

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.

Special areas of interest include:

- Computer architecture and microcomputers
- Electromagnetics
- Electronics
- Signal and image processing

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. Students have the opportunity to work with cutting-edge laboratory equipment provided by Eagle Test Systems and Texas Instruments. This allows students the unique skills to test complex electronics for automotive, computing, telecommunications, aerospace, and defense industries.





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)

At least 36 credit hours must be graduate-level courses (500-level courses from any department, or 400-level mathematics, which has been approved by the students' advisory committee)

Thesis-based MSEE Program

48 credit hours

At least 24 credit hours must be upper-level ECE courses (400 and 500-level ECE courses)

At least 24 credit hours must be at the ECE 500-level
12 credit hours of thesis work

Successful defense of thesis

Acceptance of a technical article for publication and/or conference presentation

Dual Master of Science Program with Ulm University of Applied Sciences

Students study at both Rose-Hulman and Ulm University in Germany to earn a master of science in systems engineering and management from their respective home institution.

Recently Offered ECE 500 Courses

- Error Correcting Codes
- Data Communications
- Introduction to MEMs
- Advanced MEMs
- Advanced Microcomputers
- High Speed Digital Design
- Antenna Engineering
- Microwave/Millimeter Wave Engineering
- Advanced Electromagnetics
- Electromagnetic Metamaterials
- Analog Integrated Circuit Design
- Radio Frequency Integrated Circuit Design
- Power Electronics
- Analog Test and Product Engineering
- Mixed Signal Test Product Engineering
- Testing of Digital Systems
- Digital Signal Processing
- Advanced Image Processing



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 **Model-Based System Design Laboratory** helps better prepare engineering students to develop complex systems. It re-engineers the traditional development process from one that is paper-based to one that utilizes an executable model that is the repository for all information about the concept, design, and implementation of a product.

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 **Energy Lab** has modern equipment and instrumentation in a state-of-the-art studio laboratory configuration, with the school's computing network, so that students can use their laptop computers to interact with material presented in an interactive learning environment. We use the Cadence® tools for research thanks to a Tellabs Foundation grant.

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

® Cadence is a registered trademark of Cadence Design Systems, Inc., 2655 Seely Avenue, San Jose, CA 95134.

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