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

Students may register for an additional two semesters of thesis work. Depending on the affiliation of the thesis advisor, students may register for Thesis (PHYS 7990) for a total of 8 semester hours or 4 semester hours of Master's Project (EECE 7945) followed by 4 semester hours of Thesis (EECE 7990). 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. A thesis committee is composed of an advisor and two faculty members from physics or electrical engineering.

Program Requirements

- Concentrations and course offerings may vary by campus and/or by program modality. Please consult with your advisor or admissions coach for the course availability each term at your campus or within your program modality.
- Certain options within the program may be *required* at certain campuses or for certain program modalities. Please consult with your advisor or admissions coach for requirements at your campus or for your program modality.

Complete all courses and requirements listed below unless otherwise indicated.

Concentrations

Complete one of the following concentrations:

- Analysis, Modeling, and Computation (p. 1)
- Electromagnetics, Plasma, and Optics (p. 2)
- Microsystems, Materials, and Devices (p. 2)

Optional Thesis

Code	Title	Hours
Select one of the following options based on the college affiliation of the thesis advisor. Thesis coursework will not be applied to other requirements of this degree program. Completion of this thesis option requires a total of 40 semester hours to earn the degree:		8
Option 1 (College of Science thesis advisor)		
PHYS 7990	Thesis (completed twice over two semesters)	
Option 2 (College of Engineering thesis advisor)		
EECE 7945	Master's Project	
EECE 7990	Thesis	

Program Credit/GPA Requirements

32 total semester hours required (40 with optional thesis)
Minimum 3.000 GPA required

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	

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	

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	