Rice University Department of Electrical and Computer Engineering - MECE Degree Plan

Academic Advisor:

Name: (First, Last)	Full or Part Time:	Student ID #:	Capstone Specialization Area	Cour Spec Area	ialization	1 st semester at Rice (fall/spr 202x):		Intended Final Term: (fall/spr 202x):	
What is your career objective that is guiding your course selection?									
Requirement (credit hours)	Course (number & name)				Semester (fall/spr)	Year (202x)	Credit Hours Grade		Grade
Foundations (3)									
Capstone (6)									
Communications (3)									
Software (6)									
Specialization (6)									
Elective (6)									
Seminar (required each semester in-residence at Rice University, credit hours earned do not apply towards degree									
requirements) Plan reviewed and	approved by	·:			[Date:			

Once reviewed and signed by your academic advisor, submit the signed version to the Degree Plan assignment in Canvas for ELEC 698 no later than 2 days before the ADD deadline.

MECE Degree Requirements

The MECE degree plan includes a summary of the MECE student's career objectives along with a listing of coursework taken in previous semesters and proposed for future semesters aimed to further the student's career objectives.

Coursework listed on the MECE degree plan must satisfy the following requirements:

- It must include at least 30 credit hours comprised of 10 courses of at least 3 credit hours each
 - Courses must be at the 500-level or above
- 27 credit hours must be taken at Rice University
- 3 courses (9 credit hours) fulfilling the Capstone Requirement for your Capstone Specialization Area:
 - o 1 course (3 credit hours) to fulfill the Capstone Foundations requirement
 - 2 courses (6 credit hours) to fulfill the Capstone Experience Project requirement
- 1 course (3 credit hours) fulfilling the Engineering Communications Requirement
- 2 courses (6 credit hours) fulfilling the Engineering Software Development Requirement
- 2 courses (6 credit hours) in your Course Specialization Area
- 2 courses (6 credit hours) fulfilling the Elective Requirements
- ELEC 698 each semester in residence at Rice University
- Note that your Capstone Specialization Area and Course Specialization Area can be different, but either must be selected from the following: Computer Engineering, Wireless Systems, AI & Systems, Computer Vision, Digital Health, Quantum Engineering, or Neuroengineering

The following course lists are suggestions for fulfilling each requirement.

Capstone Foundations Courses (must choose from this list)

ELEC 522 Advanced VLSI Design [Computer Engineering Capstone]

ELEC 551 Modern Communication Theory and Practice [Wireless Systems Capstone]

ELEC 578 Introduction to Machine Learning or COMP 540 Statistical Machine Learning [AI & Systems Capstone]

ELEC 576 Introduction to Deep Learning [Computer Vision Capstone, Digital Health Capstone]

ELEC 580 Quantum Mechanics and Real-World Applications [Quantum Engineering Capstone]

ELEC 587 Introduction to Neuroengineering [Neuroengineering Capstone]

Capstone Experience Course (required regardless of capstone area; must be taken twice)

ELEC 594 MECE Capstone Project

 ELEC 594 must be taken during both the second and third semesters of your degree unless an exception is provided by your academic advisor

Engineering Communications Courses (must choose from this list)

ENGI 501 Workplace Communication for Professional Master's Students in Engineering

ENGI 510 Technical and Managerial Communications

RCEL 501 Engineering Mgmt and Leadership

RCEL 542 Professional Communication for Engineering Leaders

ENGI 555 Engineering Persuasion: How to Drive Decisions and Change

Engineering Software Development Courses (suggestions, not an exhaustive list)

STAT 605 R for Data Science

STAT 606 SAS Statistical Programming

COMP 533 Introduction to Database Systems

COMP 534 Parallel Computing

COMP 539 Software Engineer Methodology

COMP 553 Big Data Management for Data Science

COMP 562 Intro to Modern Robotics

COMP 614 Computer Programming for Data Science

ELEC 512 Graduate Design and Analysis of Algorithms

ELEC 532 Neural Interface Engineering Laboratory

ELEC 546 Introduction to Computer Vision

ELEC 547 Introduction to Human-Machine Interfaces

ELEC 550 Algorithmic Robotics

- ELEC 552 Operating Systems and Concurrent Programming
- ELEC 555 Imaging and Vision for Robotics
- ELEC 565 Solid State Materials & Device Applications [Particularly for quantum engineering]
- ELEC 568 Introduction to Quantum Computing with Qiskit [Particularly for quantum engineering]
- ELEC 581 Quantum Information Processing [Particularly for quantum engineering]
- ELEC 584 Quantum Physics in Semiconductor Devices [Particularly for quantum engineering]

Recommendations for Course Specialization (suggestions, lists are not exhaustive)

Computer Engineering

- ELEC 514 Wireless IC
- **ELEC 517 Microwave Engineering**
- ELEC 521 Advanced Digital Integrated Circuit Design
- ELEC 522 Advanced VLSI Design
- ELEC 523 Introduction to Microfabrication
- ELEC 526 High Performance Computer Architecture
- ELEC 527 VLSI Systems Design
- **ELEC 534 Hardware Verification**
- ELEC 537 Intelligent Mobile Systems
- ELEC 543 Advanced High-Speed System Design
- ELEC 553 Mobile and Embedded System Design and Application
- ELEC 554 Computer Systems Architecture
- ELEC 574 Ubiquitous and Wearable Computing

