

## Master's Degrees Electrical and Computer Engineering



GRADUATE STUDIES

Rose-Hulman Institute of Technology offers two master's degree programs in its Department of Electrical and Computer Engineering: a master of science in electrical engineering (MSEE) degree that requires a thesis and a publication, and a course-based master of electrical and computer engineering (MECE) degree. Both degree programs combine mathematics, physics, engineering, and computer science to meet the demands of the ever-changing fields of electrical and computer engineering.

Both degree programs build upon the basic foundations established by the student's undergraduate course of study. Students may concentrate on a specialized interest or seek a better understanding of the broad underlying theories of the entire profession.

The ECE department has a long and distinguished tradition of emphasizing hands-on learning through rigorous laboratory experiences designed to help students discover and understand the laws, principles, and concepts of engineering, mathematics, and science. Graduate students can access state-of-the-art equipment such as spectrum and vector network analyzers, high-frequency oscilloscopes, advanced FPGA and micro-controller platforms, semiconductor fabrication facilities and an Eagle Test Systems integrated circuit testing platform.





## Program Requirements

### Course-based MECE Program

- 48 credit hours of course work
- At least 32 credit hours must be upper-level ECE courses (400 and 500-level ECE courses)
- No more than 12 credit hours of 400-level classes

### Thesis-based MSEE Program

- 48 credit hours
- At least 24 credit hours must be upper-level ECE courses (400 and 500-level ECE courses)
- No more than 12 credit hours of 400-level classes
- 12 credit hours of thesis work and successful defense of thesis
- Acceptance of a technical article for publication

### Special Areas of Interest

- Computer architecture and microcomputers
- Electromagnetics
- Electronics
- Signal and image processing
- MEMS
- Power systems
- Control systems and robotics
- Communications

## Recently Offered ECE Graduate Courses

- Introduction to MEMS
- Advanced MEMS
- Advanced Microcomputers
- Antenna Engineering
- Microwave/Millimeter Wave Engineering
- Advanced Electromagnetics
- Electromagnetic Metamaterials
- Analog Integrated Circuit Design
- Radio Frequency Integrated Circuit Design
- Digital Integrated Circuit Design
- Power Electronics
- Analog Test and Product Engineering
- Mixed Signal Test Product Engineering
- Digital Test and Production Engineering
- Digital Signal Processing
- Advanced Image Processing
- Probability and Random Processes
- Wireless Systems
- Mobile Robotics
- Discrete-Time Control Systems
- Industrial Power Systems



## At a Glance

Rose-Hulman's graduate programs have a strong focus on applied research involving excellent faculty, facilities, and flexibility in a student's plan of study to meet individual goals. The graduate studies programs at Rose-Hulman offer a supportive atmosphere focused on the growth and development of each student.

## Recent MS Thesis Titles

An Implementation of a Biometric-based Security System for Wireless Body Area Networks in Tiny OS

Real-Time Chord Recognition Implemented on Embedded Hardware

A Simple Mutual Deconvolution Algorithm for Acoustic Blind Dereverberation

A Reliability Study of the Electric Power Distribution Substation for a Cooling Water Tower

The Design, Modeling, and Control of a Four-Rotor Aerial Robot

Silicon Carbide Amplifier Design for Radio Astronomy

## Research and Laboratories

The ECE Department has nine different instructional laboratories. Labs include:

The **Test and Product Engineering Laboratory** allows Rose-Hulman to offer courses that cover analog and mixed signal test and product engineering. These courses make available opportunities for students to learn the special methods required for testing analog and mixed signal integrated circuits at the production level, where minimizing test time is critical.

The **Electromagnetics Lab** has modern equipment and instrumentation including probe station, 20GHz network analyzers, anechoic chamber, and 5GHz oscilloscope.

The **Communications Lab** has equipment that can be used to develop and analyze today's mixed-signal communication systems. Equipment includes 3GHz spectrum analyzers, 6GHz vector network analyzers, 16-channel logic analyzers with multiple built-in protocols, and four-channel oscilloscopes.

This allows us to empower our research in the following areas:

- Design of ICs for Instructional Labs
- Design of ICs to model Biological Muscle
- Actuation
- Design of ICs to model neural activity

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## Satisfied Alumni

*"My Rose-Hulman graduate education was the start of a great career. The hands-on experience I received, particularly through projects and internships, left me very well prepared for the professional world, in ways my prior education had not. Rose-Hulman opened doors for me to succeed and to continue my development."*

| Adam Hoffman, 2009, AirXpanders,  
Palo Alto, California

*"As an undergraduate electrical engineering student, I did not focus my studies in the power area. By completing my MSEE with an emphasis in power, it opened opportunities in the power and manufacturing (refining) industry that I would not have had otherwise."*

| Amy Macak, 2006, operations supervisor,  
Marathon Petroleum Company, Robinson, Illinois

## ROSE-HULMAN INSTITUTE OF TECHNOLOGY

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