

M.S. IN ELECTRICAL ENGINEERING

OVERVIEW

The Master of Science in electrical engineering (M.S. EE) program is open to qualified applicants with a B.S. degree in electrical engineering or a closely related field.

Graduate courses and research include topics in communications; controls, signal processing; machine vision and imaging; power systems; power electronics; electronic materials and devices; photovoltaic devices; device modeling, laser-based advanced processing; renewable energy and smart grid; electro-optics and photonics; microelectronics; fault tolerance and reliability; electromagnetics; computer aided design and simulation; microwave electronics, antennas, and plasma physics; and hardware-oriented security and trust.

The program is offered in a thesis-option version or in two non-thesis option versions:

1. **Thesis option:** A minimum of 30 credit hours of approved graduate study including 9 credit hours of M.S. Thesis under the supervision of an EECS Department faculty member is required. Students are required to successfully complete the oral defense of the thesis work and upload the thesis document to the OhioLink electronic repository.
2. **Non-thesis options:** The degree requirements for M.S. with non-thesis option are available with the approval of the Department Chair or the Department Graduate Program Director.
 - a. M.S. with project option: Students are required to complete 30 credit hours of an approved graduate study including 6 hours of M.S. Project as specified by individual department guidelines and requirements. Students are required to submit a typed Project Report to the department-approved committee, consisting of the student's advisor and another faculty member.
 - b. M.S. with coursework-only option: Students are required to complete a minimum of 30 credit hours of approved graduate-level course work.

The program prepares students with advanced and up-to-date knowledge and skills to pursue careers in the various fields of electrical engineering. The M.S. degree provides the foundation needed to become a productive researcher or a developer of innovative solutions to technological problems in the field.

ADMISSION REQUIREMENTS

Admission to the M.S. in electrical engineering program requires a B.S. degree in electrical engineering or a closely related field.

Application requirements:

- **Degree:** Applicants must hold a four-year bachelor's degree from a regionally accredited college or university
- **GPA:** Applicants must have at least a 2.8/4.0 grade point average for undergraduate coursework from a U.S. institution; a 3.0/4.0 for

undergraduate coursework from an international institution; or a 3.3/4.0 for previous graduate coursework.

- **Application:** UToledo application required
- **GRE:** Required for applicants whose degree is from a non-US institution.
- **Transcripts:** Required
- **Statement of Purpose:** Required
- **Letters of Recommendation:** 2
- **Proof of English language proficiency:** Required for students from non-English speaking countries. See University graduate admissions for minimum test score requirements and exceptions.

Application priority deadlines for admissions and funding decisions:

- **Fall:** March 1
- **Spring:** October 1
- **Summer:** Contact department

Admission decisions are made on an individual basis and take into consideration the applicant's test results and previous academic record, the intended area of study, and the capacity of the EECS department.

PROGRAM REQUIREMENTS

MS EE program students can select one of the options below.

1. Master of Science degree with Thesis option: A minimum of 30 credit hours of approved graduate study, including nine credit hours of Master of Science thesis under the supervision of a faculty member, is required. Students are required to submit a written thesis and successfully complete the oral defense of the thesis work.
2. Master of Science degree with Non-Thesis option: The degree requirements for the Master of Science with non-thesis option are:
 - a. Master of Science degree with Project option: Students are required to complete 30 credit hours of approved graduate-level work, including six hours of Master of Science project as specified by the individual department guidelines and requirements. Students are required to submit a written project report to the department.
 - b. Master of Science degree with Course Work-only option: Students are required to complete 30 credit hours of approved graduate-level course work

Requirements and rules:

1. Students must submit a Plan of Study by the end of the 1st semester, which must be approved by a faculty advisor and the graduate program director.
2. Students must take one credit hour (included in the required 30 hours for the program) of the EECS graduate seminar

course EECS 5930 with a maximum of two excused absences in the semester.

3. Students admitted to the MSEE must also be admitted into one of the associated "specialization" areas based on their undergraduate degree and background.
 - a. This is accomplished during orientation week before the first semester or during the first week of the semester. The graduate Program Director (GPD) will advise students that they must select an available "specialization area" within the degree program into which they are admitted before they are permitted to register. Not all listed specialization areas may be available during any given academic year.
 - b. Once the student chooses a "specialization area", then the student must consult with the GPD to secure his/her signature for permission to register for the courses in that specific area, which must be completed before the first semester starts or in the first week of the semester.
 - c. Students must register for all core courses offered from the specialization area during that term, and if not all core courses are available during that term, then additional courses must be included from the "recommended electives" list as required by the registration status of the student. However, student must take the remaining core courses for the chosen specialization area during their next immediate term of offering.
4. Student admitted into a specialization area associated with the the MSEE program must take all required core courses as designated for that specialization area.
 - Core courses may be substituted by recommended electives under unique circumstances and on an exceptional and case-by-case basis. This is so if a core course cannot be offered by the department for foreseeable future due to reasons outside the control of department, which may include but not limited to, such as faculty unavailability or student having taken those courses as part of BS/MS program at UT or a transfer student into our MS programs etc.
 - The procedure to follow to substitute a required core is as follows: faculty adviser, but not the student, must in writing request substitution of a core course with a recommended elective or another course which may be from a different specialization area within the degree program with a detailed rationale from the EECS Graduate Committee whose written and documented approval of such requests is required for them to take effect.
5. Students must take at least 15 credit hours of graduate level EECS courses, specifically 3 core courses of a specialization area excluding independent study, independent research, masters' project or masters' thesis hours.
6. Students must take at least 6 credit hours of 6000-level courses excluding masters' thesis, independent study, masters' project or independent research.
7. Non-compliance with the requirements may result in a "HOLD" being put on student account preventing any further registration actions.

A table with required and recommended courses for each specialization area is included in the attached Program Restructuring document below.

Students are encouraged to include higher-level math courses in their program, subject to approval of their advisers.

Courses taken on an audit basis do not count toward the degree. Courses outside of the College of Engineering require prior approval.

In order to be awarded the Master of Science degree, the student must have at least a B average (a minimum GPA of 3.0/4.0) for all graduate course credits in the program of study as well as for the entire graduate transcript. Only credit hours obtained with a letter grade of "C" or higher, or an "S" grade for the limited number of classes offered on a satisfactory or unsatisfactory basis, will fulfill the degree requirements.

MSEE with thesis option:

Code	Title	Hours
Core courses		9
Recommended courses		9
EECS 6990	Independent Study	2
EECS 5930	Electrical Engineering & Computer Science Seminar	1
EECS 6960	Master's Graduate Research And Thesis	9
Total Hours		30

MSEE with project option:

Code	Title	Hours
Core courses		9
Recommended courses		12
EECS 6990	Independent Study	2
EECS 5930	Electrical Engineering & Computer Science Seminar	1
EECS 5920	Projects	6
Total Hours		30

MSEE with courses-only option:

Code	Title	Hours
Core courses		9
Recommended courses		18
EECS 6990	Independent Study	2
EECS 5930	Electrical Engineering & Computer Science Seminar	1
Total Hours		30

- PLO 1. Apply specialized knowledge and skills gained through the MSEE program to solve complex electrical engineering problems.
- PLO 2. Demonstrate competency commensurate with the master's education for one or more of the following engineering activities: design, develop, integrate, simulate, prototype, test, verify or validate a component, subsystem, system in hardware or software.
- PLO 3. Demonstrate effective communication skills.
- PLO 4. Demonstrate professionalism appropriate to the discipline.