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>
</tr>
</thead>
<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>
</tr>
</tbody>
</table>

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

- EECE 5606 Micro- and Nanofabrication
- EECE 5680 Electric Drives
- EECE 7204 Applied Probability and Stochastic Processes
- EECE 7240 Analog Integrated Circuit Design
- EECE 7242 Integrated Circuits for Mixed Signals and Data Communication
- EECE 7244 Introduction to Microelectromechanical Systems (MEMS)
- EECE 7245 Microwave Circuit Design for Wireless Communication
- EECE 7353 VLSI Design
- EECE 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 7331 Network Science Data
- PHYS 7734 Topics: Condensed Matter Physics

### ELECTROMAGNETICS, PLASMA, AND OPTICS

**Core Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 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>
</tr>
</tbody>
</table>

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

- EECE 7105 Optics for Engineers
- EECE 7202 Electromagnetic Theory 1
- EECE 7245 Microwave Circuit Design for Wireless Communication
- EECE 7270 Electromagnetic Theory 2
- EECE 7271 Computational Methods in Electromagnetics
- EECE 7275 Antennas and Radiation
- EECE 7293 Modern Imaging
- PHYS 5318 Principles of Experimental Physics
- PHYS 7305 Statistical Physics
- PHYS 7315 Quantum Theory 1
- PHYS 7316 Quantum Theory 2
- PHYS 7321 Computational Physics

### ANALYSIS, MODELING, AND COMPUTATION

**Core Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 7205</td>
<td>Fundamentals of Computer Engineering</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 7321</td>
<td>Computational Physics</td>
<td>4</td>
</tr>
</tbody>
</table>

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

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

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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</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>
</tr>
<tr>
<td>PHYS 7301</td>
<td>Classical Mechanics/Math Methods</td>
</tr>
<tr>
<td>PHYS 7305</td>
<td>Statistical Physics</td>
</tr>
<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