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CEG 499-01: WWW Autonomous Robotics

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CEG 499: WWW Autonomous Robotics
Department of Computer Science and Engineering
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Brief Description

WWW Autonomous Robotics is a computer engineering practicum offered entirely via the Internet. The course adopts a low threshold, no ceiling philosophy. This means that the course is designed to be inclusive of students with limited formal training while still providing significant challenges for those with greater preparation and/or motivation. Students will be required to create control programs for a mobile autonomous robot. In each course unit, the problems posed will become increasingly more challenging. Coaching, advise, and instruction are done online via chat interfaces. Student code is tested first in a simulator that we provide and then on a real robot whose activity can be monitored remotely via a web cam.

Instructors

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Textbook

Mobile and Autonomous Robotics: A WWW Introduction to Robot Controller Design by Duane S. Bolick, Jr., Richard F. Drushel, and John C. Gallagher.

Note: This book is in draft stage. Copies will be distributed to registered students at the beginning of the course.

Detailed Course Description

WWW Autonomous Robotics is guided project-based course. There are no tests and no structured classroom interaction. Rather, students will be judged based on their performances in completing a series of increasingly difficult projects. The instructors will provide the tools, technical knowledge, and equipment needed to complete each project. Students will be required to manage their own efforts and make appropriate use of provided resources to complete their projects in a timely manner. They will also be required to engage fellow students in discussions about the techniques they applied on a class discussion list. Specifically, students will be evaluated and graded as follows: Every student will be required to keep a journal recording his/her

activities and personal impressions of each project. Students will be expected to submit weekly journal updates. The instructors may pose edited journal entries to the class WWW page. Details can be found below. Every student will be required to answer a series of discussion questions each week. Discussions will occur via a class message board. Details on how to access the board will be provided during the first week of the course. The evaluation standards for both the journals and for class participation will be discussed in later sections of this document.

Meeting Times

This is an asynchronous course. This means that there are neither formalized lectures nor set meeting times. All interactions among students, between students and staff, and with equipment will occur using Internet tools at times selected by the students themselves. The instructor and staff will publish a schedule of times they are guaranteed to be on line and ready to assist students. They will be available at other times by appointment and as their schedules permit.

Grades

You will have an opportunity to earn up to 100 points for various activities relating to your project. Letter grades will be assigned based on the following scale:

A	90 points and up
B	89 - 80 points
C	79 - 70 points
D	69 - 60 points
F	59 points and below

Points are earned in two categories. Those categories, and the maximum number of points earnable in each, are:

Journal	60 points
Class Discussions	40 points

Journal

Points in this category are awarded based on assessments of the quality of your class journal. The purpose of the journal is to be an archival record of your personal progress, contributions, and impressions. It is expected that all design decisions and their implications, including test results of both good and bad solutions. What you should be shooting for is a document that both you and the instructor can use to determine "what you were doing and thinking" at particular points in the class.

Student journals are "private documents". They should be shared only with class staff. They should NOT be published on a WWW page or otherwise distributed to fellow students. The instructor, however, may post portions of some journals as examples of exemplary work or

interesting design ideas. Such postings will be done only with the explicit consent of the journal's author.

Since the journal is largely a personal document, its format and specific content are up to you. All journals, however, must meet the following minimal standards:

1. Submitted journal entries must be in Adode Acrobat PDF or Adobe Postscript format. You may produce and maintain your journal using any tools you like. However, you may submit only pdf or postscript files. Refer to the manuals for your document preparation tools for guidance on producing PDF files. If you still have difficulties, feel free to consult with the instructors.

2. Journals must be neat. Sketches and drawings do not have to be publication quality, but they must be legible.

3. One substantive, dated entry must be made per work session. You should have a minimum of two, four-hour work sessions each week. Additional entries and work sessions are encouraged. No detail is too small for inclusion into your journal.

