



CIS 687
Course Syllabus

Instructor: Dr. Peter Molnar

Office Hours	Monday, Tuesday 2:30- 5:30
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Course Number/Sect	Course Title	Credit Hours	Semester	Time	Level (U/G)
CIS 687 01	Intelligent Machines/Robotics	3	Fall 2007	M 5:55-8:30	G
Brief Description	Cohesive study of intelligent machines involving computers, robots and sensor systems and experiments with robots and computers				
Prerequisites	CIS 475 or CIS 675				
Course Length	48 hours. 3 hours per week for 16 weeks				
HTTP Link	www.cis.cau.edu/687				

Course Description:

This class is intended to introduce students to state-of-the-practice Artificial Intelligence techniques for mobile robots. Topics include sensing, navigation, planning, and uncertainty. Besides an overview on the vast field of robotics and its history, we will discuss various theories and paradigms. The objective of this class is to obtain a general detailed understanding of the presented topics, and to apply this knowledge to in simulation programs and robot experiments.

Course Objectives:

The objective of this class is to obtain a general detailed understanding of the presented topics, and to apply this knowledge to in simulation programs and robot experiments.

Learning Outcomes:

After successful completion of this course, a student should:

- Understand the concept of
 1. Robot Architectures
 2. Behavioral Robotics
 3. Common Sensing Techniques
 4. Robot Swarms
 5. Planning
- Be able to define and implement behaviors on the Pioneer 2 robots.
- Incorporate the various sensors to robotic behavior.

Major Topics:

- General Topics (Concepts):
 - Robot Architecture
 - Hierarchical Paradigm
 - Reactive Paradigm
 - Hybrid Deliberative/Reactive Paradigms
 - Common Sensing Techniques
 - Multi-agents, Robot Swarms
 - Planning
 - Topological Path Planning
 - Metric Path Planning
 - Localization and Map Making
- Programming Robots (Practice):
 - Pioneer 2 with Player/Stage or ARIA
 - Lego NXT with NXT Education or legOS/lejos
- Special Topics (Implementation):
 - Vision
 - Communication
 - Sensor Fusion
 - Reactive Navigation

Teaching/Learning Methods:

- Lectures
- Viewgraphs and Whiteboard notes will be available on the website
- CD-ROM with class material and software
- Software for the programming assignments is available on the Robotics Linux Cluster

Method of Instruction:

- Lecture.
- Programming Project, Paper and Presentation.
- Class material and assignments will be posted on class website of WebCT. Students are required to obtain access to WebCT.

Evaluation Methods**Grading and other policies and expectations:**

Grade Scale:

A:	90-100%	B:	80-89%	C:	70-79%
D:	60-69%	F:	below 60 %		

Grades are determined by the accumulation of all points of all assignments according to the following distribution:

Class Participation	20%
Programming Projects (2)	50%
Paper & Presentation	30%
Total	100%

Students are expected to attend classes.

No assignments will be accepted after the due date.

Required Readings:

Robin R. Murphy, 'Introduction to AI Robotics', MIT Press, ISBN 0-262-13383-0

Supplemental Readings/Additional Bibliography:- see class web site -

Course Outline and Schedule: - see calendar on class web site -