CSCE574 – Robotics
Spring 2014 – Syllabus

Instructor

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Lectures

Tuesdays and Thursdays
1:15–2:30pm
Swearingen 2A22

Office hours

Tuesdays and Thursdays
2:30–3:30pm

You're welcome to stop by at other times, or to make an appointment.

Description

This class covers a variety of planning and reasoning algorithms for robots.

After completing this course, you should be able to:

1. Describe the hardware components of robot systems.

2. Apply algorithms for robotic perception, planning, navigation, localization, and manipulation.

3. Implement and use algorithms for controlling mobile robots.

Prerequisites

CSCE 211 (Digital Logic Design)
CSCE 212 (Introduction to Computer Architecture)
CSCE 240 (Introduction to Software Engineering)

Textbook

There are two required textbooks for the course:

> Howie Choset, Kevin M. Lynch, Seth Hutchinson, George Kantor, Wolfram Burgard, Lydia E. Kavraki, and Sebastian Thrun, *Principles of Robot Motion: Theory, Algorithms and Implementations*, MIT Press, Cambridge MA, 2005.

> Jason M. O'Kane, *A Gentle Introduction to ROS*, independently published, 2013.

> > (Electronic copies freely available from `http://www.cse.sc.edu/~jokane/agitr`)

In addition, this recommended textbook may be helpful:

> Gregory Dudek and Michael Jenkin, *Computational Principles of Mobile Robotics*, Second Edition. Cambridge University Press, New York, NY, 2010.

I think these books are a good investment, and studying them carefully is likely to help you in this course.

Webpage

Information about the course, including scheduling information, assignments, and announcements, will be posted at this site:

> http://www.cse.sc.edu/~jokane/teaching/574

In lieu of class-wide announcement emails, this site provides an RSS feed which is updated for every meaningful change to the course website. If you don't use an RSS reader, you might instead use an RSS-to-email service (ask Google for one) to stay up-to-date.

Course Policies

- Attendance: You are expected to attend and participate in each lecture, and I will make every effort to ensure that class attendance is worth your time. Missed tests due to unexcused absences will result in a score of zero. Note that, in the instructor's experience, lack of class attendance has correlated strongly with poor grades.

  Makeup exams will be allowed only with preapproval of the instructor or with an acceptable, documented reason. Acceptable reasons for makeup exams include severe illness, family emergencies, or other unavoidable events including dangerous weather conditions and car accidents. The format of makeup exams may differ from the format of the original exam.

- Cheating (short version): Don't.

- Cheating (long version): Academic dishonesty undermines the educational mission of the course and reflects disrespect to your classmates and to your instructor. Therefore, you are expected to practice the highest possible standards of academic integrity. The minimum penalty for cheating is a -50% score on the assignment. Additional, more severe penalties may be levied for repeated or egregious violations. This policy includes improper citation of sources, using another student's work, and any other form of academic misrepresentation. Details on the University cheating policy can be found in the section on "Academic Responsibility" in the Carolina Community Handbook.

  In the absence of instructions to the contrary, it *is* permissible to consult Internet resources to complete the assignments in this class, provided that you give adequate citations of every resource you consult. However, it is *not* permissible to copy code or anything else directly from the web. Representing the work of others as your own is *never* permissible. When in doubt, ask first.

- Late assignments: Homework assignments will not be accepted late, because the answers will be discussed in class immediately. Unless the course schedule prevents it, programming assignments will be accepted up to three days late, subject to a 10% penalty for each day or fraction of a day.

- Mobile devices: Please silence any mobile devices before coming to class. If your phone rings in class, I reserve the right to answer it for you and take a message. Likewise, if my phone rings during class time, I will allow a student to answer it.

- Computing platform: You will be expected to write software to control both simulated and real robots. These tasks are most straightforward in the C++ language, and the course will provide some direct instruction on how to do so. You are also welcome to identify and use other appropriate languages if you prefer, provided that using such a language does not trivialize the assignment. However, the instructor cannot provide assistance with this.

- Policy changes: Changes to the syllabus at the instructor's reasonable discretion, including changes to the evaluation and grading mechanisms, are possible but unlikely.

Grading

Your learning in this course will be evaluated based on:

1. *Homework* assignments throughout the semester. These assignments will be similar in format to exam questions, and will account for **15%** of your final grade. Because we will discuss solutions in class immediately, no late homework assignments will be accepted.

2. *Programming assignments* using ROS and the TurtleBot platform. There will be approximately six of these assignments, some of which will be completed individually and others in small groups. Programming assignments will account for **35%** of your final grade.

3. One *in-class test*, accounting for **20%** of your final grade.

4. A *final exam*, covering the entire course, but with greater focus on the second half of the course. The final will account for **30%** of your final grade.

In addition, graduate students will be expected to complete an additional research-related project. This project will be worth **10%** of the final grade. Overall scores for graduate students will be divided by 1.1 to scale the maximum possible score of 110% down to 100%.

The following table gives upper bounds on the thresholds for determining final grades. I reserve the right to adjust these thresholds downward, but promise not to adjust them upward.

A	$\geq 90\%$		C	$\geq 70\%$
B+	$\geq 87\%$		D+	$\geq 67\%$
B	$\geq 80\%$		D	$\geq 60\%$
C+	$\geq 77\%$		F	$< 60\%$

Grades will be posted on the CSE Moodle server (`https://dropbox.cse.sc.edu`). It is your responsibility to verify that grades are correctly recorded on this site.

The goal is to ensure that all of the grading for this course is fair and correct. If you believe there's been a mistake in grading, please bring it to my attention after class or in office hours within one week after the exam or assignment is returned. Regrade requests after one week will be politely declined.

Keep in mind that I am grading your work, not you as a person.

Important Dates

The schedule of topics we will cover is so tentative that it would be pointless to include the details here. The following dates, however, are unlikely to change.

Date	Event
January 17	Last day to add or drop without W
March 3	Last day to drop without WF
March 6	Midterm
May 1, 12:30pm	Final Exam