MASTER OF ELECTRICAL AND COMPUTER ENGINEERING (MECE) DEGREE

Program Learning Outcomes for the MECE Degree

Upon completing the MECE degree, students will be able to:

1. Design and implement technical solutions to real-world problems that reflect an advanced command of principles in mathematics and science.
2. Communicate effectively expert analysis of technical problems and features of proposed solutions to stakeholders.
3. Practice as an expert specialist in at least one of the major sub-fields of electrical and computer engineering.

Requirements for the MECE Degree

The MECE degree is a non-thesis master's degree. For general university requirements, please see Non-Thesis Master's Degrees (https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-non-thesis-masters-degrees/). For additional requirements, regulations, and procedures for all graduate programs, please see All Graduate Students (https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-all-degrees/). Students pursuing the MECE degree must complete:

- A minimum of 10 courses (30-34 credit hours, depending on course selection) to satisfy degree requirements.
- A minimum of 30 credit hours of graduate-level study (graduate semester credit hours, coursework at the 500-level or above).
- A minimum of 27 graduate semester credit hours must be taken at Rice University.
- A minimum of 24 graduate semester credit hours must be taken in standard or traditional courses (with a course type of lecture, seminar, laboratory, lecture/laboratory).
- A minimum residency enrollment of one fall or spring semester of part-time graduate study at Rice University.
- A minimum of 3 courses (9 credit hours) from the Capstone Requirement.
  - 1 course (3 credit hours) to fulfill the Capstone Foundations requirement.
  - 2 courses (6 credit hours) to fulfill the Capstone Experience Project requirement.
- A minimum of 1 course (3 credit hours) from the Engineering Communications Requirement.
- A minimum of 2 courses (6 credit hours) from the Engineering Software Development Requirement.
- A minimum of 2 courses (6 credit hours) in one area of specialization (see below for areas of specialization). The MECE degree program offers six areas of specialization:
  - Computer Engineering (p. 2), ***or***
  - Computer Vision (p. 2), ***or***
  - Data Science (p. 3), ***or***
  - Digital Health (p. 3), ***or***
  - Neuroengineering (p. 3), ***or***
  - Quantum Engineering (p. 3), ***or***
  - Wireless Systems (p. 4).
- A minimum of 2 courses (6 credit hours) from the Elective Requirements.
- ELEC 698 each semester in residence at Rice University.
- A maximum of 1 course (3 graduate semester credit hours) from transfer credit. For additional departmental guidelines regarding transfer credit, see the Policies (p. 4) tab.
- A minimum overall GPA of 2.67 or higher in all Rice coursework.
- A minimum program GPA of 3.00 or higher in all Rice coursework that satisfies requirements for the non-thesis master's degree with a minimum grade of C (2.00 grade points) in each course.

Students are admitted to the MECE degree program in the fall semester. MECE students are to consult with an academic advisor on the MECE Committee each semester in order to identify and clearly document their individual curricular requirements or degree plan to be followed.

The courses listed below satisfy the requirements for this degree program. In certain instances, courses not on this official list may be substituted upon approval of the program's academic advisor, or where applicable, the department or program's Director of Graduate Studies. Course substitutions must be formally applied and entered into Degree Works by the department or program's Official Certifier (https://registrar.rice.edu/facstaff/degreeworks/officialcertifier/). Additionally, these must be approved by the Office of Graduate and Postdoctoral Studies. Students and their academic advisors should identify and clearly document the courses to be taken.

Summary

Code	Title	Credit Hours
Total Credit Hours Required for the MECE Degree		30-34

Degree Requirements

Code	Title	Credit Hours
Capstone Requirement		
Select 1 of the following Capstone topical areas: Computer Engineering, Computer Vision, Data Science, Digital Health, Neuroengineering, Quantum Engineering, or Wireless Systems		
Capstone: Foundations		
Select 1 course from the following:		*3*
ELEC 522	ADVANCED VLSI DESIGN	
ELEC 551	MODERN COMMUNICATION THEORY AND PRACTICE	
ELEC 576 / COMP 576	A PRACTICAL INTRODUCTION TO DEEP MACHINE LEARNING	
ELEC 578	INTRODUCTION TO MACHINE LEARNING	
ELEC 587	INTRODUCTION TO NEUROENGINEERING: MEASURING AND MANIPULATING NEURAL ACTIVITY	
Capstone: Experience Project		
Select 1 from the following (minimum of 2 semesters):		*6-8*
DSCI 535 / COMP 549	APPLIED MACHINE LEARNING AND DATA SCIENCE PROJECTS (2 semesters required)	

