

# Computational Intelligence

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 neural networks, signal and imaging, together with robotics and mechatronics skills are highly desirable in today industrial environments. Local employers include most major companies with automation department such as

B-D and SAS

US-wide employers include

Boeing, General Dynamics, General Motors, Honeywell, Johnson Control, Lockheed-Martin, Northrop-Grumman, and most major companies with analysis departments.

While there are many possible approaches to this area, the fundamental courses include:

- ECE 555 Computer Control of Robots
- ECE 556 Mechatronics

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

- ECE742 Neural Networks
- ECE759 Pattern Recognition
- ECE756 Advanced Mechatronics
- ECE763 Computer Vision

For those students interested in control applied to power devices and distribution, please refer to plan of work for that area. Since computational intelligence crosses 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:

- CSC 520 Artificial Intelligence I
- CSC 720 Artificial Intelligence II
- CSC 725 Intelligent Multimedia Systems
- ST 722 Decision Analytic Modeling
- MA 719 Vector Space Methods in System Optimization

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 Please note that the actual courses taught are constantly changing, and these might be out of date.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.

Computational Intelligence					
Fall		Spring		Fall	
ECE556	RMC&I	ECE555	RMC&I	ECE570	NET
ECE742	SP&CI	ECE756	RMC&I	ECE763	SP&CI
CSC520		ECE759		ECE591Q/755	SP&CI
		CSC522			

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**

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Created by MYC. Last edited by HJT 10/7/2008