Robotics and Mechatronics

Example outcomes gained by taking this track would include joining groups that analyze/design/implement/build control algorithms simulation and microcontroller/embedded system implementation. The combination of control, embedded systems, and DSP skill is highly desirable in today industrial environments. Local employers include most major companies with automation department such as B-D, Caterpillar, Eaton, Lord Corp, Square D, Superior Control.
US-wide employers include
Boeing, Caterpillar, General Dynamics, General Motors, Honeywell, Ingersoll Rand, John Deer, Johnson Control, Lockheed-Martin, Northrop-Grumman, and most major companies with automation department**.** While there are many possible approaches to this area, the fundamental courses include:

- ECE 516 System Control Engineering
- ECE 555 Computer Control of Robots
- ECE 556 Mechatronics

The advanced offerings in would be used to allow a concentration within this area

- ECE726 Advanced Feedback Control
- ECE755 Advanced Robotics
- ECE756 Advanced Mechatronics

For those students interested in control applied to power devices and distribution, please refer to plan of work for that area. Since control, robotics and mechatronics cross many disciplines, course from other departments are of interest. However, some of these courses significantly overlap; thus, care should be taken in creating a plan that avoids redundancy. Courses outside ECE include:

- MAE522 Non Linear System Analysis and Control
- MAE 524 Principles of Mechatronics Control
- MAE (WPS) 534 Mechatronics Design
- MAE (ECE) 535 Design of Electromechanical Systems
- MAE 544 Real Time Robotics
- MAE721 Robust Control with Convex Methods
- ISE 707 Real-Time Control of Automated Manufacturing
- ISE 716 Automated Systems Engineering

In addition to courses that are directly related to control, robotics and mechatronics, there are many courses that are complementary to the area and provide the breadth that is needed for a master of science or a PHD degree. ECE Recommended complementary courses include:

- ECE513 Digital signal processing
- ECE514 Random process
- ECE561 Embedded System Design
- ECE570 Intro. to networking
- ECE591Q Machine Learning
- ECE592B Electric Motor Drive
- ECE717 Multivariable Linear Systems Theory
- ECE742 Neural Networks
- ECE753 Computer analysis of Large Scale Power Systems
- ECE759 Pattern Recognition
- ECE763 Computer vision

Sample MS Plan of Work

These plans of work are suggestions only. Feel free to seek other advice or to structure your own curricula. Please note that the actual courses taught are constantly changing, and these might be out of date. These are written assuming you are a full time student taking 10 courses over three semesters. You might choose to not overload in Spring, but take one last course in Fall after this.

Classical Robotics and Mechatronics					
Fall		Spring		Fall	
ECE556	RMC&I	ECE555	RMC&I	ECE763	SP&CI
ECE513	SP&CI	ECE756	RMC&I	ECE755 (even) ECE550(odd)	RMC&I PE&PS
ECE514	(none)	ECE516	RMC&I	ECE570	NET
		ECE561	CA		

For those students with an inclination toward biomedical topics, we offer

Biomedical Robotics and Mechatronics					
Fall		Spring		Fall	
ECE556	RMC&I	ECE555	RMC&I	ECE763	SP&CI
ECE522	RMC&I	ECE756	RMC&I	ECE755 (even) ECE550(odd) or ECE534	RMC&I PE&PS PE&PS
ECE513	SP&CI	ECE516	RMC&I	BME 541	BME
		BME512 Or Elective to fulfill 3 ECE areas	BME		

Electives are chosen from the lists of related courses. Note the requirement for 21 hours of ECE courses and two 700 level courses in the MS plan.

Associated Faculty

M-Y Chow, E. Grant

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