

91.450 Robotics I, Fall 2001 Syllabus

Contact Information

Prof. Holly Yanco
Office: Olsen 220A
Lab: Olsen 304
E-mail: holly@cs.uml.edu
Phone: 978-934-3642

Class Meetings

Tuesday and Thursday, 11:30-12:20

On lecture days, we will meet in Olsen 412. On lab days, we will meet in Olsen 304.

Office Hours

Office hours for the course will be held in the lab (Olsen 304) to allow us to work with the robots. I will be in the lab during the following hours.

Tuesdays 12:30 to 2:00
Wednesdays 11:00 to 2:00
Thursdays 12:30 to 2:00

You may also make an appointment with me if you can not make it to the scheduled office hours.

Course Description

In this course, you will learn about robotics, with a focus on autonomous mobile robots. There will be lectures (held in Olsen 412) and labs (held in Olsen 304). In the labs, you will build and program your own robots. There will be a robot contest (starting Tuesday, 10/23 with finals on Thursday, 11/8) and a final project (with presentations on Tuesday, 12/11). You will choose your own final project; I will hold meetings with each group during the week of Monday, 11/12 to discuss what you are planning to do.

Project Sequence

This course, taken in conjunction with Artificial Intelligence in Spring 2002, has been approved as a project sequence for the 2001-2002 school year.

Textbooks

Introduction to AI Robotics
Robin Murphy
MIT Press, 2000

Robotic Explorations: A Hands-on Introduction to Engineering
Fred Martin
Prentice Hall, 2000

Grading

Homework and Labs	30%
Midterm Exam	15%
Projects:	
Contest	15%
Final project	20%
Final Exam	20%

Collaboration Policy

Labs will be done in groups of two students each. You may choose your own partners, but I reserve the right to regroup people as the term progresses. For the labs, I expect that each person will do his or her own equal share of the work. To learn, you'll need to actually build and program the robots, not watch another person do it.

Homework assignments should be written up by yourself. You may discuss the questions with your classmates, but you must write them up individually.

Exams are also to be an individual proposition.

Robots

In the lab, you'll be building and programming robots. We will be using two processing boards as the brains for our robots. The first is the Handy Board, and the second is the Lego RCX brick (from the Mindstorms kit). Our robot bases will be built out of Lego. Each two person team will be given a robot kit with the processing boards, lots of Lego, sensors, and motors for use during the term. Each team will have their own workbench with computer in Olsen 304.

Lab

The lab is in Olsen 304. Soon (hopefully), the door should have an id lock, so you will have 24 hour access to the lab. Each group will have their own workbench with computer for building and programming their robots.

Please try to keep your workspace and the lab neat.

Schedule

On lecture days, go to Olsen 412. On lab days, go to Olsen 304.

Th 9/6	Lecture: Class overview	Murphy, p. 1-12
T 9/11	Lecture: Introduction to robotics	Murphy, Chap 1
Th 9/13	Lecture: Hierarchical paradigm	Murphy, Chap 2
T 9/18	Lab: Introduction to the robot kit	Martin, Chap 1, App D & E
Th 9/20	Lab: Building your first robot	Martin, Sections 2.1-2.3
T 9/25	Lecture: Biological foundations of reactive paradigm	Murphy, Chap 3
Th 9/27	Lecture: Reactive paradigm	Murphy, Chap 4
T 10/2	Lab: Braitenburg vehicles	Martin, Sections 2.4-2.6
Th 10/4	Lecture: Designing for the reactive paradigm	Murphy, Chap 5
T 10/9	Lecture: Common sensing techniques	Murphy, Chap 6
Th 10/11	Lab: Sensors, reactive robots	Martin, Sec 2.7-2.8, Chap 3
T 10/16	Lab: Motors	Martin, Chap 4
Th 10/18	Midterm Exam: covers material through 10/9	
T 10/23	Lab: Competition start, Intro RCX	NQC handout, Martin, App F
Th 10/25	Lecture: Hybrid deliberative/reactive paradigm	Murphy, Chap 7
T 10/30	Lecture: Control	Martin, Chap 5
Th 11/1	Lecture: Multi-agents	Murphy, Chap 8
T 11/6	Lab: Seeding rounds for competition	
Th 11/8	Lab: Competition finals	
T 11/13	Lab: Advanced sensing; Project meetings this week	Martin, Chap 6
Th 11/15	Lecture: Topological path planning	Murphy, Chap 9
T 11/20	Lecture: Metric path planning; Project proposals due	Murphy, Chap 10
Th 11/22	Thanksgiving	
T 11/27	Lecture: Localization and map making	Murphy, Chap 11
Th 11/29	Lecture: More map making	
T 12/4	Lab: Project work	
Th 12/6	Lecture: On the horizon	Murphy, Chap 12
T 12/11	Final project presentations	
Finals	Final exam	