



ROBOTICS

THE UNIVERSITY OF UTAH

Graduate Certificate Requirements

Minimum 18 credits

CORE COURSES required

| MECHANICS | CONTROL | COGNITION | PERCEPTION |
|---|--|---|---|
| ROBOT 6000/ CS 6310/ ECE 6650/ ME EN 6220 (3 cr) Robotics I: Mechanics | ROBOT 5100 / ME EN 5230 (3 cr) Robotics II: Control | * ROBOT 6200/ CS 6370 / ME EN 6225 (3 cr) Motion Planning or CS 6300 (3 cr) AI | CS 6640 / BME 6640 (3 cr) Image Processing or * CS 6320 (3 cr) Computer Vision |

SEMINAR 1 credit

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| ROBOT 6800 (1 cr) Robotics Seminar |
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PROJECT 1 credit minimum

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| ROBOT 6920 Graduate Project or |
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* Approved Intensive Project Courses

* 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 18 credit hour minimum.

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| ROBOT 6500/ ME EN 6240 (4 cr) Advanced Mechatronics ROBOT 6960 (3 cr) Wearable Robotics ROBOT 6200/ CS 6370/ ME EN 6225 (3 cr) Motion Planning CS 6320 (3 cr) Computer Vision ROBOT 6400/ BME 6640/ ECE 6654 (4 cr) Neural Engineering |
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ELECTIVE COURSES

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

| MECHANICS | CONTROL | DESIGN |
|---|---|---|
| ROBOT 7000 / ME EN 7230/ CS 7310 (3 cr) Manipulation, Mobility ROBOT 7010 / ME EN 7220/ CS 7320 (3 cr) System Identification | ME EN 6200/ ECE 6615 (3 cr) Classical Control Systems ECE 6670 (3 cr) Control of Electric Motors ME EN 6210/ECE 6652/ CH EN 6203 (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 | *ROBOT 6500/ME EN 6240 (4 cr) Adv. Mechatronics * ROBOT 6960 (3 cr) Wearable Robotics ECE 6780/ CS 6780 (3 cr) Embedded System Design ECE 6960 (3 cr) Robotic Millisystems CS 6956 (3 cr) Medical Robotics |
| COGNITION | | PERCEPTION |
| CS 6350 (3 cr) Machine Learning CS 6958 Robot Learning (3 cr) | CS 6360 (3 cr) Virtual Reality ROBOT 7400 / ME EN 7240 (3 cr) Haptics *ROBOT 6400/BME 6440/ECE 6654 (4 cr) Neural Engineering | CS 7640 (3 cr) Adv. Image Processing CS 6353 (3 cr) Deep Learning ECE 6530 (3 cr) Digital Signal Processing |
| HUMAN-ROBOT INTERACTION | | |