

	Course Information		
	<p>This is an introductory course in robotics with an emphasis on mechatronics, building and design. The objective of the course is for students to be exposed to robotics and robotics research at the university level, while also learning how to construct mechanically, control electronically, and program physical robots. The course will include aspects of mechanical engineering, design and manufacturing, electronics, circuits and systems, as well as embedded systems programming. The course culminates in the presentation of small robots that the students design, build and program.</p>		
	Course Objectives		
	<p>Students will learn and understand the following:</p> <ul style="list-style-type: none"> How to design 3D parts in a CAD system How to program a microcontroller as an embedded system How to interface with sensors, servos and motors How to integrate sensors actuators and intelligence into a robot 		
	Course Logistics		
	<p>Student spend 14 days in this class over three weeks. Nominally each day is divided into</p> <ul style="list-style-type: none"> o Lecture time (3 hours in the morning), o Structured lab time (4-5 hours in the afternoon) o Typically 2-3 hours per night of homework or extended lab work time <p>Two professors supported by five teaching assistants give a nominal 1:5 teacher student ratio. As there is a final project output from this class, the amount of time in the lab becomes large at the end.</p>		
Class	Topics	Afternoon Lab Exercise	
1b	Introduction to Course and Electromagnetism	Electronics Bootcamp	
1c	Introduction to Basic Electronic Circuits and LEDs	Programming and Microcontrollers	
1d	Programming Arduino Basics, Digital I/O	Sensor Inputs	
1e	Servos, Motors, and Driving Loads	Driving Actuators	
2a	Intro to CAD / Laser Cutting / 3D Printing / Safety	Luggage Tag and Totem	
2b	Mechanisms and Mechanical Engineering	Project Assignments	
2c	Staples Field Trip	Staples Factor Trip	
2d	Engineering Design Process	Design review / Project Support	
2e	Project Design and Skills Review	Project Support Day	
3a	Embedded Programming: The Events and Services Architectur	Programming / Project Support	
3b	Capacitors / Filters and Opamp circuits	Circuit building / Project Support	
3c	Embedded Synchronization and Timing	Project Support Day	
3d	Robot Orchestra Dress Rehearsal	Dress Rehearsal	

3e	Final Presentations	Final Presentations	
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