

# ELECTRONICS ENGINEERING, M.S.

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The Master of Science in Electronics Engineering program offers a rigorous and high quality graduate education that prepares students for successful professional careers in engineering. Award-winning engineering faculty guide and mentor students to become innovative researchers and leaders for a technology driven global society.

## M.S. Program Requirements

The M.S. program requires 30 graduate credit hours of course work including a thesis or a project. The 30 credits include 15 credits of core courses for all students. Thesis students need 9 elective course credits and 6 thesis credits. Non-thesis students need 12 elective credits and 3 project credits. All degree requirements must be completed within four calendar years.

**Full-time** students with a B.S. degree in Engineering should expect to complete the M.S. degree with thesis in 2 years and non-thesis in 1-1/2 years. A cumulative GPA of 3.0/4.0 is required for graduation.

The M.S. program with a project is also offered as an **online accelerated** option for students interested in Biomedical Engineering or Microelectronics and Photonics. Students who select this option should expect to complete M.S. degree in 1 year. For more information on this option see our website (<https://online.nsu.edu/degrees/technology/master-science-electronics-engineering/>).

## Assistantships

Financial assistance for graduate studies can include federal and state financial aid. The Engineering Department awards a number of teaching assistantships, research assistantships, and laboratory assistantships each semester. Renewals of these awards are subject to semester and annual reviews and available funding. In general, the awards are available only for four semesters.

## Expected Learning Outcomes

The program's Student Learning Outcomes are as follows:

- **Outcome 1:** Program graduates will be able to analyze and solve advanced engineering problems.
- **Outcome 2:** Program graduates will be able to apply knowledge to design and/or produce effective and comprehensive solutions to complex engineering problems and applications.
- **Outcome 3:** For thesis students only: Program graduates will be able to conduct original and independent research.
- **Outcome 4:** Program graduates will be able to explore new and advanced technologies in engineering.
- **Outcome 5:** Program graduates will be able to demonstrate good oral and written communication skills and be able to present their ideas and designs in a professional setting to both technical and non-technical audiences.
- **Outcome 6:** Program graduates will be able to demonstrate knowledge of and display commitment to professionalism.

## Summary of Graduation Requirements

### Thesis Option:

| Subject Area              | Credits   |
|---------------------------|-----------|
| Core                      | 15        |
| Elective                  | 9         |
| Thesis/Project            | 6         |
| <b>Total Credit Hours</b> | <b>30</b> |

### Non-Thesis Option:

| Subject Area              | Credits   |
|---------------------------|-----------|
| Core                      | 15        |
| Elective                  | 12        |
| Thesis/Project            | 3         |
| <b>Total Credit Hours</b> | <b>30</b> |

### Core Courses:

| Code                | Title                            | Credits |
|---------------------|----------------------------------|---------|
| <b>Core Courses</b> |                                  |         |
| EEN 531             | Microcontrollers                 | 3       |
| EEN 551             | Communications Systems           | 3       |
| EEN 581             | Analog Integrated Circuits       | 3       |
| EEN 610             | Advanced Engineering Mathematics | 3       |
| EEN 683             | Advanced Topics in Vlsi          | 3       |

### Track

|   |           |
|---|-----------|
| Select a track                          | 15        |
| Biomedical/Modeling & Simulation (p. 1) |           |
| Microelectronics and Photonics (p. 1)   |           |
| <b>Total Credits</b>                    | <b>30</b> |

## Tracks

### Biomedical Engineering

| Code    | Title                                    | Credits |
|---------|--|---------|
| EEN 541 | Biomedical Engineering Devices & Systems | 3       |
| EEN 582 | Bioelectrics                             | 3       |
| EEN 590 | Research Methods                         | 1       |
| EEN 601 | Systems Modeling                         | 3       |
| EEN 691 | Advanced Topics II                       | 3       |
| EEN 697 | Masters Project                          | 3       |
| EEN 698 | Master's Thesis I                        | 3       |
| EEN 699 | Master's Thesis II                       | 3       |

### Microelectronics and Photonics

| Code    | Title  | Credits |
|---------|--|---------|
| EEN 562 | Semiconductor Processing Technology                | 3       |
| EEN 590 | Research Methods                                   | 1       |
| EEN 614 | Neural Networks                                    | 3       |
| EEN 621 | Electromagnetic Field Theory                       | 3       |
| EEN 646 | Wireless Communications                            | 3       |
| EEN 6XX | Contact department for specific course information | 3       |
| EEN 663 | Solid State Devices                                | 3       |
| EEN 690 | Advanced Topics I                                  | 3       |
| EEN 691 | Advanced Topics II                                 | 3       |
| EEN 697 | Masters Project                                    | 3       |

|         |                                    |   |
|---------|------------------------------------|---|
| EEN 698 | Master's Thesis I                  | 3 |
| EEN 699 | Master's Thesis II                 | 3 |
| OEN 520 | Optical Design and Instrumentation | 3 |
| OEN 530 | Optical Materials                  | 3 |
| OEN 540 | Lasers and Photonics               | 3 |
| OEN 560 | Optical Communications I           | 3 |
| OEN 580 | Quantum Mechanics                  | 3 |
| OEN 630 | Opto-Electronic Devices            | 3 |

