MASTER OF SCIENCE IN THE FIELD OF ELECTRICAL ENGINEERING

The master of science in the field of electrical engineering degree program is designed to help students understand and apply the principles of the field to diverse areas such as communications, power and energy, and micro- and nano-electronics. Students may choose from the following five areas of focus: communications and networks; electrical power and energy; applied electromagnetics; electronics, photonics, and MEMS; and signal and image processing, systems, and controls.

Specific admission requirements are shown on the Graduate Program Finder (http://www.gwu.edu/all-graduate-programs).

Visit the program website (http://www.ece.seas.gwu.edu/master-science-electrical-engineering) for additional information.

REQUIREMENTS

The following requirements must be fulfilled: 30 credits, including the number of required and elective credits determined by the selected focus area. Thesis and non-thesis options are available. Students should contact the department concerning these options.

Students also are required to attend five colloquia during their time in the program and, upon completion of each colloquium, submit to the department an attendance form (https://www.ece.seas.gwu.edu/undergraduate-resources) signed by the academic advisor.

Students select one of the following five areas of focus: communications and networks; electrical power and energy; applied electromagnetics; electronics, photonics, and MEMS; and signal and image processing, systems, and controls.

Communications and Networks

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECE 6015</td>
<td>Stochastic Processes in Engineering</td>
<td></td>
</tr>
<tr>
<td>ECE 6035</td>
<td>Introduction to Computer Networks</td>
<td></td>
</tr>
<tr>
<td>ECE 6510</td>
<td>Communication Theory</td>
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At least two of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ECE 6500</td>
<td>Information Theory</td>
<td></td>
</tr>
<tr>
<td>ECE 6505</td>
<td>Error Control Coding</td>
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</table>

Electives

15 credits in elective courses. Normally, no more than two courses taken outside the Department of Electrical and Computer Engineering may be counted toward the requirements for the degree.

Electrical Power and Energy

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ECE 6060</td>
<td>Electric Power Generation</td>
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<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ECE 6010</td>
<td>Linear Systems Theory</td>
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</tr>
<tr>
<td>ECE 6020</td>
<td>Applied Electromagnetics</td>
<td></td>
</tr>
<tr>
<td>ECE 6025</td>
<td>Signals and Transforms in Engineering</td>
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At least three of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ECE 6610</td>
<td>Electrical Energy Conversion</td>
<td></td>
</tr>
<tr>
<td>ECE 6620</td>
<td>Electrical Power Systems</td>
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</tr>
<tr>
<td>ECE 6622</td>
<td>Power Electronics</td>
<td></td>
</tr>
<tr>
<td>ECE 6666</td>
<td>Power System Transmission, Control, and Security</td>
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</tr>
<tr>
<td>ECE 6677</td>
<td>Nuclear Power Generation</td>
<td></td>
</tr>
<tr>
<td>ECE 6688</td>
<td>Power Distribution Grids</td>
<td></td>
</tr>
<tr>
<td>ECE 6699</td>
<td>Smart Power Grids</td>
<td></td>
</tr>
<tr>
<td>ECE 6670</td>
<td>Power System Protection</td>
<td></td>
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</table>
### Master of Science in the Field of Electrical Engineering

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ECE 6690</td>
<td>Power Systems Economics</td>
<td></td>
</tr>
<tr>
<td>ECE 6691</td>
<td>Power Systems Reliability</td>
<td></td>
</tr>
<tr>
<td>ECE 6699</td>
<td>Energy and Sustainability</td>
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</tbody>
</table>

**Electives**

12 credits in elective courses. Normally no more than two courses taken outside the Department of Electrical and Computer Engineering may be counted toward the requirements for the degree.

### Applied Electromagnetics

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Required</strong></td>
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<td></td>
</tr>
<tr>
<td>ECE 6020</td>
<td>Applied Electromagnetics</td>
<td></td>
</tr>
<tr>
<td>ECE 6710</td>
<td>Microwave Engineering</td>
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</tr>
<tr>
<td>ECE 6715</td>
<td>Antennas</td>
<td></td>
</tr>
</tbody>
</table>

At least one of the following:

- ECE 6720 Remote Sensing
- ECE 6725 Electromagnetic Radiation and Scattering
- ECE 6730 Waves in Random Media
- ECE 6735 Numerical Electromagnetics
- ECE 6745 Analysis of Nonlinear and Multivalued Devices
- ECE 6750 Modern Radar Systems
- ECE 6760 Propagation Modeling in Wireless Communications
- ECE 6765 Photonics and Fiber Optics
- ECE 6770 Applied Magnetism

**Electives**

15 credits in elective courses. Normally no more than two courses taken outside the Department of Electrical and Computer Engineering may be counted toward the requirements for the degree.

### Electronics, Photonics, and MEMS

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td><strong>Required</strong></td>
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</tr>
<tr>
<td>ECE 6030</td>
<td>Device Electronics</td>
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</tr>
</tbody>
</table>

### Signal and Image Processing, Systems and Controls

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td><strong>Required</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECE 6015</td>
<td>Stochastic Processes in Engineering</td>
<td></td>
</tr>
</tbody>
</table>

At least four of the following:

- ECE 6005 Microcomputer Systems Architecture
- ECE 6010 Linear Systems Theory
- ECE 6025 Signals and Transforms in Engineering
- ECE 6666 Power System Transmission, Control, and Security
- ECE 6800 Computational Techniques in Electrical Engineering
- ECE 6810 Speech and Audio Processing by Computer
- ECE 6815 Multimedia Processing
- ECE 6820 Real-Time Digital Signal Processing
- ECE 6825 Computer Control Systems
ECE 6830  System Optimization
ECE 6835  Nonlinear Systems
ECE 6840  Digital Image Processing
ECE 6842  Image Engineering
ECE 6845  Image Synthesis
ECE 6850  Pattern Recognition
ECE 6855  Digital Signal Processing Techniques
ECE 6860  Compression Techniques for Data, Speech, and Video
ECE 6865  Statistical Signal Estimation
ECE 6875  Wavelets and Their Applications
ECE 6880  Adaptive Signal Processing
ECE 6885  Computer Vision

**Electives**

15 credits in elective courses. Normally no more than two courses taken outside the Department of Electrical and Computer Engineering may be counted toward the requirements for the degree.

Additional requirements found on the Department of Electrical and Computer Engineering Master’s Degree requirements (https://www.ece.seas.gwu.edu/masters-program-degree-requirements) webpage.