ELEC 594	MECE CAPSTONE PROJECT (2 semesters required)	
Engineering Communications Requirement		
Select 1 course from the following:		*3*
ENGI 501	WORKPLACE COMMUNICATION FOR PROFESSIONAL MASTER'S STUDENTS IN ENGINEERING	
ENGI 510	TECHNICAL AND MANAGERIAL COMMUNICATIONS	
ENGI 555	ENGINEERING PERSUASION: HOW TO DRIVE DECISIONS AND CHANGE	
RCEL 542	PROFESSIONAL COMMUNICATION FOR ENGINEERING LEADERS	
Engineering Software Development Requirement		
Select 2 courses from the following:		*6-8*
COMP 504	GRADUATE OBJECT-ORIENTED PROGRAMMING AND DESIGN	
COMP 533	INTRODUCTION TO DATABASE SYSTEMS	
COMP 534	PARALLEL COMPUTING	
COMP 539	SOFTWARE ENGINEERING METHODOLOGY	
COMP 553	BIG DATA MANAGEMENT FOR DATA SCIENCE	
COMP 614	COMPUTER PROGRAMMING FOR DATA SCIENCE	
ELEC 512 / COMP 582	GRADUATE DESIGN AND ANALYSIS OF ALGORITHMS	
ELEC 546 / COMP 546	INTRODUCTION TO COMPUTER VISION	
ELEC 550 / COMP 550 / MECH 550	ALGORITHMIC ROBOTICS	
ELEC 552 / COMP 521	OPERATING SYSTEMS AND CONCURRENT PROGRAMMING	
STAT 605	R FOR DATA SCIENCE	
STAT 606	SAS STATISTICAL PROGRAMMING	
Area of Specialization		
Select 1 of the following Areas of Specialization (see Areas of Specialization below):		*6*
Computer Engineering		
Computer Vision		
Data Science		
Digital Health		
Neuroengineering		
Quantum Engineering		
Wireless Systems		
Elective Requirements		
Free Elective Requirement: select 2 additional courses as free electives [1]		*6*
Professional Master's Seminar		
ELEC 698	ECE PROFESSIONAL MASTERS SEMINAR SERIES [2]	0
Total Credit Hours		**30-34**

Footnotes and Additional Information

[1] The Free Elective Requirement may be fulfilled by any 2 courses (6 credit hours) selected from the following:

- Departmental (ELEC) course offerings taught by ECE faculty.
- Research coursework, such as ELEC 590 or ELEC 591, when either are taken for at least 3 credit hours.
- Any of the following courses: ENGI 528/CEVE 528, ENGI 529/CEVE 529, ENGI 610/NSCI 610, ENGI 615, or NSCI 511.
- Any other course approved by the student's MECE academic advisor.

[2] ELEC 698 is taken for a Satisfactory/Unsatisfactory grade and must be completed with a Satisfactory grade. As a S/U course it does not apply to the requirement of a minimum grade of C (2.00 grade points) in each required course.

Areas of Specialization

Students must complete a minimum of 2 courses (6 credit hours) from one Area of Specialization.

Area of Specialization: Computer Engineering

Code	Title	Credit Hours
Select 2 courses (6 credit hours) from the following:		*6*
ELEC 515	MACHINE LEARNING FOR RESOURCE-CONSTRAINED PLATFORMS	
ELEC 516	ANALOG INTEGRATED CIRCUITS	
ELEC 517	MICROWAVE ENGINEERING	
ELEC 521	ADVANCED DIGITAL INTEGRATED CIRCUITS DESIGN	
ELEC 522	ADVANCED VLSI DESIGN	
ELEC 523	INTRODUCTION TO MICROFABRICATION	
ELEC 526 / COMP 526	HIGH PERFORMANCE COMPUTER ARCHITECTURE	
ELEC 527	VLSI SYSTEMS DESIGN	
ELEC 543	ADVANCED HIGH-SPEED SYSTEM DESIGN	
ELEC 553	MOBILE AND EMBEDDED SYSTEM DESIGN AND APPLICATION	
ELEC 554 / COMP 554	COMPUTER SYSTEMS ARCHITECTURE	
ELEC 574	UBIQUITOUS AND WEARABLE COMPUTING	
Total Credit Hours		**6**

Area of Specialization: Computer Vision

Code	Title	Credit Hours
Select 2 courses (6 credit hours) from the following:		*6*
ELEC 502 / COMP 502 / STAT 502	NEURAL MACHINE LEARNING I	
or COMP 54(	STATISTICAL MACHINE LEARNING	
ELEC 515	MACHINE LEARNING FOR RESOURCE-CONSTRAINED PLATFORMS	
ELEC 531	STATISTICAL SIGNAL PROCESSING	
ELEC 533 / CMOR 553 / STAT 583	INTRODUCTION TO RANDOM PROCESSES AND APPLICATIONS	
ELEC 541	3D VISION: FROM AUTONOMOUS CARS TO THE METAVERSE	

