CSCI-4530/6530: Introduction to Robotics
(Fall, 2013: 9:30 Tu/Th, 9:05 M, Prerequisite: POD)

Description (Theme: Mechanics and Behavior)
This course provides an introduction to robotics with a focus on autonomous mobile robots. The two major issues we will deal with are: (1) cognitive behavior, and (2) motion. Cognitive behavior addresses problem solving using sensory inputs and desired goals. Motion deals with various aspects of movement from simple robotic arm movement to autonomous rovers in unknown environments.

Instructor: Don Potter
Office: GSRC-113 (enter through 111), Phone: 542-0361, Email: potter@uga.edu
Hours: By Appointment, Drop In, or __(hours to be determined)__
Notes: Be sure to leave a note/voice-mail/email if I'm not in. If you stop by and the door to 111 is locked, it is possible that I am in the office. Ring the doorbell and wait several seconds.

Text (required):
1) *The Robotics Primer*, by Maja Mataric, MIT Press, 2007.
2) *Introduction to Autonomous Mobile Robots*, by Siegwart & Nourbakhsh, MIT Press, 2nd Edition
3) *Microelectronics and Robotics Laboratory Safety Guidelines* (on my web site)

References:
1) *Robotic Explorations: A Hands-On Introduction to Engineering*, by Martin
      *** Each team will want at least one copy of this book. ***
2) *Mobile Robots: A Practical Introduction*, by Nehmzow
3) *Exploring Robotics with the IntelliBrain-Bot*, RidgeSoft
4) *Robotics*, Appin Knowledge Series (pretty good supplement)
5) Current literature, texts, and plus items on reserve in the Science Library
6) BrainStem (GP/Moto) Specs (www.acroname.com)

Bots (available):
LEGO MindStorms – Robotics Invention Systems (1.5 & 2.0)
Parallax Basic Stamp BoeBots and PPRK (PalmBots & iPAQBots)
ROYO-Bots, Lynxmotion Walkers, ER-1 Bots, IntelliBrains, and BotBall Bots

Grading:

Assignments	45%	Lab & research reports
Participation	15%	Group projects & discussion
Midterm Exam	15%	around Oct 3rd
Final Exam	25%	Thursday Dec 6th: 8am (tentative)

Policies:
- All academic work must meet the standards contained in "A Culture of Honesty." Students are responsible for informing themselves about those standards before performing any

academic work. Be sure you are familiar with the departmental policy as well (see attached or visit: http://www.cs.uga.edu/~potter/ArtIntell/AcademicHonesty.htm.

- No make-up exams are given.
- Attendance is required.

NOTE: The course syllabus is a general plan for the course; deviations announced in class by the instructor may be necessary.

COURSE OBJECTIVES / EXPECTED LEARNING OUTCOMES

Students completing *Introduction to Robotics* will have been exposed to a number of lecture topics as well as many practical topics. Lecture topics include introduction to robotics, cybernetics, history of robotics, robotics in fact and fiction, sensors, control, intelligent behavior, autonomous robot architectures, robot reasoning, knowledge representation, and planning. Practical topics include robot construction, wiring diagrams, motors, gears, principles of motion, feedback, microprocessors, sensors, and programming for intelligent behavior. The course will consist of lectures and lab-style activities. Students will be graded on the standard A to F grading scale, and will provide end of course evaluations on the instruction and course content following established Computer Science Department course evaluation procedures.

TOPICAL OUTLINE

(Each major topic item is covered at the approximate rate indicated. However, due to the dynamic nature of the in-class activities, it is very likely that there will be substantial variation from this schedule.)

Week1:   Introduction and History of Robotics
                        Cybernetics
                        Artificial Intelligence
                        Robotics
Week 3:   Robot Control Architectures
                        Reactive & Deliberative
                        Subsumption
                        Schema-Based
                        The Feedback Control Loop
Week 5:   What Can We Learn From Animal Behavior?
                        Insects
                        Mammals
Week 6:   What Are Robotic Behaviors?
                        Reaction
                        Action
                        Navigation
                        Stimulus-Response
Week 8:   Construction Architectures
                        Basic Electronics
                        Motors and Gears
                        Sensors
                        Construction Rules and Techniques

Mobile Architecture
                        Reasoning Architecture
Week 12:   Intelligent Behavior
                        Decision Making On The Move
                        Self-Survival
                        Achieving Goals
                        Adaptation
Week 16:   Robot Applications
                        Search and Rescue
                        Surveillance
                        Manufacturing
                        Health Care
                        Automotive
Week 17:   Advanced Topics
                        Learning New Behaviors
                        Cooperation
                        Distributed Reasoning

Computer Science Departmental Policy Statement: Academic Honesty

The Computer Science Department recognizes honesty and integrity as necessary to the academic function of the University. Therefore all students are reminded that the CS faculty requires compliance with the conduct regulations found in the University of Georgia Student Handbook. Academic honesty means that any work you submit is your own work.

Common forms of academic dishonesty against which students should guard are:

1. Copying from another student's test paper or laboratory report, or allowing another student to copy from you;
2. Fabricating data (computer, statistical) for an assignment;
3. Helping another student to write a laboratory report or computer software code that the student will present as his own work, or accepting such help and presenting the work as your own;
4. Turning in material from a public source such as a book or the Internet as your own work.

Three steps to help prevent academic dishonesty are:

1. Familiarize yourself with the regulations.
2. If you have any doubt about what constitutes academic dishonesty, ask your instructor or a staff member at the Office of Judicial Programs.
3. Refuse to assist students who want to cheat.

All faculty, staff and students are encouraged to report all suspected cases of academic dishonesty. All cases of suspected academic dishonesty (cheating) will be referred to the Office of Judicial Programs. Penalties imposed by the Office of Judicial Programs may include a failing grade in the course and a notation on the student's transcript. Repeated violations are punishable by expulsion from the University. For further information please refer to the UGA Code of Conduct, available at the URL below.

http://conduct.uga.edu/code_of_conduct/codeofconduct.pdf

Revised 8/2006