The combined MS program in applied physics and engineering allows graduate students to receive training in one of three concentrations of the electrical and computer engineering department while also receiving fundamental graduate-level physics training that is relevant to that area.

**Thesis Option**
A student may complete an additional 8 semester hours of thesis. Students may register for an additional two semesters of thesis work, Thesis (EECE 7990) (4 semester hours) or Thesis (PHYS 7990) (4 semester hours), depending on the affiliation of the thesis advisor. A thesis committee is composed of an advisor and two faculty members from physics or electrical engineering.

**Program Requirements**
Complete all courses and requirements listed below unless otherwise indicated.

**Concentrations**
Complete one of the following concentrations:

- Microsystems, Materials, and Devices (p. 1)
- Electromagnetics, Plasma, and Optics (p. 1)
- Analysis, Modeling, and Computation (p. 1)

### MICROSYSTEMS, MATERIALS, AND DEVICES

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>EECE 7201</td>
<td>Solid State Devices</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 7324</td>
<td>Condensed Matter Physics</td>
<td>4</td>
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</table>

**Engineering Course Work**
Complete 12 semester hours from the following:

- ECEE 5606 Micro- and Nanofabrication
- ECEE 5680 Electric Drives
- ECEE 7204 Applied Probability and Stochastic Processes
- ECEE 7240 Analog Integrated Circuit Design
- ECEE 7242 Integrated Circuits for Mixed Signals and Data Communication
- ECEE 7244 Introduction to Microelectromechanical Systems (MEMS)
- ECEE 7245 Microwave Circuit Design for Wireless Communication
- ECEE 7353 VLSI Design
- ECEE 7398 Special Topics

**Physics Course Work**
Complete 12 semester hours from the following:

- PHYS 5318 Principles of Experimental Physics
- PHYS 7305 Statistical Physics
- PHYS 7315 Quantum Theory 1
- PHYS 7316 Quantum Theory 2
- PHYS 7321 Computational Physics
- PHYS 7731 Biological Physics 1

### ELECTROMAGNETICS, PLASMA, AND OPTICS

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>ECEE 7203</td>
<td>Complex Variable Theory and Differential Equations</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 7302</td>
<td>Electromagnetic Theory</td>
<td>4</td>
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</tbody>
</table>

**Engineering Course Work**
Complete 12 semester hours from the following:

- ECEE 5698 Special Topics in Electrical and Computer Engineering (Subsurface Imaging)
- ECEE 7105 Optics for Engineers
- ECEE 7202 Electromagnetic Theory 1
- ECEE 7245 Microwave Circuit Design for Wireless Communication
- ECEE 7270 Electromagnetic Theory 2
- ECEE 7271 Computational Methods in Electromagnetics
- ECEE 7275 Antennas and Radiation
- ECEE 7293 Modern Imaging

### ANALYSIS, MODELING, AND COMPUTATION

<table>
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<tr>
<th>Code</th>
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<tr>
<td>ECEE 7205</td>
<td>Fundamentals of Computer Engineering</td>
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</tr>
<tr>
<td>PHYS 7321</td>
<td>Computational Physics</td>
<td>4</td>
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</tbody>
</table>

**Engineering Course Work**
Complete 12 semester hours from the following:

- ECEE 5639 Computer Vision
- ECEE 5640 High-Performance Computing
- ECEE 5642 Data Visualization
- ECEE 5643 Simulation and Performance Evaluation
- ECEE 5644 Introduction to Machine Learning and Pattern Recognition
- ECEE 7205 Fundamentals of Computer Engineering
- ECEE 7271 Computational Methods in Electromagnetics
- ECEE 7352 Computer Architecture
- ECEE 7353 VLSI Design
- ECEE 7374 Fundamentals of Computer Networks
<table>
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<tbody>
<tr>
<td>EECE 7376</td>
<td>Operating Systems: Interface and Implementation</td>
</tr>
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</table>

**Physics Course Work**

Complete 12 semester hours from the following: 12

<table>
<thead>
<tr>
<th>Course Code</th>
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</thead>
<tbody>
<tr>
<td>PHYS 5116</td>
<td>Complex Networks and Applications</td>
</tr>
<tr>
<td>PHYS 5318</td>
<td>Principles of Experimental Physics</td>
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<tr>
<td>PHYS 7301</td>
<td>Classical Mechanics/Math Methods</td>
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<tr>
<td>PHYS 7305</td>
<td>Statistical Physics</td>
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<tr>
<td>PHYS 7331</td>
<td>Network Science Data</td>
</tr>
<tr>
<td>PHYS 7335</td>
<td>Dynamical Processes in Complex Networks</td>
</tr>
</tbody>
</table>

**Thesis Option**

Students may register for an additional two semesters of thesis work, Thesis (EECE 7990) or Thesis (PHYS 7990), depending on the affiliation of the thesis advisor. Thesis credits cannot be substituted for any of the course work listed above. This option requires a total of 40 semester hours for the master’s degree.

**Program Credit/GPA Requirements**

32–40 total semester hours required  
Minimum 3.000 GPA required