ELEC 542	GENERATIVE AI FOR IMAGE SYNTHESIS
ELEC 546 / COMP 546	INTRODUCTION TO COMPUTER VISION
ELEC 549	COMPUTATIONAL PHOTOGRAPHY
ELEC 553	MOBILE AND EMBEDDED SYSTEM DESIGN AND APPLICATION
ELEC 558	DIGITAL SIGNAL PROCESSING
ELEC 575	LEARNING FROM SENSOR DATA
ELEC 576 / COMP 576	A PRACTICAL INTRODUCTION TO DEEP MACHINE LEARNING
ELEC 578	INTRODUCTION TO MACHINE LEARNING
ELEC 631	ADVANCED MACHINE LEARNING

Area of Specialization: Data Science

Code	Title	Credit Hours
Select 2 courses (6 credit hours) from the following:		*6*
ELEC 502 / COMP 502 / STAT 502	NEURAL MACHINE LEARNING I	
or COMP 54(	STATISTICAL MACHINE LEARNING	
ELEC 506	LINEAR ALGEBRA FOR DATA SCIENCE	
ELEC 515	MACHINE LEARNING FOR RESOURCE-CONSTRAINED PLATFORMS	
ELEC 519	DATA SCIENCE AND DYNAMICAL SYSTEMS	
ELEC 531	STATISTICAL SIGNAL PROCESSING	
ELEC 533 / CMOR 553 / STAT 583	INTRODUCTION TO RANDOM PROCESSES AND APPLICATIONS	
ELEC 535	INFORMATION THEORY	
ELEC 546 / COMP 546	INTRODUCTION TO COMPUTER VISION	
ELEC 558	DIGITAL SIGNAL PROCESSING	
ELEC 575	LEARNING FROM SENSOR DATA	
ELEC 576 / COMP 576	A PRACTICAL INTRODUCTION TO DEEP MACHINE LEARNING	
ELEC 578	INTRODUCTION TO MACHINE LEARNING	
ELEC 631	ADVANCED MACHINE LEARNING	
Total Credit Hours		**6**

Area of Specialization: Digital Health

Code	Title	Credit Hours
Select 2 courses (6 credit hours) from the following:		*6*
ELEC 533 / CMOR 553 / STAT 583	INTRODUCTION TO RANDOM PROCESSES AND APPLICATIONS	
ELEC 541	3D VISION: FROM AUTONOMOUS CARS TO THE METAVERSE	
ELEC 542	GENERATIVE AI FOR IMAGE SYNTHESIS	
ELEC 545	INTRODUCTION TO DIGITAL IMAGE AND VIDEO PROCESSING	
ELEC 546 / COMP 546	INTRODUCTION TO COMPUTER VISION	
ELEC 558	DIGITAL SIGNAL PROCESSING	
ELEC 570	DISTRIBUTED METHODS FOR OPTIMIZATION AND MACHINE LEARNING	
Total Credit Hours		**6**

Area of Specialization: Neuroengineering

Code	Title	Credit Hours
Select 2 courses (6 credit hours) from the following:		*6*
ELEC 502 / COMP 502 / STAT 502	NEURAL MACHINE LEARNING I	
ELEC 523	INTRODUCTION TO MICROFABRICATION	
ELEC 533 / CMOR 553 / STAT 583	INTRODUCTION TO RANDOM PROCESSES AND APPLICATIONS	
ELEC 548 / BIOE 548	MACHINE LEARNING AND SIGNAL PROCESSING FOR NEURO ENGINEERING	
ELEC 582	IMAGING OPTICS	
ELEC 587	INTRODUCTION TO NEUROENGINEERING: MEASURING AND MANIPULATING NEURAL ACTIVITY	
ELEC 588 / CMOR 615 / NEUR 615	THEORETICAL NEUROSCIENCE I: BIOPHYSICAL MODELING OF CELLS AND CIRCUITS	
ELEC 589	NEURAL COMPUTATION	
ELEC 680 / BIOE 680	NANO-NEUROTECHNOLOGY	
ELEC 682	SPOTLIGHT ON LATEST NEUROTECHNOLOGY	
NEUR 582	INTRODUCTION TO COMPUTATIONAL NEUROSCIENCE	
Total Credit Hours		**6**

