

16-762: Mobile Manipulation

Spring 2026

Class Sessions:

Monday & Wednesday 3:30 - 4:50 PM

Location: NSH 3002

Website:

<https://zackory.com/mm2026/>

Professor:

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TA:

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Course Description

In this course, you'll learn about mobile manipulation through hands-on experience working with real mobile manipulators. You'll gain experience with teleoperation, autonomy, perception, navigation, manipulation, and human-robot interaction, all within the context of mobile manipulators.

This course is structured as a hands-on introduction to mobile manipulators. Lectures will provide base concepts on topics in mobile manipulation, followed by in-class lab-style implementations on real-world mobile manipulators. The course will culminate in a final project with a small team on a topic/problem of the students' choosing that connect many of the mobile manipulation techniques learned throughout the semester.

Pre- &/or Co-Requisites

Prior experience with the Python programming language is encouraged and extremely beneficial.

Course Goals and Learning Objectives

The primary goal of this course is to provide you with a practical understanding of mobile manipulation in real contexts. Upon successful completion of this course, you should:

- Have a practical understanding of perception, action, human-robot interaction, and robot learning for mobile manipulation.
- Have hands-on experience in the design of mobile manipulation algorithms that operate in the real world.
- Have a stronger grasp on the mobile manipulation research process, including defining goals, developing methodologies, and disseminating results.
- Have familiarity with relevant literature and the state-of-the-art.
- Have experience identifying problems and tasks that could benefit from mobile manipulation and developing robot manipulation methods that enable robots to perform these tasks.

Grading

Component	Percentage
Lab Assignments	60%
Final Project	40%

Final Project: This is an extensive project that requires working with a small group of 2-3 of your peers to develop a set of techniques/skills/algorithms for a real mobile manipulator to solve a real-world problem or series of tasks (of your choosing). You will work with your team to define a problem, read relevant literature, develop a methodology, and implement a working system on a real robot. At the completion of the project, your group will prepare a video recording, a live robot demonstration, a presentation, and a paper report (preferably in IEEE format) to disseminate your methods and results.

Take care of yourself

Take care of yourself. Do your best to maintain a healthy lifestyle this semester by eating well, exercising, avoiding drugs and alcohol, getting enough sleep and taking some time to relax. This will help you achieve your goals and cope with stress.

All of us benefit from support during times of struggle. There are many helpful resources available on campus and an important part of the college experience is learning how to ask for help. Asking for support sooner rather than later is almost always helpful.

If you or anyone you know experiences any academic stress, difficult life events, or feelings like anxiety or depression, we strongly encourage you to seek support. Counseling and Psychological Services (CaPS) is here to help: call 412-268-2922 and visit their website at <http://www.cmu.edu/counseling/>. Consider reaching out to a friend, faculty or family member you trust for help getting connected to the support that can help.

Diversity and Inclusive Learning

We must treat every individual with respect. We are diverse in many ways, and this diversity is fundamental to building and maintaining an equitable and inclusive campus community. Diversity can refer to multiple ways that we identify ourselves, including but not limited to race, color, national origin, language, sex, disability, age, sexual orientation, gender identity, religion, creed, ancestry, belief, veteran status, or genetic information. **Each of us is responsible for creating a safer, more inclusive environment.** I strive to create a class environment that is respectful of diversity where all students feel supported and encouraged to ask questions and engage in discussion. I welcome suggestions and feedback about this.

My research involves creating robotic technology for accessibility, and I feel strongly that diversity in the classroom includes accommodating diverse abilities. If you have a disability and have an accommodations letter from the Disability Resources office, I encourage you to discuss your accommodations and needs with me as early in the semester as possible. I will work with you to ensure that accommodations are provided as appropriate. If you suspect that you may have a disability and would benefit from accommodations but are not yet registered with the Office of Disability Resources, I encourage you to contact them at access@andrew.cmu.edu.

Food Insecurity

If you are worried about affording food or feeling insecure about food, there are resources on campus who can help. Email the CMU Food Pantry Coordinator to schedule an appointment:

Pantry Coordinator
cmu-pantry@andrew.cmu.edu
412-268-8704 (SLICE office)

Academic Integrity

Academic Integrity is a core CMU value, and as a member of the CMU community, it is important that the work you turn in for this class is wholly your own. All content produced for this class must be **original to the submitter(s)**, unless noted. Any sources of information should be cited correctly. Any material taken directly from a source, including figures, must be clearly quoted and attributed. Plagiarism is a very serious offense and will be treated according to university policy. If you have any questions about whether something is allowable, please contact the instructor. For more details, see CMU's academic integrity policy:

<https://www.cmu.edu/policies/student-and-student-life/academic-integrity.html>