Syllabus

Course Information

CS 639, Section 003: Autonomous Robotics

Credits: 3

Credit Hour Explanation: This class meets for two 75-minute class periods each week over the semester and carries the expectation that students will work on course learning activities (reading, writing, problem sets, studying, etc) for about 3 hours out of the classroom for every class period.

Course Description: Robots are devices that sense and act to bring about change in the physical world. This course will introduce students to the challenges of and methods for developing autonomous robots that can make decisions in unstructured environments with uncertain sensing and actuation. Topics covered will include probabilistic state estimation, robot localization, simultaneous localization and mapping (SLAM), motion control, planning, robot learning, and human robot interaction.

Requisites: Students entering the class are expected to have a background knowledge of probability, linear algebra, and calculus, and have good programming experience. The course will provide minimal review on the background knowledge and will not provide tutorials on programming.

Course Designations/Attributes: N/A

Learning Outcomes

After taking this course, students will be able to:

1. Explain and implement algorithms that enable a robot to recognize the state of the world using its onboard sensors.
2. Explain and implement algorithms that enable a robot to plan and enact movement in the world.
3. Understand the broader landscape of advanced robotics topics: learning, HRI, and societal impacts.

Meeting and Instructor Information

Meeting Time and Location: Morgridge Hall 6618

Instructional Modality: In-person lectures

Instructor Title and Name: Professor Josiah Hanna

Instructor Contact Information: jphanna@cs.wisc.edu

Day/Time/Location of Office Hours: Tuesdays from 11am - 12pm

Teaching Assistant Name(s): N/A

Teaching Assistant Contact Information: N/A

Day/Time/Location of TA Office Hours: N/A

Overview

Materials

Link to Canvas Site: https://canvas.wisc.edu/courses/500307

Other Digital Instructional Tools (if applicable):

Piazza: https://piazza.com/wisc/spring2026/cs639003

Gradescope: https://www.gradescope.com/courses/1213241

Required Textbook(s), Software and Other Materials: Probabilistic Robotics. Sebastian Thrun, Wolfram Burgard, Dieter Fox. MIT Press, 2005.

Coursework and Grading

Assignments/Exams/Other Graded Work: See grading below

Exam Proctoring (if applicable): N/A

Grading:

The following weights are used:

- **Weekly Readings and Questions:** 10%
- **Class Participation:** 10%

- **Midterm Exam:** 20%
- **Final Programming Project:** 20%
- **Programming Assignment:** 40%

Schedule

See the course schedule page:
https://pages.cs.wisc.edu/~jphanna/teaching/26spring_cs639/

AI Policy

The class policy is generally to allow and encourage use of AI as a tool that can help you go farther with your final projects and for additional study.

The one exception to this permissive policy is the weekly pre-class reading responses. As the pre-class reading is critical to effective class participation, use of AI to bypass the reading and response writing is not allowed. If AI use is suspected (due to the response itself or a lack of preparedness for class period), the response will receive a zero.

Otherwise, you are welcome (but not required) to use AI tools to complete programming assignments, refine writing, etc. However, all submitted content will be treated as your own, including for the purpose of determining academic dishonesty.

Please document your use of AI and include your documentation with your assignment submission. Documentation could include specific prompts used, process for iterating on prompt design, etc.

Academic Policies and Statements

- Academic Calendar and Religious Observances
- Academic Integrity
- Accommodations for Students with Disabilities
- Course Evaluations
- Diversity and Inclusion
- Mental Health and Well-Being
- Privacy of Student Records and the Use of Audio Recorded Lectures
- Remote Proctoring with Honorlock (if applicable)
- Students' Rules, Rights and Responsibilities
- Teaching & Learning Data Transparency