ROBOTICS ENGINEERING (BSE)

Bachelor of Science in Engineering

The Robotics Engineering major requires a total of 126 credits. Robotics Engineering majors are required to complete the following:

Course	Title	Credits
Required Courses		
ENGR 1166	Foundations of Engineering	3
CSE 2050	Data Structures and Object-Oriented Design	3
CSE 2500	Introduction to Discrete Systems	3
or MATH 2710	Transition to Advanced Mathematics	
CSE 3500	Algorithms and Complexity	3
CSE 4820	Introduction to Machine Learning	3
ECE 1401	Programming for Electrical Engineers	3
ECE 2001	Electrical Circuits	4
ECE 3101	Signals and Systems	3
ECE 3411	Microprocessor Applications Laboratory	3
ECE 3111	Systems Analysis and Design	4
or ME 3253	Linear Systems Theory	
or ME 3254	Linear Systems Theory	
ECE/ME 3161	Introduction to Robotics	3
ECE/ME 3162	Robot Motion Planning	3
ECE/ME 3163	Robot Control and Dynamics	3
ECE/ME 4161	Robotics Systems Laboratory	3
MATH 2110Q	Multivariable Calculus	4
MATH 2210Q	Applied Linear Algebra	3
MATH 2410Q	Elementary Differential Equations	3
STAT 3345Q	Probability Models for Engineers	3
or MATH 3160	Probability	
Senior Design and In-Major Writing		
Complete one of the senior design sequences below:		
Sequence 1		
ECE 4900W & ECE 4901 & ECE 4902	Communicating Engineering Solutions in a Societal Context and Electrical and Computer Engineering Design I and Electrical and Computer Engineering Design II	
Sequence 2		
Select one of the following:		
ME 4972 & ME 4973W	Senior Design Project I and Senior Design Project II	
ME 4975 & ME 4974W & ME 4976	Senior Design Project I and Ethics for Engineers and Senior Design Project II	
Sequence 3		
CSE 4939W & CSE 4940	Computer Science and Engineering Design Project I and Computer Science and Engineering Design Project II	
Track Electives		

Select three courses; taken from designated list of courses for each track:		9
Electronics Track (p. 1)		
Systems Track (p. 1)		
Mechanical Track (p. 1)		
Biomedical Track (p. 1)		
Robotics Electives		
Two additional courses; taken from designated list of courses from any of the track lists		6
Elective Courses		
Select one of the following:		2-3
ECE 3111	Systems Analysis and Design (two credits)	
ME 3253	Linear Systems Theory (three credits)	
ME 3254	Linear Systems Theory (three credits)	
Total Credits		**74-75**

Tracks

Electronics Track

Course	Title	Credits
CSE 2301	Principles and Practice of Digital Logic Design	4
ECE 3201	Electronic Circuit Design and Analysis	4
ECE 3211	Power Electronics	4
ECE 3212	Electric Machines and Drives	4

Systems Track

Course	Title	Credits
CSE 3100	Systems Programming	3
CSE 4705	Artificial Intelligence	3
CSE 4709	Networked Embedded Systems	3
ECE 4131	Introduction to Digital Signal Processing	3
ECE 4132	Image Processing Systems Laboratory	3

Mechanical Track

Course	Title	Credits
CE 2110	Applied Mechanics I	3
CE 3110	Mechanics of Materials	3
ME 2120	Applied Mechanics II	3
ME 3220	Mechanical Vibrations	3
ME 3221	Manufacturing Automation	3
ME 3227	Design of Machine Elements	3
ME 3256W	Data-Driven Decisions and Technical Communications	3
ME 3262	Applied Measurements and Data Analysis	3

Biomedical Track

Course	Title	Credits
BME 3500	Biomedical Engineering Measurements	4
BME 3600	Biomechanics	4
BME 4120	Neural Information Processing and Sensory Coding	3
BME 4130	Neural Prostheses	3

| BME 4300 | Physiological Control Systems | 3 |
| BME 4500 | Bioinstrumentation | 3 |

Additional Notes

Robotics is a multidisciplinary field that draws on aspects from electrical engineering, mechanical engineering, and computer engineering. The proposed curriculum is built around fundamental core courses in each of these areas that are then brought together with specific robotics engineering courses. The Robotics Engineering program educational objectives are that our alumni/ae:

- make technical contributions to design, development, and manufacturing in their practice of robotics engineering.
- advance in their professional career.
- engage in professional development or post-graduate education to pursue flexible career paths amid future technological changes.