

## Autonomous Mobile Robots Syllabus

**CS494/529, Fall 2014**  
**Tuesday/Thursday, 11:10 – 12:25 PM, Min Kao 525**

**Class web page:** <http://web.eecs.utk.edu/~leparker/Courses/CS494-529-fall14/>

**Instructor:** Dr. Lynne E. Parker

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*Office Hours:* Tues./Thurs.: 12:30 – 1:00PM (i.e., after class)

(or send email for appointment at another time; or, just stop by when I'm in my office)

**TA:** Ying Qu

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Office Hours: Wednesdays 11:00AM – 1:00 PM (or send email for appointment)

### Course Description:

This course provides an introduction to the fundamentals of mobile robotics, examining the basic principles of locomotion, kinematics, sensing, perception, and cognition that are key to the development of autonomous mobile robots. Emphasis is placed on the software control issues of autonomous mobile robotics. Grading will be based on homework/project assignments and in-class mini-quizzes.

### Required Textbook:

*Autonomous Mobile Robots*, by R. Siegwart, I. Nourbakhsh, and D. Scaramuzza, Second Edition, MIT Press, 2011. (Text website here: <http://mitpress.mit.edu/books/introduction-autonomous-mobile-robots>). Several additional required readings will be distributed in class or posted online that cover detailed material needed for the class.

### Prerequisites:

This course does not assume any prior knowledge of robotics. However, the course does assume a working knowledge of calculus (Math 141/142), discrete math (CS 311), matrix algebra (Math 251), probability (Math 323 or ECE 313, or a Markov Chains course, or equivalent), data structures and algorithms (CS302), systems programming (CS360) and the ability to program.

**Evaluation:** Grading will be based on in-class mini-quizzes and homework/project assignments. Some assignments may count more than others; if this is the case, it will be clearly indicated with the assignment. Mini-quizzes and assignments contribute to your grade as follows:

Mini-quizzes (two quizzes with lowest grades dropped):	15%
Homework/Project Assignments:	85%

Final grades will be determined by overall average as follows:

A: 90 – 100	C+: 75 – 79.9	Decisions on borderline grades will be based upon exceptional class attendance and participation.
B+: 85 – 89.9	C: 70 – 74.9	
B: 80 – 84.9	D: 60 – 69.9	
F: 0 – 59.9		

Since this class includes both undergraduate and graduate students, the assignments will be slightly different, depending on whether you're registered for CS494 or CS529. These differences will be clearly indicated in the assignments. In-class mini-quizzes may include extra questions for those who are registered for CS529. In grading the assignments, the quality of the work expected is higher for those registered for CS529 than for those registered for CS494, and thus will be graded more strictly. The curving of grades will take place on two separate scales – one for CS494 students and the other for CS529 students.

### **Class Policies:**

- Class attendance: Class attendance will be taken. Decisions on borderline grades will be based upon exceptional class attendance and participation, as deemed merited by the course instructor. Of course, if you have a good reason to miss class (e.g., you are sick, or you need to present a paper at a research conference, or you have a job interview, etc.), then it is not a problem. Just let the instructor know as soon as you know you will need to miss class. Please don't come to class if you think you have a contagious illness. We will work with you to help keep you posted on class activities and material covered. In any case, it is your responsibility to catch up (or keep up) with all course material and announcements covered in class.
- Homework and project assignments: Assignments will be handed out in class and posted on the course web site, along with the due dates. All assignments will be introduced and discussed during class time. They will sometimes involve programming. Some of the assignments may also involve written reports. Some of the assignments will be group projects. If programming is needed, you are allowed to use any high-level programming language, as long as it runs on the platforms specified for the assignment (i.e., usually our departmental Linux-based Hydra machines). When appropriate, as part of the assignment materials you turn in, you will be required to submit instructions for how to run your code, along with all files needed to successfully run your code. *If you do not already have a login account on the EECS Hydra machines, then please request it via [ithelp@utk.edu](mailto:ithelp@utk.edu).*
- Collaboration Policy: Discussing and exchanging ideas is strongly encouraged. You may help each other with your strategy for how to address the assignments. You are expected to note significant collaborations by giving the name of your student collaborators on the assignment material you turn in. However, except if specifically allowed by the instructor, copying from any outside sources (e.g., fellow students, Internet, etc.) on any material to be graded is not permitted, and will be considered cheating. Cheating will be dealt with harshly, and may result in failure of the assignment and/or failure of the class. Each student is responsible for securing his or her work from copying. Each student is expected to abide by UT's policies on Academic Conduct and the Honor Statement. Refer to the University of Tennessee Undergraduate Catalog and the HillTopics Student Handbook for more details.

- Due dates and late assignments:
  - One (1) assignment may be turned in up to 4 days late and still receive full credit. I strongly encourage you to save this late assignment for a personal emergency that might arise during the semester. Don't use it just because you've procrastinated. (Note that the way this works is that exactly one assignment may be late, for up to 4 days. This does not mean that you have 4 late days that can be distributed across multiple assignments. For example, if you turn in one assignment 1.5 days late, then you have used up your late assignment allowance.)
  - All assignments turned in more than 5 minutes after the due date and time will immediately be given a grade of zero, with no exceptions. This policy is to ensure fairness to all class members. If some people are late, then all people expect to be able to turn assignments in late. So the policy is that you only get 1 late assignment (up to 4 days late). Please don't test me on this. I really mean it.

- Exams: No exams will be given. ☺

- In-class mini-quizzes: In-class mini-quizzes will be given at the beginning of random classes. They will not be announced in advance, but will occur frequently – sometimes twice a week, sometimes once a week, although we will also sometimes skip weeks. They are designed to ensure that you keep up with the material. They will be multiple choice and/or short answer questions that cover recent lectures and assigned readings. They will be short – no more than 5-10 minutes per quiz. As long as you pay attention in class and read what you are assigned, you should find them easy.

Two (2) mini-quizzes with your lowest scores will be dropped. These drops account for times when you might have to miss class due to illness, travel, etc. That is, if you miss a quiz because you are not in class, then that quiz grade will be a 0. But, we'll drop the lowest two grades, so it gives you some flexibility when you can't be in class. Plan wisely!

- Grading corrections: Bring any grading correction requests to the instructor within 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.
- Announcement responsibilities: Important announcements, schedule revisions, etc., will be posted to the class email list. You are responsible for information distributed to this email list.
- Schedule and readings: The schedule for each class will be posted on the class web site, along with relevant readings for each topic. You are expected to keep up with the readings as we go, as they will help provide the foundation for the mini-quizzes, and for completing your assignments.