Applied Physics and Engineering, MS

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. 2)

MICROSYSTEMS, MATERIALS, AND DEVICES

Code	Title	Hours
Core Courses		
EECE 7201	Solid State Devices	4
PHYS 7324	Condensed Matter Physics	4
Engineering Coursework		
Complete 12 semester hours from the following:		12
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	Advanced Special Topics in Electrical and Computer Engineering	
Physics Coursework		
Complete 12 semester hours from the following:		12
PHYS 5318	Principles of Experimental Physics	
PHYS 7301	Classical Mechanics/Math Methods	
PHYS 7302	Electromagnetic Theory	
PHYS 7305	Statistical Physics	
PHYS 7315	Quantum Theory 1	
PHYS 7316	Quantum Theory 2	
PHYS 7321	Computational Physics	
PHYS 7734	Topics: Condensed Matter Physics	

ELECTROMAGNETICS, PLASMA, AND OPTICS

Code	Title	Hours
Core Courses		
EECE 7203	Complex Variable Theory and Differential Equations	4
PHYS 7302	Electromagnetic Theory	4
Engineering Coursework		
Complete 12 semester hours from the following:		12
EECE 5698	Special Topics in Electrical and Computer Engineering (Subsurface Imaging)	
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	
Physics Coursework		
Complete 12 semester hours from the following:		12
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 7324	Condensed Matter Physics	
PHYS 7731	Biological Physics 1	

ANALYSIS, MODELING, AND COMPUTATION

Code	Title	Hours
Core Courses		
EECE 7205	Fundamentals of Computer Engineering	4
PHYS 7321	Computational Physics	4
Engineering Coursework		
Complete 12 semester hours from the following:		12
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	
Physics Coursework		
Complete 12 semester hours from the following:		12
PHYS 5116	Network Science 1	
PHYS 5318	Principles of Experimental Physics	
PHYS 7301	Classical Mechanics/Math Methods	
PHYS 7305	Statistical Physics	
PHYS 7335	Dynamical Processes in Complex Networks	

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 coursework 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