CSC 126 Introduction to Robotics
Fall 2013 Syllabus

Instructor Information

Dr. Jan Pearce
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M 1:00-2:50 pm & W 3:00-3:50 pm

Email is a good way to reach me, so please feel free to email me if you have questions or would like to schedule a time to meet. Please also feel welcome to drop by in case I happen to be in my office.

Primary Teaching Associate: Cody Ferguson

Course Description : Robots often perform tasks that are too dull, too dirty, or too dangerous for humans. Robots entertain us, clean our houses, mow our lawns, build our cars, fight our wars, perform surgery on our bodies, dive to the bottoms of the deepest oceans on our planet, and visit distant planets in our galaxy. This course introduces the fundamental concepts of robotics. Topics include how robots move, sense, and perceive the world around them. Students will construct and program robots in laboratory sessions. No previous computer programming or electronics experience is necessary. *This course is designed to meet the Practical Reasoning (PR) General Education Requirement.*

Prerequisite: Completion or waiver of developmental mathematics or the consent of the instructor is required.

Learning Goals

Students who successfully complete this course will have:

- Gained familiarity with the interdisciplinary field of robotics and its growing impact on society.
- Developed the ability to direct robots using computer languages for communication.
- Become familiar with widely used computer programming constructs including variables, assignment, looping, and conditional statements.
- Gained aptitude in understanding, designing, and evaluating patterns of logic and reasoning expressed as algorithms.
- Learned to practice reflection on topics related to disciplinary content, including ethics.
- Have become more comfortable and effective working in a team setting, particularly in analyzing and communicating logical and computational ideas with others.

Resources:

- This course's web site is linked from http://faculty.berea.edu/pearcej/CSC126/ as well as from the Moodle site: http://moodle2.berea.edu. You can find this syllabus, course readings, homework, labs, and other course-related information, as well as the Moodle site for submissions and additional resources, on the course web site.
- Required text: *The Robotics Primer* by Maja J. Mataric, MIT Press, September 2007, ISBN-10: 0-262-63354-X & ISBN-13: 978-0-262-63354-3
- Other readings will be drawn from: *The Case of the Killer Robot: Stories about the Professional, Ethical, and Societal Dimensions of* Computing by RG Epstein

Technology Policies

Much of the work in this course will require use of the computer, so these policies are designed to help students better understand how to be effective in a technology-rich environment.

- *Laptop and Software*: Each student is required to bring his or her appropriately equipped laptop to class every day except when otherwise announced.
- *Unapproved Technology*: The in-class use of unapproved technology will not be tolerated and in certain cases will constitute a violation of academic honesty. For example, no games are ever acceptable, and communication programs, such as e-mail or instant messaging programs, are only acceptable for class work during class, so must otherwise be disabled before class. Likewise, cellular phones and pagers must be disabled before class. To help students to appreciate the gravity of this policy, each and every in-class use of unapproved technology will result in a 1% reduction of the student's homework assignment grade.
- *Appropriate Collaboration*: Team participation is a proven and useful means by which students can learn material. Much information is easily accessible by searching the web. Students are encouraged to appropriately use information from other students, the web, and other resources. However, any information used from other students or any other resource MUST BE CITED. (See below for more information on this serious topic.)
- *Communication*: On the other hand, electronic communication programs are useful when used appropriately, so each student is required to use the course web page and Moodle course management system to access assignments, and to use a Berea College e-mail account to facilitate electronic communication outside of class.
- *Backups*: All students are expected to back-up their work, which includes assignments, quizzes, and exams, daily. The best way to do this is to store a copy of all work in a cloud service such as Dropbox, SkyDrive, Google Drive, or on a DVD, flash drive, or some other media, and not in another location on their laptop. The normally understanding instructor will not be at all sympathetic to loss of electronic work, so it is the student's responsibility to protect his/her work from such heartbreaking loss.
- *Exceptions*: Exceptions to any of these technology policies will be considered on an individual case-by-case basis, but will only be granted under extremely unusual circumstances.