Computer Vision

- ELEC 502 Neural Machine Learning I
- **ELEC 531 Statistical Signal Processing**
- ELEC 533 Introduction to Random Processes and Applications
- ELEC 537 Intelligent Mobile Systems
- ELEC 542 Generative AI for Image Data
- ELEC 546 Introduction to Computer Vision
- **ELEC 549 Computational Photography**
- ELEC 553 Mobile and Embedded System Design and Application
- ELEC 555 Imaging and Vision for Robotics
- ELEC 558 Digital Signal Processing
- ELEC 575 Learning from Sensor Data
- ELEC 576 A Practical Introduction to Deep Machine Learning
- ELEC 578 Introduction to Machine Learning
- ELEC 631 Advanced Machine Learning

AI & Systems

- ELEC 502 Neural Machine Learning I
- ELEC 506 Linear Algebra For Data Science
- ELEC 512 Graduate Design and Analysis of Algorithms
- ELEC 519 Data and Systems
- ELEC 531 Statistical Signal Processing
- ELEC 533 Introduction to Random Processes and Applications
- **ELEC 535 Information Theory**
- ELEC 537 Intelligent Mobile Systems
- ELEC 546 Introduction to Computer Vision
- ELEC 547 Introduction to Human-Machine Interfaces
- ELEC 550 Algorithmic Robotics
- ELEC 558 Digital Signal Processing
- ELEC 575 Learning from Sensor Data
- ELEC 576 A Practical Introduction to Deep Machine Learning
- ELEC 578 Introduction to Machine Learning
- ELEC 631 Advanced Machine Learning
- COMP 540 Statistical Machine Learning

Wireless Systems

- ELEC 514 Wireless IC
- **ELEC 517 Microwave Engineering**
- **ELEC 531 Statistical Signal Processing**
- ELEC 533 Introduction to Random Processes and Applications
- **ELEC 535 Information Theory**
- ELEC 537 Intelligent Mobile Systems
- **ELEC 538 Advanced Wireless Networking**
- ELEC 539 Introduction to Communication Networks
- ELEC 551 Modern Communication Theory and Practice
- ELEC 558 Digital Signal Processing
- ELEC 573 Network Science and Analytics

Neuroengineering

- ELEC 502 Neural Machine Learning I
- ELEC 523 Introduction to Microfabrication
- ELEC 532 Neural Interface Engineering Laboratory
- ELEC 533 Introduction to Random Processes and Applications
- ELEC 547 Introduction to Human-Machine Interfaces
- ELEC 548 Machine Learning and Signal Processing for Neuro Engineering
- **ELEC 582 Imaging Optics**
- ELEC 587 Introduction to Neuroengineering
- ELEC 588 Theoretical Neuroscience I: Biophysical Modeling of Cells and Circuits
- **ELEC 589 Neural Computation**
- ELEC 680 Nano-Neurotechnology
- ELEC 682 Spotlight on Latest Neurotechnology

Quantum Engineering

- **ELEC 517 Microwave Engineering**
- ELEC 523 Introduction to Microfabrication
- ELEC 560 Physics of Sensor Materials and Nanosensor Technology
- ELEC 562 Optoelectronic Devices
- ELEC 563 Introduction to Solid State Physics I
- ELEC 565: Solid-State Materials and Device Applications
- ELEC 566 Nanophotonics and Metamaterials
- **ELEC 567 Nano-Optics**
- ELEC 568 Quantum Computing with Qiskit
- ELEC 569 Ultrafast Optical Phenomena
- ELEC 571 Imaging at the Nanoscale
- ELEC 572 Finite Element Method for Multiphysics Modeling
- ELEC 581 Quantum Information Processing Systems
- ELEC 584 Quantum Physics in Semiconductor Devices
- ELEC 603 Topics in Nanophotonics
- ELEC 605 Computational Electrodynamics and Nanophotonics
- ELEC 660 Quantum Information Science and Technology

Digital Health

- ELEC 533 Introduction to Random Processes and Applications
- ELEC 537 Intelligent Mobile Systems
- ELEC 541 3D Vision: From Autonomous Cars to the Metaverse
- ELEC 542 Generative AI for Image Data
- ELEC 546 Introduction to Computer Vision
- ELEC 547 Introduction to Human-Machine Interfaces
- ELEC 558 Digital Signal Processing
- ELEC 570 Distributed Methods for Optimization and Machine Learning
- ELEC 575 Learning from Sensor Data
- ELEC 576 A Practical Introduction to Deep Machine Learning
- ELEC 578 Introduction to Machine Learning
- **ELEC 582 Imaging Optics**

Elective Courses

Free electives 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 is taken for at least 3 credit hours;
- Any of the following courses: COMP 532, ELEC 512, ELEC 520, ELEC 552, ELEC 556, ELEC 557, ENGI 510, ENGI 528, ENGI 529, RCEL 501, RCEL 615, or NSCI 511; or
- Any other course approved by the student's MECE academic advisor.