4. Design ideas should be recorded as they occur to you. Attaching code listings and screen dumps relating to the design idea is encouraged. Screen dumps and narrative descriptions of test procedures and test results are also encouraged.

5. Results of testing and subsequent revisions of ideas should be recorded.

6. Design ideas, code, or techniques you received from some other person or source other than your own imagination should be properly referenced. The ethical standards of the university, as well as basic respect and courtesy, require nothing less that complete disclosure of sources.

Sketchy, infrequently utilized, sloppy, poorly written journals will have an adverse effect upon your final grade. Journals are subject to informal spot-inspection at any time by the instructor to insure that they are being kept regularly and with appropriate format and content. The instructors will make informal evaluations of each journal once every two weeks. Two formal evaluations will occur at the middle and end of the quarter. Each formal evaluation will be worth 30 points, together they are worth 60 points toward your final grade in the course. The evaluations will follow these guidelines:

Regularity (5 points)	The fraction of weeks in the quarter for which there is a substantive journal entry times 5.
Neatness (5 points)	The instructors' evaluation of the journal's clarity, legibility, and organization
Design Ideas (10 points)	The instructors' evaluation of the quality of code, algorithm descriptions, and any other figures relating to design ideas.
Design Testing and Critical Review (10 points)	The instructors' evaluation of how well you ensured the merit of your ideas. Did you test? How? Why should anyone believe your ideas are workable? Are your ideas safe? You are ethically responsible to protect the users of your product from harm. Have you?

Class Discussions

Over the course of the quarter, there will be four guided discussions. Each discussion will center around a short list of discussion questions to be distributed via email to all students. Live discussions will occur online at a times agreed upon by all students and staff. Participation in each discussion is worth up to ten points per discussion for a maximum of 40 points. A student's participation in a discussion will be evaluated as follows:

Opening Round (6 points)	The discussion will open with each student giving his/her pre-prepared reactions too each question. Students are encouraged to pre-send comments to all students and staff via email. Setting up personal WWW pages to which discussion participants can refer is also encouraged, but not required. Student will be graded on the quality of their responses and the strength of their arguments.
Interaction (4 points)	The instructors' evaluation of how well a student participates in ongoing commentary and discussion of issues raised in the opening round.

Academic Integrity

Intentionally damaging, disabling, tampering with, or maliciously attempting to interfere with the robot or server machines supporting this class will result in a grade of F as well as the invocation of all applicable legal and university disciplinary actions. Attempting to access or destroy other students' files and documents will incur the same penalties. There will be no second chances or other forgiveness for such infractions.

We wish to foster a collegial atmosphere and encourage students to assist each other as much as they can. However, individual students are responsible for completing their own work. If the instructor determines that a student misrepresents work done by another as his/her own, that student will be assigned a class grade of F. The evidence of infractions will also be submitted to the appropriate college or university officials for further disciplinary action. As with attempts to damage or steal resources -- there will be no second chances or forgiveness for plagiarism.

We recognize that the line between "collaboration" and "plagiarism" can be hazy for some students -- especially in a course were the instructors are encouraging students to work together. We therefore offer the following guidelines to assist students in not crossing the line:

1. Qualitative discussions of algorithms, techniques, and methods is encouraged. Sharing of actual executable code is disallowed and prohibited.

2. Reference to outside sources such as textbooks, WWW pages, and research papers is encouraged. Representing ideas gained from those sources as one's own is disallowed and prohibited. If you find an interesting idea or algorithm in the literature, tell us from where it

came. It demonstrates both that you are becomming aware of the larger research community and that you act ethically with respect to intellectual property.

3. Collaborative debugging, either using the collaboration features of the simulator or the online robot is encouraged. Giving code to another student and asking them to "fix it" is not. Other students can serve as a fresh pair of eyes to observe and interpret robot behavior (or lack of it). They can suggest tests to be done to exercise the robot or eliminate specific candidate bugs. They may not check and/or rewrite code that is not their own.