

M.S. IN ELECTRICAL AND COMPUTER ENGINEERING

The Electrical and Computer Engineering Department offers the Degree of Master of Science in Electrical and Computer Engineering (M.S.E.C.E.) with a thesis option (24 course credit hours and 6 thesis credit hours) or a non-thesis option (30 course credit hours and no thesis credit hours). The M.S.E.C.E. program offers five tracks: audio engineering, data analytics, Microdevices and Photonics, cybersecurity, and a general ECE track.

Admissions Requirements

Admission to MS degree programs in the College of Engineering (CoE) at the University of Miami is competitive. A qualified applicant needs a strong academic record, as evidenced by their grades in relevant coursework (traditionally a cumulative gpa of 3.0 or higher). Additionally, prospective students should have a 300 or higher on the GRE General Test (verbal plus quantitative), acceptable scores on TOEFL or ILETS exams (English proficiency exams for international students only), as well as comprehensive letters of recommendation. Transfer of credits from other institutes complies with the rules of the graduate school. Many of our applicants have research experiences that have resulted in publication.

Traditionally a BS degree in engineering is required for admission into one of our MS programs. Students who do not have a degree in an Engineering field can still apply and will be considered by the admission committee, but if admitted pre-requisite coursework is traditionally required before being fully admitted into MS studies with us.

Graduation Requirements

The M.S.E.C.E. program with the non-thesis option complies in full with the CoE degree requirements

- An approved integrated program with a minimum of 30 credit hours with an average grade of B or better and no grade below C.
- At least 12 course credit hours must be at the 700-level.
- In addition, the **cybersecurity track** requires a 3-credit-hour graduating project.

The M.S.E.C.E. program with the thesis option, complies with the following CoE degree requirements

- An approved integrated program with a minimum of 30 credit hours with an average grade of B or better and no grade below C.
- At least 6 of the course credit hours must be at the 700 level
- 6 credit hours of the required 30 must be earned in thesis work.

In addition to the CoE degree requirements, the M.S.E.C.E. program with the thesis option requires the following:

- Appointment of a Thesis Defense Committee comprised of at least 3 members: the Chair of the committee is the Research Advisor who must have RF/GF status within ECE; at least one other member (excluding the Research Advisor) must have RF/GF status within ECE; at least one member must be from outside ECE.

Curriculum Requirements: General ECE Option

Any 600-level and 700-level ECE courses and courses in other departments with the approval of the academic advisor.

Code	Title	Credit Hours
Electives		
Any 600- or 700-Level ECE Courses		24
Select Thesis or Non-Thesis Option		6
Thesis Option:		
ECE 810	Master's Thesis	
ECE 820	Research in Residence	
ECE 825	Continuous Registration–Master's Study	
Non-Thesis Option:		
Any 600- or 700-Level ECE Courses		
Total Credit Hours		30

Curriculum Requirements: Audio Engineering Option

Code	Title	Credit Hours
Suggested Courses for Audio Engineering Option		
ECE 602	Engineering Acoustics	3
ECE 633	Random Signals and Noise	3
ECE 636	Adaptive Filters and Signal Processing	3
ECE 638	Introduction to Digital Image Processing	3

ECE 640	Digital Speech and Audio Processing	3
ECE 648	Machine Learning	3
Remaining credits may be taken from 600/700 level courses in ECE, CS, MTH, or any other department in consultation with the academic advisor.		6
Select Thesis or Non-Thesis Option		6
Thesis Option:		
ECE 810	Master's Thesis	
ECE 820	Research in Residence	
ECE 825	Continuous Registration–Master's Study	
Non-Thesis Option:		
Any 600- or 700-Level ECE Courses		
Total Credit Hours		30

Data Analytics Option

Code	Title	Credit Hours
Suggested Courses for Data Analytics Option		
ECE 600	Engineering Analytical Techniques	3
ECE 633	Random Signals and Noise	3
ECE 648	Machine Learning	3
ECE 672	Object-Oriented and Distributed Database Management Systems	3
ECE 676	Internet and Intranet Security	3
ECE 677	Data Mining	3
CSC 632	Introduction to Parallel Computing	3
CSC 640	Algorithm Design and Analysis	3
Remaining credits may be taken from 600/700 level courses in ECE, CS, MTH, or any other department in consultation with the academic advisor.		
Select Thesis or Non-Thesis Option		6
Thesis Option:		
ECE 810	Master's Thesis	
ECE 820	Research in Residence	
ECE 825	Continuous Registration–Master's Study	
Non-Thesis Option:		
Any 600- or 700-Level ECE Courses		
Total Credit Hours		30

Microdevices and Photonics Option

Code	Title	Credit Hours
Suggested Courses for Microdevices and Photonics Option		
ECE 603	Laser Communications	3
ECE 604	Fundamentals of Optical Imaging	3
ECE 605	Semiconductor Photonic Devices	3
ECE 606	Microfabrication	3
ECE 632	VLSI Systems	3
ECE 643	BioNanotechnology	3
Remaining credits may be taken from 600/700 level courses in ECE, CS, MTH, or any other department in consultation with the academic advisor.		6
Select Thesis or Non-Thesis Option		6
Thesis Option:		
ECE 810	Master's Thesis	
ECE 820	Research in Residence	
ECE 825	Continuous Registration–Master's Study	
Non-Thesis Option:		

Any 600- or 700-Level ECE Courses	
Total Credit Hours	30

Cybersecurity Option

Code	Title	Credit Hours
Required Courses for Cybersecurity Option		
ECE 676	Internet and Intranet Security	3
CSC 609	Data Security and Cryptography	3
ECE 673	Information Assurance	3
ECE 785	Advanced Problems in CyberSecurity	3
Electives (Select a minimum of 9 credit hours) ^{1,2}		9-12
ECE 633	Random Signals and Noise	
ECE 634	Communication Networks	
ECE 674	Agent Technology	
ECE 675	Digital Forensics	
ECE 677	Data Mining	
ECE 678	Network Security	
ECE 753	Pattern Recognition and Neural Networks	
CSC 632	Introduction to Parallel Computing	
CSC 732	Parallel Algorithms	
Select Thesis or Non-Thesis Option		6
Thesis Option:		
ECE 810	Master's Thesis	
ECE 820	Research in Residence	
ECE 825	Continuous Registration–Master's Study	
Non-Thesis Option:		
Any 600- or 700-Level ECE Courses		
Total Credit Hours		30

1 Remaining credits may be taken from 600/700 level courses in ECE, CS, MTH, or any other department in consultation with the academic advisor.

2 Additional Elective Course Areas: Legal Issues (Digital Evidence and Analysis, Privacy, Legal Response/Responsibilities, Policies)

Mission

The MS program in the Department of Electrical and Computer Engineering is designed to prepare students for both of the following:

- Advanced academic degrees leading to successful careers in teaching and research; and
- Rewarding and productive careers in industrial and government research positions.

Student Learning Outcomes

- The graduate will be able to exhibit broad understanding and mastery of the basic corpus of knowledge representing the discipline. They should be able to apply in their work 1) advanced mathematical principle and 2) advanced knowledge of science and engineering.
- The student will leave the university with the ability to apply critical thinking to complex engineering problems. This means that they should be able to 1) identify advanced engineering problems and address them, and 2) demonstrate proficiency in critically analyzing and solving advanced engineering problems.
- The students will demonstrate proficiency in conveying the results of their work both in terms of written communication and convincing oral presentation.