The Attendance Policy

Class mini-lectures, discussions, and hands-on laboratory work are considered to be a vital key to success in this course. It is the hope of the instructor that class sessions are both informative and useful, therefore attendance is expected at each class session unless a specific exception is made. If you are sick with flu-like symptoms, the Center for Disease Control (CDC) recommends that you stay home for at least 24 hours after your fever is gone, except to get medical care, or for other necessities. Therefore, please do not come to class if you exhibit flu-like symptoms. Instead, e-mail me and go to health services immediately. When you return to class, bring paperwork showing that you sought medical attention that day. Your absence may be excused. Students who come late, leave early, or fail to fully participate during the class will be considered absent for that portion of the period, and such partial absences will accumulate. The final grade may be lowered by one third of a letter grade for each unexcused absence beyond the third. Thus, it is the responsibility of the student to contact me about each absence from class. This should be done via email, as soon as possible, and if at all possible, before the absence occurs. Students who miss class are held responsible for all of the material covered, assigned, and collected during their absence. Quizzes will be announced and/or occasionally "popped." I will drop the lowest quiz grades before computing your overall quiz score, so under nearly any circumstances, make-up quizzes will not be given.

Required Convo

As students, you are expected to attend 7 or more events from the Berea Convocation Series per term. For this course, you are required to attend one specific convocation:

Dr. George Hart: From Mathematics to Sculpture, October 31, 2013, 3:00 p.m. in Phelps-Stokes

An interdisciplinary sculptor/designer, mathematician, computer scientist, and educator, Hart is co-founder of North America's only Museum of Mathematics, where he set the "Math is Cool!" tone of the museum and designed original exhibits and workshop activities which use art-related ways to engage students in thinking mathematically. His research explores innovative ways to use computer technology to design artwork, and his videos reveal the fun and creative sides of mathematics. Co-sponsored with Mathematics and Computer Science.

Grading Policies

For the benefit of the students in the class, all course grade computations are continually updated in Moodle by myself and/or teaching assistants, so students may check frequently on their in-progress course grade during the term. Any questions/concerns regarding grading of any component of the course are to be addressed to the instructor only, never to a teaching assistant.

System of Evaluation *	
Exam 1:	15%
Exam 2:	15%
Quiz total:	15%
Assignments:	15%
Labs and Outreach:	25%
Final Project:	15%

Scale:

A's:	$90\% \le A- < 93 \le A \le 100\%$
B's:	$80\% \le B- < 83 \le B < 87 \le B+ < 90\%$
C's:	$70\% \le C- < 73 \le C < 77 \le C+ < 80\%$
D's:	$60\% \le D- < 63\% \le D < 77 \le D+ < 70\%$
F:	$0\% \le F < 60\%$

Note that the lowest score of the exam and quiz grade items may be dropped, as explained below. *

Please refer to the Grading Scale http://www.berea.edu/cataloghandbook/academics/aps/grades/gradingscale.asp as described in the current Berea College Catalog for the College-wide interpretations of these letter grades.

"Good Student" Drop Bonus

*After having completed all work in the course, students who satisfy all of the following conditions will have their lowest exam score or quiz total dropped before their final grade is computed:

a. They have completed all coursework assignments, labs, outreach, quizzes, and exams.
b. They have not been excessively tardy to or absent from class.
c. They have not had any noted incidents of disruptive behavior.

I reserve the right to raise the grade of students who have demonstrated significant improvement in their performance. This is at my sole discretion, but a student is welcome to bring this possibility to my attention.

Assignment Bonus

Assignments will be assigned for homework on a near-daily basis, since this is the method for learning about the broader applications of robotics. Because the instructor desires to strongly encourage a diligent effort on homework assignments, students who turn in each of their assignments, with no more than two assignments submitted late, will be awarded an additional 5% on the assignment grade!

Exams and Quizzes

Two exams and frequent short reading quizzes will be given in this course. Quiz questions will include questions relating to the reading assignment for that lesson. Students will take these quizzes individually at the start of the class period. After everyone has completed taking the quiz individually, students will take the quiz again in groups, coming to consensus on the answers to each of the questions. Thus, evidence that you have engaged and retained the information you have read will be reflected in your quiz scores. By keeping track of group and individual scores separately, you will have measures of your ability to listen, and to learn from others as well.

The most likely time of the two exams will be:

- Exam 1: Tuesday, October 1
- Exam 2: Tuesday, November 26

Problems that appear on the tests will be more varied in nature, ranging from homework or lab-like problems to problems that require a deeper synthesis of ideas. Items ranging from true or false questions to short-answer questions may also be included.

On Assignment and Lab Collection

Homework assignments and labs are a form of written communication which are intended to help students to address course leaning objectives. Thus, assignments and labs are expected to be well-reasoned and well-organized in order to demonstrate reflection, as well as the ability to communicate ideas clearly.

