

CSCI 4971/6968: Algorithmic Robotics

Textbook: Peter Corke, *Robotics, Vision, and Control*, 2nd Ed., Springer, 2017.

Course Description

This course will cover the basics of mobile robotics in a hands-on format using the platforms and materials develop in [MIT's Duckietown project](#). Students will purchase and assemble their own Duckiebots (about \$200 each), and then use them throughout the course to test theories and algorithms studied. The topics include: pose representation, trajectory generation, ROS (Robot Operating System), motion control, obstacle avoidance, the “bug” algorithms, simultaneous localization and mapping (SLAM), and motion planning.

Style of Class

There will be about two hours of lecture per week. The goals are to provide understanding of fundamental algorithmic and mathematical concepts pertinent to robots, especially mobile robots. The lab assignments are expected to take about four hours per week.

Lab Assignments

There will be ten lab assignments over the first ten weeks of the semester, which will be designed to cover the most important basic of perception and control of mobile robots. The lab over the last five weeks of the semester will be a “term” project designed by the student with input from the instructor.

Exams

There will be two exams, scheduled for weeks six and twelve of the semester. They will cover fundamental material from the lectures and some aspects of implementation of algorithms needed for the lab assignments.

There will be no make-up exams unless the absence is officially excused by the Office of the Student Experience.

Homework

There will be short homework assignments to reinforce understanding of basic concepts from lectures that are likely to show up on the exams. Homework will not be graded in detail, but solutions will be made available. Homework grades will be reflective of effort.

Grading

- 60% - Lab Assignments (4% for each weekly lab, 20% for final lab)
- 30% - Exams (15% each)
- 10% - Homework
- No Final Exam

The following table will be used to assign grades. Overall grades may be curved, but only to raise grades.

Percentage:	100-93	92-90	89-87	86-83	82-80	79-77	76-73	72-70	69-67	66-60
Grade:	A	A-	B+	B	B-	C+	C	C-	D+	D

Students with Special Needs

Federal law requires all colleges and universities to provide specified types of assistance to students with disabilities. If you have such special assistance, please obtain an authorizing memo from Disability Services for Students by contacting the Dean of Students in the Dean of Students Office (x6266). Information about a student's special needs will be treated as confidential. Please submit a copy of your authorizing memo to your professor well in advance of any affected exam or assignment. Failure to do so may result in a lack of special accommodations.

Academic Integrity

Students are encouraged to discuss problems with other students, but every student must formulate and write up his or her lab and homework assignments independently. You are not allowed to show another student any of your assignments prior to the due dates, because they could copy it and submit it as their own. You are responsible for protecting your own homework from being copied. If multiple students turn in problem solutions that are identical, this is cheating, and all students involved will be held accountable. No collaboration is allowed during exams.

Violation of these policies will be considered a breach of academic integrity. The minimum penalty for any violation is a grade of F and the incident will be reported to the Dean of Students. In addition, the student may be subject to other penalties outlined in "[The Rensselaer Handbook of Student Rights and Responsibilities](#)."