### TRADITIONAL COURSE SEQUENCE COURSE

|               | SEMESTER II | SEMESTER I  |
|---------------|-------------|-------------|
| EEN XXX       | Core #4     | Core #1     |
| EEN XXX       | Core #5     | Core #2     |
| EEN XXX       | Elective #2 | Core #3     |
| EEN XXX       | Elective #3 | Elective #1 |
| Total Credits | 12          | 12          |

### COURSE SEQUENCE YEAR II – Thesis option

|                    |                |                     |
|--------------------|----------------|---------------------|
| Semester I         | 3 credit hours | EEN 698 – Thesis I  |
| Semester II        | 3 Credit hours | EEN 699 – Thesis II |
| Total thesis hours | 6 credit hours |                     |

### COURSE SEQUENCE YEAR II – Non-Thesis option

Semester One: Elective #4 and EEN 697 - Project

## Sample Accelerated Course Sequence - Microelectronics and Photonics

| Course             | Title                                 | Credits   |
|--------------------|---------------------------------------|-----------|
| <b>First Year</b>  |                                       |           |
| <b>Fall</b>        |                                       |           |
| Fall Mini-Term 1   |                                       |           |
| EEN 581            | Analog Integrated Circuits            | 3         |
| EEN 610            | Advanced Engineering Mathematics      | 3         |
| Fall Mini-Term 2   |                                       |           |
| EEN 551            | Communications Systems                | 3         |
| EEN 603            | Pc Based Instrumentation              | 3         |
| <b>Credits</b>     |                                       | <b>12</b> |
| <b>Spring</b>      |                                       |           |
| Spring Mini-Term 1 |                                       |           |
| EEN 650            | Microelectromechanical Systems (mems) | 3         |
| OEN 561            | Optoelectronic and Photonic Devices   | 3         |
| Spring Mini-Term 2 |                                       |           |
| OEN 540            | Lasers and Photonics                  | 3         |
| EEN 683            | Advanced Topics in Vlsi               | 3         |
| <b>Credits</b>     |                                       | <b>12</b> |
| <b>Summer</b>      |                                       |           |
| Summer Mini-Term 1 |                                       |           |

|                      |                                     |           |
|----------------------|-------------------------------------|-----------|
| EEN 531              | Microcontrollers                    | 3         |
| EEN 562              | Semiconductor Processing Technology | 3         |
| <b>Credits</b>       |                                     | <b>6</b>  |
| <b>Total Credits</b> |                                     | <b>30</b> |

## Sample Accelerated Course Sequence - Biomedical Engineering

| Course               | Title  | Credits   |
|----------------------|--|-----------|
| <b>First Year</b>    |  |           |
| <b>Fall</b>          |  |           |
| Fall Mini-Term 1     |  |           |
| EEN 610              | Advanced Engineering Mathematics                   | 3         |
| EEN 581              | Analog Integrated Circuits                         | 3         |
| Fall Mini-Term 2     |  |           |
| EEN 551              | Communications Systems                             | 3         |
| EEN 603              | Pc Based Instrumentation                           | 3         |
| <b>Credits</b>       |  | <b>12</b> |
| <b>Spring</b>        |  |           |
| Spring Mini-Term1    |  |           |
| EEN 541              | Biomedical Engineering Devices & Systems           | 3         |
| EEN 582              | Bioelectrics                                       | 3         |
| Spring Mini-Term 2   |  |           |
| EEN 6XX              | Contact department for specific course information |           |
| EEN 683              | Advanced Topics in Vlsi                            | 3         |
| <b>Credits</b>       |  | <b>9</b>  |
| <b>Summer</b>        |  |           |
| Summer Mini-Term 1   |  |           |
| EEN 531              | Microcontrollers                                   | 3         |
| EEN 614              | Neural Networks                                    | 3         |
| <b>Credits</b>       |  | <b>6</b>  |
| <b>Total Credits</b> |  | <b>27</b> |

## Admissions Requirements

A Bachelor of Science Degree in Electrical and/or Computer Engineering or optical engineering from an accredited institution. Science and Technology majors should consult the Graduate Program Coordinator for additional prerequisite courses.

Undergraduate GPA 3.0/4.0 or better.

### How to Apply

Apply online and include the following:

- Official transcripts. For international applicants, we require an official, evaluated transcripts from an approved agency such as the World Education Services (WES) or Educational Credential Evaluators (ECE)
- Three letters of recommendation
- Resume
- Personal Statement
- TOEFL/IELTS score of 79/6.5 or better (for international students)
- Non-refundable application fee.

- GRE scores of 155 or better in each section of verbal and quantitative, and 3.5 or better for the analytical section. GRE scores may be waived for applicants who majored in electrical, electronics, or optical engineering and earned at least a 3.2 GPA in engineering courses. The GRE also may be waived based on other student credentials.

The Departmental Graduate Committee will make the final selection for admission and assistantship and scholarship awards.