Duluth Campus

Electrical Engineering M.S.E.E.

Electrical Engineering

Swenson College of Science and Engineering

Link to a list of faculty for this program.

Contact Information:
EE Graduate Program, 271 MWAH, 1023 University Drive, Duluth, MN 55812 (218-726-6830; fax: 218-726-7267)
Email: umnee@d.umn.edu
Website: http://www.d.umn.edu/ee/

- Program Type: Master's
- Requirements for this program are current for Spring 2020
- Length of program in credits: 31
- This program does not require summer semesters for timely completion.
- Degree: Master of Science in Electrical Engineering

Along with the program-specific requirements listed below, please read the General Information section of the catalog website for requirements that apply to all major fields.

The master of science in electrical engineering (MSEE) combines scholarship and research in a program oriented toward students and engineering practitioners in the private and public sectors who are interested in advanced coursework and applied research. The program requires 31 credits of graduate coursework and research with focus on the departmental faculty's research areas of control systems, communications, signal processing, VLSI, nanoscale optoelectronics and photovoltaics, biomedical engineering, and intelligent transportation systems.

Undergraduate students in the Electrical Engineering program who are interested in pursuing the Master of Electrical Engineering at UMD may apply for admission to the Integrated Undergraduate/Graduate (IUS) Program. Students in the IUG Program start their graduate coursework prior to the completion of their undergraduate degree and may apply up to 9 credits of coursework to both their undergraduate B.S.E.E.and graduate M.S.E.E. degrees. Admission to the IU Program is limited to highly qualified upper division undergraduates.

Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

An undergraduate degree in electrical engineering, computer engineering, or computer science. Applicants from related majors may apply but may be required to take additional undergraduate courses.

Special Application Requirements:
The earned bachelors degree required may be waived only for current students in the Electrical Engineering B.S.E.E. program and who are applying through the Integrated Undergraduate/Graduate (IUG) option.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to test abbreviations(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

Program Requirements

Plan A: Plan A requires 15 to 21 major credits, 0 to 6 credits outside the major, and 10 thesis credits.The final exam is oral.

Plan B: Plan B requires 25 to 31 major credits and 0 to 6 credits outside the major.The final exam is oral. A capstone project is required.
Capstone Project: The Plan B project is for those students or practicing engineers who wish to have a hands-on learning experience solving technical problems, preferably by teaming up with an industrial counterpart. Plan B students are required to take a minimum of 1 and a maximum of 3 project credits.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

The master of science in electrical engineering (MSEE) degree requires 31 semester credits. The program offers two degree plans, plan A and plan B. Plan A is research oriented and it requires students to complete a research thesis (10 credits) and additional coursework. Plan B is coursework oriented with a project (1~3 credits) as the research component. For both thesis research and project research, a student is expected to identify a research adviser during the first two semesters in the program.

Plan A: Thesis Option

Students must complete a minimum of 31 semester credits including 10 thesis credits and 21 coursework credits. Plan A students must register for 10 thesis (EE 8777) credits, and write and defend a thesis on original research. Students may take up to 6 credits from graduate programs in related fields outside of EE. All courses must be 4xxx or above; a maximum of 6 credits in courses at 4xxx level is allowed, a minimum of 3 credits in courses at 8xxx is required; excluding EE 8001 and EE 8777.

Plan B: Project Option

Students must complete a minimum of 31 semester credits including project credits. Plan B students must register for at least 1 project credit (EE 8222), and write and defend a project report. Students may take up to 6 credits from graduate programs in related fields outside of EE. All courses must be 4xxx or above; a maximum of 6 credits in courses at 4xxx level is allowed, a minimum of 3 credits in courses at 8xxx is required, excluding EE 8001 and EE 8222.

Plan A or Plan B
Plan A
Take exactly 1 credit(s) from the following:
- EE 8001 - Graduate Professional Communication Seminar (1.0 cr)

Take exactly 10 credit(s) from the following:
- EE 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

Take 20 or more credit(s) from the following:
- EE 4305 - Computer Architecture (4.0 cr)
- EE 4311 - Design of VLSI Circuits (4.0 cr)
- EE 4321 - Computer Networks (3.0 cr)
- EE 4341 - Digital Systems (4.0 cr)
- EE 4501 - Power Systems (4.0 cr)
- EE 4611 - Introduction to Solid-State Semiconductors (3.0 cr)
- EE 4896 - Co-op in Electrical Engineering (1.0 cr)
- EE 5151 - Digital Control System Design (3.0 cr)
- EE 5211 *{Inactive}*(3.0 cr)
- EE 5315 - Multiprocessor-Based System Design (3.0 cr)
- EE 5477 - Antennas and Transmission Lines (3.0 cr)
- EE 5479 - Antennas and Transmission Lines Laboratory (1.0 cr)
- EE 5501 - Energy Conversion System (3.0 cr)
- EE 5522 - Power Electronics I (3.0 cr)
- EE 5533 - Grid- Resiliency, Efficiency and Technology (3.0 cr)
- EE 5621 - Microelectronics Technology (3.0 cr)
- EE 5741 - Digital Signal Processing (3.0 cr)

- EE 5742 - Pattern Recognition and Machine Learning (4.0 cr)
- EE 5745 - Medical Imaging (3.0 cr)
- EE 5765 - Modern Communication (4.0 cr)
- EE 5801 - Introduction to Artificial Neural Networks (3.0 cr)
- EE 5831 *{Inactive}*(3.0 cr)
- EE 5995 - Special Topics: (Various Titles to be Assigned) (1.0 - 3.0 cr)
- EE 8151 - Optimal Control Systems (3.0 cr)
- EE 8741 - Digital Image Processing (4.0 cr)
- EE 8742 *{Inactive}*(3.0 cr)
- EE 8765 *{Inactive}*(3.0 cr)

or **Plan B**

Take exactly 1 credit(s) from the following:

- EE 8001 - Graduate Professional Communication Seminar (1.0 cr)

Take 1 - 3 credit(s) from the following:

- EE 8222 - Master's Plan B Research and Design Project (1.0 - 3.0 cr)

Take 27 - 29 credit(s) from the following:

- EE 4305 - Computer Architecture (4.0 cr)
- EE 4311 - Design of VLSI Circuits (4.0 cr)
- EE 4321 - Computer Networks (3.0 cr)
- EE 4341 - Digital Systems (4.0 cr)
- EE 4501 - Power Systems (4.0 cr)
- EE 4611 - Introduction to Solid-State Semiconductors (3.0 cr)
- EE 4896 - Co-op in Electrical Engineering (1.0 cr)
- EE 5151 - Digital Control System Design (3.0 cr)
- EE 5211 *{Inactive}*(3.0 cr)
- EE 5315 - Multiprocessor-Based System Design (3.0 cr)
- EE 5171 - Introduction to Robotics and Mobile Robot Control Architectures (3.0 cr)
- EE 5477 - Antennas and Transmission Lines (3.0 cr)
- EE 5501 - Energy Conversion System (3.0 cr)
- EE 5522 - Power Electronics I (3.0 cr)
- EE 5533 - Grid- Resiliency, Efficiency and Technology (3.0 cr)
- EE 5621 - Microelectronics Technology (3.0 cr)
- EE 5741 - Digital Signal Processing (3.0 cr)
- EE 5742 - Pattern Recognition and Machine Learning (4.0 cr)
- EE 5745 - Medical Imaging (3.0 cr)
- EE 5765 - Modern Communication (4.0 cr)
- EE 5801 - Introduction to Artificial Neural Networks (3.0 cr)
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