COMPSCI-603: Robotics

LGRC A104A, Tue/Thur 4:00–5:15 PM, Spring 2026

1 General Information

Course Website: https://hcr.cs.umass.edu/courses/compsci603

Instructor: Prof. Hao Zhang

- Email: hao.zhang@umass.edu
- Office Hours: 9:00-10:00 AM on Mondays, 3:30-4:00 PM on Tuesdays and Thursdays
- Office Location: LGRC A353A

Teaching Assistant: Shauna Choi

- Email: seohyunchoi@umass.edu
- Office Hours: 9:00-10:30 AM on Wednesdays and 10:30 AM-12:00 PM (noon) on Fridays
- Location: LGRC-Tower T220

Graduate Graders:

- Pranav Balakrishnan, pranavbalakr@umass.edu
- Nilesh Nayan, nnayan@umass.edu

Course Description: This course is intended to serve as an advanced overview of robotics from the perspective of computer science and artificial intelligence. The course discusses the complete autonomy loop, including perception, cognition, and action. This course covers the theories, algorithms, and computational implementations related to these topics, with focus on open discussions for how to do research to go beyond the state of the art. Students will gain hands-on experience in implementing and extending such algorithms using simulations and real robots.

Learning Objectives: Students will gain an understanding of the state-of-the-art robotic systems, learn fundamental theories and algorithms to build intelligent robots, gain experience of constructing a working intelligent robotic system, and improve skills including technical writing, presentation, and teamwork.

Prerequisites: No enforced prerequisites. But mathematical knowledge and sufficient programming skills are assumed.

2 Course Material

Required Textbook: No required textbook, as the course offers research-oriented project-based learning. However, several textbooks are recommended as references:

- Sebastian Thrun, Wolfram Burgard and Dieter Fox. “Probabilistic Robotics." MIT Press. 2005.
- Richard S. Sutton and Andrew G. Barto. “Reinforcement Learning: An Introduction.” MIT Press. 2018.
- Roland Siegwart, Illah Reza Nourbakhsh and Davide Scaramuzza. “Introduction to Autonomous Mobile Robots.” MIT Press. 2011.

Schedule and Assignments: Course schedule and lecture slides are available on the public course website. Project write-ups are also posted on the course website, along with deadlines. All projects involve significant programming. If you miss a class, it's your responsibility to check the course website (make sure you refresh the webpage).

Project Submission: Assignments will be submitted to the Canvas learning management system (LMS), and grades will also be posted on Canvas. The course website is used for information only.

Online Discussion: Piazza will be used optional for online discussion and will be managed by the TA:

- Link: http://piazza.com/umass/spring2026/compsci603
- Access code: Posted in Canvas and sent through email

Exams: There will be no exams.

Evaluation: Grading will be 100% based on the four (4) course projects with the following weights:

- Project 1: 10% (individual project)
- Project 2: 30% (individual project)
- Project 3: 30% (individual project)
- Final project: 30% (group project)

Final letter grades will be determined by overall weighted average as follows:

100–90	89.9–85	84.9–80	79.9–75	74.9–70	69.9–60	59.9–0
A	B+	B	C+	C	D	F

The instructor considers 0.75 point as the borderline. Decisions on borderline grades will be based on class participation. There is no extra credit or any other additional work available outside of the assigned projects.

3 Course Policy

Attendance Policy: Class attendance will not be taken. Classes will be offered in-person during the class time (4:00-5:15 PM Tues/Thur), and all materials will be posted on the course website. Please don't come to class if you're feeling unwell. We will work with you to help keep you posted on class activities and materials covered. In any case, it is your responsibility to catch up (or keep up) with course materials and announcements.

Due Dates and Late Submissions: Course project deliverables are due at the date and time stated. Most project deliverables have a four-day late submission period (i.e., gracing period with late penalty), and late submission will lose 25% points per day for the deliverable. Manage your time, and start early!

Exemptions: There may be situations when you cannot submit an assignment by the due date. You may ask for an extension by emailing a formal request to the instructor or the TA in the case of illness, religious or funerary events, university-related events (athletic event, field trip, or performance), and extenuating non-academic reasons (military obligation, family illness, jury duty, automobile collision). For religious reasons, you must provide us with a written list of such dates within two weeks after the course starts. In all other instances, please provide us with written documentation as soon as possible.

Grading Corrections: Send any assignment grading correction requests to the instructor within one (1) week of receiving the grade, or before the end of the semester, whichever comes first. After that, your grade

will not be adjusted. If you find any mistake in grading, please let the instructor know. Your grade will not be lowered.

Using Computers/Phones in Class: Please be respectful of your classmates by turning off/silencing your phones and using your computers only for taking notes or keeping up with the materials covered in class. Checking your email, working on other non-class related materials, web-surfing, etc., are not appropriate activities for class time. Please practice courteous cell phone and computer etiquette.

Learning Environment: Fundamentally, the instructor expects respect in this course for yourself, your classmates, and your instructor and TA.

- Respect for yourself includes taking care of yourself physically and mentally and advocating for an environment that facilitates learning for you.
- Respect for your classmates includes recognizing and appreciating the diversity of backgrounds and experiences of your classmates and making it your interest to foster a learning environment for everyone; all are welcome.
- Respect for your instructors (and your classmates) includes not participating in disruptive or distracting behavior: talking, playing games, or web surfing during lecture, for example, make it difficult for others to focus on the reason we are all here.
- Respect must be mutual to be effective; we (your instructors) and your TAs will be held to the same standards of respect.