Homework assignments and labs are due at the beginning of class on the announced date due, and are to be submitted electronically via Moodle. If Moodle is ever down, they may be emailed to me. They should NEVER be printed or delivered to a student assistant. If a student must miss class due to either a sickness or a planned absence, homework is still expected to be submitted on-time. Homework is always posted on the web, and may be requested in advance. Late homework will be accepted for reduced credit up until at least the time when the homework assignment is returned.

On Teamwork, Labs, and Assignments

Learning to work in teams effectively is strongly encouraged. All labs will be specifically designed for teamwork. Most homework assignments will be designed for individual work. Teamwork is designed to be about co-authorship, so each assignment must clearly include all of the authors' names on all submissions. All assignments and labs should be handed in with the author(s) acknowledging all of the help received for each problem. This includes significant help received from myself, or from any Computing and Digital Crafts Lab Consultants. Note that I or a Computing and Digital Crafts Lab Consultant may help with homework or labs, and while this help should not be acknowledged as co-authorship, it should still be mentioned. This is meant to be a sharing process; do not "give credit" to other students who have not attempted to contribute to the work, or to the team's work, because it is ultimately not a help to the student who did not contribute to the work. Thoughtful practice, not (even mindful) copying, is ultimately the best way to learn. Note that on all team-completed homework, students must describe the roles played by each author on the co-authored homework submission.

Warning: Please be careful to conform to these standards for teamwork, since they are designed to encourage good learning practices. (Furthermore, copying another person's work, or otherwise failing to adhere to these standards, may even result in a charge of academic dishonesty.)

The Outreach Projects

Through service outreach experiences, the class will introduce robots to children in our wider community by doing robotic demos. Each student in the course is required to commit in advance and to fully participate in at least one of these. The dates and times for these demos will be announced soon.

The Final Project

There will not be a final examination in this course. Instead, a final project will be due Tuesday, December 10, 2013 by 8 AM, during finals week. Details will be forthcoming.

Plagiarism and Academic Honesty

Plagiarism is the use of anyone else's work or ideas without adequate citation. It is a crime which is both easy to commit, and easy to avoid. Ideas taken from other people include those from published or unpublished books, articles, websites, TAs, or friends' homework. The best way to avoid plagiarism is to cite ALL your sources, including those from which you paraphrase or borrow ideas, and, to be sure, use quotation marks when quoting verbatim. If you are not sure whether or not to cite a source, you should cite it! Simply put, plagiarism is stealing because it constitutes theft of someone else's ideas. It is a serious offense, and Berea College takes it very seriously. Plagiarism will not be tolerated! At the first offense, the student will receive an F for that assignment. At the second offense, the student will fail the course. In addition, ALL offenses of plagiarism will be reported to the Associate Provost for Academic Services as detailed in the Berea College Student Handbook.

The Class Atmosphere

The members of this class constitute a learning community. Learning in such a community best takes place in an atmosphere in which the instructor and students treat everyone with mutual respect. Students need not always raise their hands in order to ask questions or to make comments, but they should not interrupt the instructor or fellow students in doing so. Students typically find the atmosphere sin my classroom to be a sometimes playful and nearly always relaxed one, but students will still need to work hard and consistently both in and out of class in order to do well. If at any time you have thoughts or suggestions about how the class atmosphere could be improved or made into one which is more supportive of your learning, please come by or drop me a note about it. I welcome such suggestions.

Additional Support and Disability Accommodation

The Computing and Digital Crafts Lab is open Sunday through Thursday from 7:00 to 9:00 PM (except on evenings of convocations). Our primary teaching associate, Cody Ferguson, and several other CS TAs will be able to answer questions about the computational content in the course during consultations in their Computing and Digital Crafts Lab hours. Assistance, including making up missed labs is available during my office hours, and in the Computing and Digital Crafts Lab. Topics in this course build throughout the course, so students should be sure to do their best to keep up with the class, so as to not get behind and forever lost. Remember that no question to which you do not know the answer is "dumb," unless it goes unanswered because it remained unasked. Best results are obtained trying to solve problems before asking for help, students should be prepared to show what they have already tried.

Berea College will provide reasonable accommodations for all persons with disabilities so that learning experiences are accessible. If you experience physical or academic barriers based on disability, please see Lisa Ladanyi (Disability & Accessibility Services, 110 Lincoln Hall, 859-985-3327, lisa.ladanyi@berea.edu) to discuss options. Students must provide me with an accommodation letter before any such accommodations can be provided. Accommodations cannot be provided retroactively. Please meet with me in a confidential environment to discuss arrangements for these accommodations.