COMP 4500, Mobile Robotics I, Spring 2018
Syllabus

General Information
Prof. Holly Yanco
Olsen 206
holly@cs.uml.edu

Course web page
http://www.cs.uml.edu/~holly/teaching/4500/spring2018/

Lectures
Thursdays 9:30-10:45, Olsen 102

Labs
Tuesdays 9:30-10:45 (Section 801), Olsen 302
Tuesdays 12:30-1:45 (Section 802), Olsen 302

Office Hours
Mondays 1:30 to 3:00 Olsen 206
Tuesdays 10:45 to 12:15 Olsen 302
and by appointment

Course Description
In this course, you will learn about robotics, with a focus on autonomous mobile robots, through a series of lectures and labs. Topics include sensors, locomotion, deliberative, reactive, and hybrid control architectures, computer vision, application domains, and current research. In the labs, you will build and program your own robots in teams. After the initial set of labs, you will design, build and program a robot for a term project. A public demonstration of the projects will be held at the end of the term.

Course Outcomes
At the completion of this course, students will be able to:

1. Work in teams to design, build, program, and test robot systems for a variety of tasks (ABET 3b, 3c, 3d, 3i).
2. Identify and utilize the sensors and programming strategies needed to solve problems in robotics (ABET 3a, 3b, 3i).
3. Understand open problems in robotics and ways that such problems could be solved (ABET 3b, 3h).
4. Demonstrate and describe their work in a public setting (ABET 3f).
5. Identify and discuss ethical issues in the area of robotics and society (ABET 3e, 3g).

Readings
There is no textbook for the course. Readings will be distributed in class. Many will not be available on the course web site due to copyright issues. If you miss a class, you are responsible for getting a copy of the handout from a classmate or from me during office hours.
Grading
Assignments and Labs  40% (Deductions will be taken for poor attendance)
Midterm Exam 20%
Project: 40%

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.

You should write your own assignments as well as any written components of the
labs. 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 the
Wallaby robot controller. Our robot bases will be built out of Lego (and anything
else you’d like). Each two person team will be given a robot kit with the
processing boards, sensors, and motors for use during the term; the lab contains
large bins of Lego as well as a variety of other parts such as Vex and K’Nex.

Lab
The lab is in Olsen 302. Each group will have their own area with a computer on
it for building and programming their robots. Note that the lab is shared this
semester with two lab sections for this course and it is also used by the Robotics
Club (which you can join), so desks must be left clear and ready for anyone to
use. When you are not working in the lab, you should put your robot and parts in
the box provided to you and then put the box on the storage rack.

The lab’s door has an ID lock, so you will have 24 hour access (ID access should
be live by Thursday 2/1). While some time in class is set aside for working on
your robot, you should expect to spend additional time in the lab to work on your
labs and project. The Robotics Club meetings are scheduled for Wednesday and
Thursday nights from 7-10pm, so the room will not be available for lab work
during those times.

Please keep your workspace and the lab neat. Do not leave trash lying around,
on tables or the floor. You may eat in the lab, but this policy will be changed if
people do not clean up after themselves.

Undergraduate Project Sequence
For Computer Science majors, COMP.4500 Mobile Robotics I can be grouped
with any of:
• COMP.4510 Mobile Robotics II (usually offered every other fall, due again
Fall 2019)
• COMP.4200 Artificial Intelligence
• COMP.4220 Machine Learning
Schedule
For lectures (Thursdays), go to Olsen 102. For labs (Tuesdays), go to Olsen 302.

Th 1/25 Lecture Class overview

T 1/30 Lab Intro to the robot kit; building your first robot platform
Th 2/1 Lecture Sensors, motors and robot morphologies

T 2/6 Lab Sense and avoid
Th 2/8 Lecture Braitenberg vehicles

T 2/13 Lab Braitenberg vehicles
Th 2/15 Lecture Robot control architectures; Robot learning

T 2/20 No class Monday schedule
Th 2/22 Lecture SLAM and path planning

T 2/27 Lab Wall following
Th 2/29 Lecture Projects; Computer vision

T 3/6 Lab Servo motors and sonars
Th 3/8 Lecture Guest lecture: Adam Norton, UML NERVE Center, Robot Testing

T 3/13 No class Spring Break
Th 3/15 No class Spring Break

T 3/20 Lab Vision, part I
Th 3/22 Lecture Guest lecture: Abraham Shultz, UML Robotics Lab, Swarm Robotics

T 3/27 Lab Vision, part II; Project proposals due
Th 3/29 Lecture Autonomy

T 4/3 Lab Project
Th 4/5 Lecture Human-robot interaction

T 4/10 Lab Project
Th 4/12 Lecture Guest Lecture: Joe Jones, Franklin Robotics

T 4/17 Lab Project; Mid-project check
Th 4/19 Exam Covers material through 4/12; in lecture room

T 4/24 Lab Project
Th 4/26 Lecture Robot ethics
F 4/27 Botball set up (volunteer opportunity)
S 4/28 Botball tournament and Botfest exhibition (volunteer opportunity)

T 5/1 Lab Project
Th 5/3 Final project presentations (Olsen 3rd floor lobby)

T 5/8 Project reports due by noon by email
Note: There is no final exam in this project course.