Please let your instructor know if you become aware of an issue with the classroom (or out-of-classroom) environment with regards to these policies.

Version Control Software: If you plan to use version control software, such as Github, GitLab, or Bitbucket to manage your projects, you must make sure your repositories are private and not publicly available.

Academic Honesty: While learning from your peers is encouraged, the rule of thumb is that any learning should be in your head. Thus you should not leave an encounter with another student (in person or electronic) with anything written down (or electronically recorded) that you did not have before. Giving or receiving electronic files is specifically considered cheating. We will carefully review your submissions to verify that cheating has not taken place. If you are suspected of plagiarism we will follow a formal path to determine if academic dishonesty has taken place. If you are found guilty, you will receive zero points for the project and/or fail the course, and it will go on your permanent record at UMass. This will disrupt your schedule for completing courses and may lead to you not completing your degree in a timely fashion.

Please also be aware of the university statement of academic honesty and the CICS copyright policy:

- **UMass statement on academic honesty**: Since the integrity of the academic enterprise of any institution of higher education requires honesty in scholarship and research, academic honesty is required of all students at the University of Massachusetts Amherst. Academic dishonesty is prohibited in all programs of the University. Academic dishonesty includes but is not limited to cheating, fabrication, plagiarism, and facilitating dishonesty. Appropriate sanctions may be imposed on any student who has committed an act of academic dishonesty. Instructors should take reasonable steps to address academic misconduct. Any person who has reason to believe that a student has committed academic dishonesty should bring such information to the attention of the appropriate course instructor as soon as possible. Instances of academic dishonesty not related to a specific course should be brought to the attention of the appropriate department Head or Chair. Since students are expected to be familiar with this policy and the commonly accepted standards of academic integrity, ignorance of such standards

is not normally sufficient evidence of lack of intent (https://www.umass.edu/honesty).

- **CICS copyright policy**: The College of Information and Computer Sciences explicitly forbids any redistribution (including publicly available posting on an internet site) of any CICS course materials (including student solutions to course assignments, projects, exams, etc.) without the express written consent of the instructor of the course from which the materials come. Violations of this policy will be deemed instances of "facilitating dishonesty" (since a student making use of such materials would be guilty of plagiarism) and therefore may result in charges under the Academic Honesty Policy.

4 Course Support

Inclusivity: We honor UMass Amherst's commitment to embrace diverse people, ideas, and perspectives to create a vibrant learning and working environment. In this course, each voice in the classroom has something of value to contribute and each voice in the classroom is valued. You are welcome regardless of age, background, citizenship, disability, education, ethnicity, family status, gender identity, geographical origin, language, military experience, political views, race, religion, sexual orientation, socioeconomic status, and work experience. We respect everyone's right to be addressed by the name and pronouns that they choose. You can indicate your preferred/chosen first name and pronouns on SPIRE, which appear on class rosters. A student's chosen name and pronouns are to be respected at all times in the classroom. Please read the UMass Guidelines for Classroom Civility and Respect (https://www.umass.edu/dean-students/student-conduct/campus-policies/classroom_civility) and take care to respect the different experiences, beliefs, and values expressed by students and staff involved in this course.

Accommodations: The University of Massachusetts Amherst is committed to providing an equal educational opportunity for all students. If you have a documented physical, psychological, or learning disability on file with Disability Services (DS), you may be eligible for reasonable academic accommodations to help you succeed in this course. If you have a documented disability that requires an accommodation, please notify your instructor as soon as possible so that we may make appropriate arrangements. For further information, please visit Disability Services (https://www.umass.edu/disability).

Title IX: In accordance with Title IX of the Education Amendments of 1972 that prohibits gender-based discrimination in educational settings that receive federal funds, the University of Massachusetts Amherst is committed to providing a safe learning environment for all students, free from all forms of discrimination, including sexual assault, sexual harassment, domestic violence, dating violence, stalking, and retaliation. This includes interactions in person or online through digital platforms and social media. Title IX also protects against discrimination on the basis of pregnancy, childbirth, false pregnancy, miscarriage, abortion, or related conditions, including recovery. There are resources here on campus to support you. A summary of the available Title IX resources (confidential and non-confidential) can be found at the following link: https://www.umass.edu/titleix. You do not need to make a formal report to access them. If you need immediate support, you are not alone. Free and confidential support is available 24 hours a day / 7 days a week / 365 days a year at the SASA Hotline 413-545-0800.

Plan and Communicate for Success: Your success is important to the instructor. We all learn differently and bring different strengths and needs to the class. If there are aspects of the course that prevent you from learning or make you feel excluded, please let the instructor know. Together we'll develop strategies to meet both your needs and the requirements of the course.

Acknowledgment

We are grateful for the material in this document that has been shared in syllabi in other courses in CICS @ UMass Amherst.

Changelog

- 01/26/2025: Posted the initial syllabus.
- 01/28/2025: Updated the TA's office hours.
- 02/02/2026: Updated the information for a grader.
- 02/04/2026: Updated TA office hours time from 2:00-3:30 PM to 9:00-10:30 AM on Wednesdays.