### Communications and Networking

- ECGR 5191: Analog and Digital Communications
- ECGR 5187: Data Communications and Networking II
- ECGR 6121/8121: Advanced Theory of Communications-I
- ECGR 6120/8120: Wireless Communications
- ECGR 6188/8188: Fundamentals of Wireless Systems and Protocols
- ECGR 6187/8187: Modeling and Analysis of Comm. Sys.
- ECGR 6189/8189: Wireless Sensor Networks

#### Signal and Image Processing

- ECGR 5103: Applied Computer Graphics
- ECGR 5122: Random Processes and Optimum Filtering
- ECGR 5124: Digital Signal Processing
- ECGR 5190: Acoustics
- ECGR 6114/8114: Digital Signal Processing II
- ECGR 6118/8118: Image Processing
- ECGR 6119/8119: Applied Artificial Intelligence
- ECGR 6127/8127: Medical Signal Processing

## Controls and Robotics

- ECGR 5111: Control Systems I
- ECGR 5112: Nonlinear Analysis
- ECGR 5124: Digital Signal Processing
- ECGR 5161: Control of Robotic Manipulators
- ECGR 5196: Introduction To Robotics
- ECGR 5412: Principles of Digital Control Systems
- ECGR 6111/8111: Linear Systems Theory
- ECGR 6115/8115: Optimal Control Theory I

## Electromagnetics, Antennas, and RF

- ECGR 5121: Antennas
- ECGR 5123: Advanced Electromagnetic Field Theory
- ECGR 5261: Microwave Circuit Design I
- ECGR 6264/8264: RF Design

## Electronic Devices and Systems

- ECGR 5125: Found of Optical Engineering
- ECGR 5132: Analog Integrated Circuits Design
- ECGR 5136: Solid State Microelectronic Devices II
- ECGR 5431: Linear Integrated Electronics
- ECGR 6132: Advanced Semiconductor Device Physics

## Power Systems

- ECGR 5104: Computational Methods in Power Systems
- ECGR 5142: Power Generation, Operation, and Control
- ECGR 5171: Intro to Energy Systems
- ECGR 5172: Energy Markets
- ECGR 5193: Power System Analysis I
- ECGR 5194: Power System Analysis II
- ECGR 6144/8144: Electric Power Distribution Systems I
- ECGR 6145/8145: Electric Power Distribution Systems II
- ECGR 6147/8147: Power System Stability and Control
- ECGR 6173/8173: Power Quality
- ECGR 6190/8190: Smart Grid: Characteristics, Design, and Analysis

## Power Electronics and Machines

- ECGR 5144: Power Electronics I
- ECGR 6197/8197: Power Electronics II
- ECGR 5195: Electrical Machines
- ECGR 6199: Dynamics and Control of AC Drives

## **2. Breadth of Knowledge Requirement (6 credit hours)**

*Select courses from at least two technical areas other than the chosen technical area of focus. Courses in the MS in Computer Engineering can also be taken to fulfill the breadth of knowledge requirement.*

## **3. Advanced Knowledge Requirement (12 credit hours)**

*At least 12 credit hours must be taken at the 6000-level or above. At least 3 credit hours at the 6000-level or above should be in the student's chosen Technical Area of Focus.*