

## **ROBOTICS ENGINEERING 2022-2023**

### **FRESHMAN YEAR**

<b>First Semester</b>	<b>Credits</b>	<b>Second Semester</b>	<b>Credits</b>
MATH 1131Q – Calculus I	4	MATH 1132Q – Calculus II	4
CHEM 1127Q – Gen. Chem. I	4	PHYS 1501Q – Engineering Physics I <sup>1</sup>	4
CSE 1010 – Intro. to Computing for Engr.	3	ENGR 1166 – Foundations of Engineering or CSE 1729 Intro Principles of Programming	3
ENGL 1007 – Writing	4	ECE 1401 – Programming for Elec. Engineers	3
ENGR 1000 – Orientation to Engr.	<u>1</u>	Content Area course <sup>2</sup>	<u>3</u>
	16		17

### **SOPHOMORE YEAR**

<b>First Semester</b>	<b>Credits</b>	<b>Second Semester</b>	<b>Credits</b>
ECE 2001 – Electric Circuits	4	ECE 3101 – Signals and Systems	3
MATH 2110Q – Multivariable Calculus	4	MATH 2210Q – Applied Linear Algebra	3
MATH 2410Q – Differential Equations	3	ECE 3411 – Microprocessor Applications	3
PHYS 1502Q – Engineering Physics II <sup>1</sup>	4	ECE/ME 3161 – Introduction to Robotics	3
CSE 2050 – Data Structures and OO Design	<u>3</u>	CSE 2500 – Intro. to Discrete Systems or MATH 2710 – Transition to Adv. Maths	<u>3</u>
	18		15

### **JUNIOR YEAR**

<b>First Semester</b>	<b>Credits</b>	<b>Second Semester</b>	<b>Credits</b>
ECE 3111 – Systems Analysis or ME 3253/3254 – Linear System Theory	4/3	ECE/ME 3163 – Robot Control & Dynamics	3
ECE/ME 3162 – Robot Motion Planning	3	CSE 4820 – Intro to Machine Learning	3
CSE 3500 – Algorithms	3	Track Elective	3
STAT 3345 – Prob. Models Engineers <sup>3</sup>	3	PHIL 1104 – Philosophy and Social Ethics	3
Content Area course <sup>2</sup>	<u>3</u>	Content Area course <sup>2</sup>	<u>3</u>
	16/15		15

### **SENIOR YEAR**

<b>First Semester</b>	<b>Credits</b>	<b>Second Semester</b>	<b>Credits</b>
ECE 4901 – ECE Design I <sup>4</sup>	2	ECE 4902 – ECE Design II	3
ECE 4900W – Comm. Engr. Solutions <sup>5</sup>	1	Track Elective	3
ECE 4161 – Robotics Systems Laboratory	3	Robotics Elective	3
Track Elective	3	Robotics Elective	3
Content Area course <sup>2</sup>	3	Content Area course <sup>2</sup>	<u>3</u>
Elective	<u>2/3</u>		15
	14/15		

<sup>1</sup> Either the two-semester sequence of PHYS 1401Q-1402Q or the three-semester sequence of PHYS 1201Q-1202Q followed by PHYS 1230 or 1530 may be taken instead to satisfy this requirement. However, only eight credits of PHYS 1201-1202-1230/1530 can be used toward the required 126 credits for the Engineering degree.

<sup>2</sup> The courses from content areas one (Arts and Humanities) and two (Social Sciences) must be from four different departments. One course from either content area one (Arts and Humanities) or content area two (Social Sciences) may also be used to fulfill one of the requirements from content area four (Diversity and Multiculturalism). One course from content area four must be an international course.

<sup>3</sup> STAT 3345 can be replaced with MATH 3160.

<sup>4</sup> ECE 4901/4902/4900W can be replaced by ME 4972/4973W or ME 4974W/4975/4976 or CSE 4939W/4940.

<sup>5</sup> One additional W course must be taken, typically as one of the content-area courses.

**Track Electives:** Choose 3 courses from one of the following tracks

*Electronics Track*

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

*Systems Track*

CSE 3100: Systems Programming  
CSE 4705: Artificial Intelligence  
CSE 4709: Networked Embedded Systems  
ECE 4132: Image Processing Systems Laboratory  
ECE 4131: Digital Signal Processing

*Mechanical Track*

CE 2110: Applied Mechanics I  
ME 2120: Applied Mechanics II  
CE 3110: Mechanics of Materials  
ME 3220: Mechanical Vibrations  
ME 3221: Manufacturing Automation  
ME 3227: Design of Machine Elements  
ME 3262: Applied Measurements & Data Analysis  
ME 3256: Aerospace Control Systems

*Biomedical Track*

BME 3500: Biomedical Engineering Measurements  
BME 3600: Biomechanics  
BME 4120: Neural Information Processing and Sensory Coding  
BME 4130: Neural Prostheses  
BME 4300: Physiological Control Systems  
BME 4500: Bioinstrumentation

**Robotics Electives:** Choose 2 additional courses from any of the track lists