ROBOTICS
THE UNIVERSITY OF UTAH

Undergraduate Certificate Requirements

Minimum 20 credits

* Students choosing to take project-intensive courses to double count as CORE and PROJECT *may need to take additional approved electives or the Robotics Seminar* to reach the 20 credit hour minimum.

CORE COURSES

Required:

Choose ***two*** additional core classes from different categories.
Foundational Courses may **not** be double counted as Core Courses.

MECHANICS

ROBOT 5000/ CS 5310/ ECE 5650/ ME EN 5220 (3 cr)
Robotics I: Mechanics

CONTROL

ROBOT 5100 / ME EN 5230 (3 cr)
Robotics II: Control

COGNITION

*** ROBOT 6200/ CS 6370 / ME EN 6225 (3 cr)**
Motion Planning
or
CS 4300 (3 cr) AI

PERCEPTION

CS 4640 / BME 4640 (3 cr) Image Processing
or
*** CS 5320 (3 cr)**
Computer Vision

ELECTIVE COURSES

Select **1 course** from any different category:

MECHANICS

ROBOT 7000 / ME EN 7230/ CS 7310 (3 cr)
Manipulation, Mobility
ROBOT 7010 / ME EN 7220/ CS 7320 (3 cr)
System Identification

COGNITION

CS 5350 (3 cr)
Machine Learning
CS 5958 (3 cr)
Robot Learning

HUMAN-ROBOT INTERACTION

CONTROL

ME EN 5200/ ECE 5615 (3 cr)
Classical Control Systems
ECE 5670 (3 cr)
Control of Electric Motors
ME EN 5210/ECE 5652/CH EN 5203 (3 cr)
State Space Control
ME EN 7200 (3 cr)
Nonlinear Control
ME EN 7210 (3 cr)
Optimal Control
ECE 6570 (3 cr)
Adaptive Control

CS 5360 (3 cr) Virtual Reality
ROBOT 7400 / ME EN 7240 (3 cr) Haptics
***ROBOT 6400/BME 6440/ECE 6654 (4 cr)** Neural Engineering

DESIGN

***ROBOT 6500/ME EN 5240 (4 cr)** Adv. Mechatronics
*** ROBOT 5960 (3 cr)**
Wearable Robotics
ECE 5780/ CS 5780 (3 cr)
Embedded System Design
ECE 5960 (3 cr)
Robotic Millisystems
CS 6956 (3 cr)
Medical Robotics

PERCEPTION

CS 7640 (3 cr)
Adv. Image Processing
CS 5353 (3 cr)
Deep Learning
ECE 5530 (3 cr)
Digital Signal Processing

FOUNDATIONAL COURSES

Complete ***one set of two courses*** (students must meet course prerequisites in order to enroll)

Set 1: MECHANICAL ENGINEERING

ME EN 3220 (3 cr) Dynamic Systems & Control
ME EN 3230 (4 cr) Mechatronics

Set 2: ELECTRICAL & COMPUTER ENGINEERING

ECE 3610 (3 cr)
Fundamentals of Robotics & Cyberphysical Systems
ECE 5615 (3 cr)
Classical Control Systems

or Set 3: COMPUTER SCIENCE

CS 4300 (3 cr) Artificial Intelligence
CS 4640 (3 cr) Image Processing Basics

SEMINAR 1 credit

ROBOT 5800
Robotics Seminar

PROJECT 1 credit minimum

ROBOT 5920 (Independent) Graduate Project with faculty + presentation
or * Approved Intensive Project Course