Autonomous Mobile Robots

Syllabus

CS494/594, Fall 2008
Tuesday/Thursday, 5:05 – 6:20 PM, Claxton 206

Class web page: http://www.cs.utk.edu/~parker/Courses/CS594-fall08

Instructor: Prof. Lynne E. Parker
Office: Claxton Complex 220
Email: parker@cs.utk.edu
URL: http://www.cs.utk.edu/~parker
Office Hours: Tuesday and Thursday 4:00 – 5:00 PM and 6:25 – 7:00 PM (or send email for appointment at another time)

TAs (both ¼ time):
Yifan Tang
Office: Claxton Complex 124
Email: ytang@cs.utk.edu
Office Hours: Tuesday and Wednesday 1:00 – 2:00 PM (or send email for appointment at another time)

Yu ("Tony") Zhang
Office: Claxton Complex 125
Email: yzhang51@cs.utk.edu
Office Hours: Monday and Wednesday 10:00 – 11:00 AM (or send email for appointment at another time)

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. Grading will be based on homeworks (which will often include programming in the PlayerStage robot simulator in C or C++), 3 exams, and (for the graduate students) a final project (i.e., program plus short written report).

Required Textbook:
Autonomous Mobile Robots, by Siegwart and Nourbakhsh, MIT Press, 2004. In addition, several required readings will be distributed in class that cover detailed material beyond the textbook.

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 Prof. Thomason's 494/594 Markov Chains course, or equivalent), data structures and algorithms (CS302), and the ability to program in C or C++ in a Linux environment.

Evaluation: Grading will be based on homeworks, exams, and (for graduate students only) a final project, as follows:

For undergraduate students: For graduate students:

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<td>Homeworks</td>
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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
Students taking the class for undergraduate credit will be assigned the same homeworks as those taking the class for graduate credit. The exams will also be the same, except that there will be extra question(s) for graduate students. In grading the homeworks and exams, the quality of the work expected is higher for graduate students than for undergraduates, and thus the graduate student work will be graded more strictly. The curving of grades will take place on two separate scales – one for graduate students and the other for undergraduate 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. You are expected to keep up with all course material and announcements covered in class. If you miss class, you must obtain the covered material from a willing classmate. Neither the instructor nor the TAs will be available (during office hours or other times) to repeat material covered in class.

- **Homework assignments:** Homework assignments will be handed out in class and posted on the course web site, along with the due dates. All homeworks will be introduced and discussed during class time. Homeworks will usually involve programming. For our ease in grading, you are required to use either C++ or C to program your homeworks. The software you turn in should run on our departmental Linux machines. As part of the homework 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.

- **Final Project (for GRADUATE STUDENTS ONLY):** The purpose of the final project is to enable you to explore your own ideas for the development of software for autonomous mobile robots. This project will involve new software development, a 3-5 page final project report (in the specified IEEE conference format to be discussed in class), and a brief (~7 min) presentation of your project in class during one of the last 2 class meetings. Later in the semester, more specific instructions on this final project will be given.

- **Collaboration Policy:** Discussing and exchanging ideas is encouraged. You may help each other with your strategy for how to solve the homeworks (or final project). You are expected to note significant collaborations by giving the name of your student collaborators on the homework 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/exam 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 homeworks:**
  - One (1) homework may be turned in up to 4 days late and still receive full credit. I strongly encourage you to save this late homework for a personal emergency that might arise during the semester. Don’t use it just because you’ve procrastinated.
  - All homeworks turned in more than 5 minutes after the due date and time (according to the email time stamp) will immediately be given a grade of zero, with no exceptions. Please don’t test me on this. I really mean it.

- **Exams:** All exams (including the final exam) will be in-class, closed book exams. The final exam will be comprehensive, covering material from the entire course.

- **Grading corrections:** Bring any homework or exam 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 completing your homeworks.