**ELECTRICAL ENGINEERING MS**

**Degree Requirements**

The following requirements are in addition to, or further elaborate upon, those requirements outlined in The Graduate School Policy Guide (https://catalogs.northwestern.edu/tgs/academic-policies-procedures).

**Common Requirements**

Three plans are available, as shown below. For all three plans, the following are required:

- A total of 12 units.
- All courses must be at the 300-level or higher
  - Effective September 9, 2019, ELEC_ENG 302-0 Probabilistic Systems is considered a graduate-level course and can be counted.
- At least 9 courses from Electrical Engineering, Computer Engineering, or Computer Science. Any courses taken outside ECE or CS must be approved by the student’s advisor.
- At least 6 courses from the Core Electrical Engineering list below.
- At least 3 courses at the 400-level (ELEC_ENG 590-0 Research does not count at a 400-level course).
- The only P/N course acceptable for the master’s degree program is ELEC_ENG 590-0 Research.
- Additional requirements are listed in the ECE graduate study manual.

**Plan 1: Thesis**

Additional requirements:

- Up to three credits may be ELEC_ENG 590-0 Research.
- A written thesis is required, in a format specified by the thesis committee.

**Plan 2: Project**

Additional requirements:

- Up to two credits may be ELEC_ENG 590-0 Research.
- A project report is required, in a format specified by the project committee.

**Plan 3: Course-only**

Additional requirements:

- ELEC_ENG 590-0 Research may not be included in the 12 required units.

**Core Electrical Engineering Courses:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>ELEC_ENG 307-0</td>
<td>Communications Systems</td>
</tr>
<tr>
<td>ELEC_ENG 308-0</td>
<td>Advanced Electromagnetics and Photonics</td>
</tr>
<tr>
<td>ELEC_ENG 326-0</td>
<td>Electronic System Design I</td>
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<tr>
<td>ELEC_ENG 327-0</td>
<td>Electronic System Design II: Project</td>
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<tr>
<td>ELEC_ENG 332-0</td>
<td>Introduction to Computer Vision</td>
</tr>
<tr>
<td>ELEC_ENG 333-0</td>
<td>Introduction to Communication Networks</td>
</tr>
<tr>
<td>ELEC_ENG 350-0</td>
<td>Digital Microelectronics</td>
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<tr>
<td>ELEC_ENG 351-0</td>
<td>Digital Signal Processing</td>
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</tbody>
</table>

*Core EE* courses from Computer Engineering:

- ELEC_ENG 360-0 Introduction to Feedback Systems
- ELEC_ENG 363-0 Digital Filtering
- ELEC_ENG 374-0 Introduction to Digital Control
- ELEC_ENG 378-0 Digital Communications
- ELEC_ENG 379-0 Lasers and Coherent Optics
- ELEC_ENG 380-0 Wireless Communications
- ELEC_ENG 381-0 Electronic Properties of Materials
- ELEC_ENG 382-0 Photonic Information Processing
- ELEC_ENG 383-0 Fiber-Optic Communications
- ELEC_ENG 384-0 Solid State Electronic Devices
- ELEC_ENG 385-0 Optoelectronics
- ELEC_ENG 386-0 Computational Electromagnetics and Photonics
- ELEC_ENG 388-0 Nanotechnology
- ELEC_ENG 389-0 Superconductivity and Its Applications
- ELEC_ENG 390-0 Introduction to Robotics
- ELEC_ENG 395-0 Special Topics in Electrical Engineering
- ELEC_ENG 398-0 Electrical Engineering Design
- ELEC_ENG 401-0 Fundamentals of Electronic Devices
- ELEC_ENG 402-0 Advanced Electronic Devices
- ELEC_ENG 403-0 Quantum Semiconductors
- ELEC_ENG 404-0 Quantum Electronics
- ELEC_ENG 405-0 Advanced Photonics
- ELEC_ENG 406-0 Nonlinear Optics
- ELEC_ENG 407-0 Quantum Optics
- ELEC_ENG 408-1 Classical Electrodynamics
- ELEC_ENG 408-2 Computational Electrodynamics
- ELEC_ENG 409-0 Semiconductor Lasers
- ELEC_ENG 410-0 System Theory
- ELEC_ENG 411-0 Fundamentals and Applications of Special Relativity
- ELEC_ENG 414-0 Advanced Topics in Quantum Electronics
- ELEC_ENG 418-0 Advanced Digital Signal Processing
- ELEC_ENG 420-0 Digital Image Processing
- ELEC_ENG 421-0 Multimedia Signal Processing
- ELEC_ENG 422-0 Random Processes in Communications and Control 1
- ELEC_ENG 423-0 Random Processes in Communications and Control 2
- ELEC_ENG 424-0 Distributed Optimization
- ELEC_ENG 425-0 Introduction to Nanoscale Lasers, Quantum Noise, Photons, and Measurement
- ELEC_ENG 426-0 Signal Detection and Estimation
- ELEC_ENG 427-0 Optical Communications
- ELEC_ENG 428-0 Information Theory
- ELEC_ENG 429-0 Selected Topics in Quantum Information Science and Technology
- ELEC_ENG 432-0 Advanced Computer Vision
- ELEC_ENG 433-0 Statistical Pattern Recognition
- ELEC_ENG 435-0 Deep Learning: FAA
- ELEC_ENG 454-0 Advanced Communication Networks
- ELEC_ENG 463-0 Adaptive Filters
- ELEC_ENG 475-0 Machine Learning: Foundations, Applications, and Algorithms
- ELEC_ENG 478-0 Advanced Digital Communications
- ELEC_ENG 495-0 Special Topics in Electrical Engineering
- ELEC_ENG 510-0 Seminar
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<tr>
<td>COMP_ENG 303-0</td>
<td>Advanced Digital Design</td>
</tr>
<tr>
<td>COMP_ENG 391-0</td>
<td>CMOS VLSI Circuit Design</td>
</tr>
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