Area of Specialization: Quantum Engineering

Code	Title	Credit Hours
Select 2 courses (6 credit hours) from the following:		*6*
ELEC 517	MICROWAVE ENGINEERING	
ELEC 523	INTRODUCTION TO MICROFABRICATION	
ELEC 560	PHYSICS OF SENSOR MATERIALS AND NANOSENSOR TECHNOLOGY	
ELEC 562	OPTOELECTRONIC DEVICES	
ELEC 563 / PHYS 563	INTRODUCTION TO SOLID STATE PHYSICS I	
ELEC 566	NANOPHOTONICS AND METAMATERIALS	
ELEC 567	NANO-OPTICS	
ELEC 568	INTRODUCTION TO QUANTUM COMPUTING WITH QISKIT	
ELEC 569 / PHYS 569	ULTRAFAST OPTICAL PHENOMENA	
ELEC 571	IMAGING AT THE NANOSCALE	
ELEC 572	FINITE ELEMENT METHOD FOR MULTIPHYSICS MODELING	
ELEC 580	QUANTUM MECHANICS AND REAL-WORLD APPLICATIONS	

ELEC 605 / PHYS 605	COMPUTATIONAL ELECTRODYNAMICS AND NANOPHOTONICS	
ELEC 660	QUANTUM INFORMATION SCIENCE AND TECHNOLOGY	
Total Credit Hours		**6**

Area of Specialization: Wireless Systems

Code	Title	Credit Hours
Select 2 courses (6 credit hours) from the following:		*6*
ELEC 531	STATISTICAL SIGNAL PROCESSING	
ELEC 533 / CMOR 553 / STAT 583	INTRODUCTION TO RANDOM PROCESSES AND APPLICATIONS	
ELEC 535	INFORMATION THEORY	
ELEC 536	ARCHITECTURE FOR WIRELESS COMMUNICATIONS	
ELEC 537 / MECH 537	COMMUNICATION NETWORKS	
ELEC 539	INTRODUCTION TO COMMUNICATION NETWORKS	
ELEC 551	MODERN COMMUNICATION THEORY AND PRACTICE	
ELEC 558	DIGITAL SIGNAL PROCESSING	
ELEC 573	NETWORK SCIENCE AND ANALYTICS	
Total Credit Hours		**6**

Policies for the MECE Degree

Department of Electrical and Computer Engineering Graduate Program Handbook

The General Announcements (GA) is the official Rice curriculum. As an additional resource for students, the department of Electrical and Computer Engineering publishes a graduate program handbook, which can be found here: https://gradhandbooks.rice.edu/2023_24/Electrical_Computer_Engineering_Graduate_Handbook.pdf

Transfer Credit

For Rice University's policy regarding transfer credit, see Transfer Credit (https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-all-degrees/#transfer). Some departments and programs have additional restrictions on transfer credit. Students are encouraged to meet with their academic program's advisor when considering transfer credit possibilities.

Departmental Transfer Credit Guidelines

Students pursuing the MECE degree should be aware of the following departmental transfer credit guidelines:

- No more than 1 course (3 credit hours) of transfer credit from U.S. or international universities of similar standing as Rice may apply towards the degree.
- Requests for transfer credit will be considered by the program director (and/or the program's official transfer credit advisor) on an individual case-by-case basis.

Additional Information

For additional information, please see the Electrical and Computer Engineering website: https://www.ece.rice.edu/

Opportunities for the MECE Degree

Fifth-Year Master's Degree Option for Rice Undergraduate Students

In certain situations and with some terminal master's degree programs, Rice students have an option to pursue a master's degree by adding an additional fifth year to their four years of undergraduate studies.

Advanced Rice undergraduate students in good academic standing typically apply to the master's degree program during their junior or senior year. Upon acceptance, depending on course load, financial aid status, and other variables, they may then start taking some required courses of the master's degree program. A plan of study will need to be approved by the student's undergraduate major advisor and the master's degree program director.

As part of this option and opportunity, Rice undergraduate students:

- must complete the requirements for a bachelor's degree and the master's degree independently of each other (i.e. no course may be counted toward the fulfillment of both degrees).
- should be aware there could be financial aid implications if the conversion of undergraduate coursework to that of graduate level reduces their earned undergraduate credit for any semester below that of full-time status (12 credit hours).
- more information on this *Undergraduate - Graduate Concurrent Enrollment* opportunity, including specific information on the registration process can be found here (https://ga.rice.edu/undergraduate-students/academic-opportunities/undergraduate-graduate-concurrent-enrollment/).

Rice undergraduate students completing studies in science and engineering may have the option to pursue the Master of Electrical and Computer Engineering (MECE) degree. For additional information, students should contact their undergraduate major advisor and the MECE program director.

Additional Information

For additional information, please see the Electrical and Computer Engineering website: https://www.ece.rice.edu/