ECE 455: Course Syllabus (Fall 2019)
TR 5:15-6:30 pm, ENGRG B101

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Textbook: *Modern Robotics: Mechanics, Planning, and Control*, Kevin M. Lynch and Frank C. Park, ISBN 9781107156302

Course Webpage: Class material will be available via Canvas. If you have questions, please contact Ahmad!

Course Description: ECE 455 - Introduction to Robot Programming and Simulation will focus on the fundamentals of simulating articulated objects. Upon successful completion of the course, students shall be able to:

1. Design a three-dimensional world that includes rigid bodies and articulated objects.

2. Specify three-dimensional motion for both rigid bodies and articulated objects.

3. Simulate a three-dimensional world with accurate animation of moving objects.

4. Program robot motion using typical commercial robot programming languages.

5. Control the motion of arbitrary robot manipulators to achieve a desired trajectory for the joints.

Lecture material is supported by recommended readings, homework assignments, computer projects, quizzes, and exams.

Recommended Readings: On the course website, you will find a folder for recommended readings which contains a reading outline, supplementary text, and two PDF articles. It is highly recommended you follow the reading outline as the material presented will compliment lecture material and help increase your understanding of the topic. Although I understand it may not always be possible, you are encouraged to read the material prior to lecture so you can ask questions on material you found confusing and the lecture can be more interactive. In addition, it is recommended you read the exercises at the end of each chapter to give you an idea of the types of problems you should be able to solve if you have fully understood the material.

Assignments: Homework problems will be assigned on Thursday when a different assignment is not due. Each assignment consists of fewer than five problems and will be due the following Thursday. All the problems were chosen to emphasize material presented in class and should be viewed as a learning tool. Please ask questions and make sure you understand all material presented! In addition to homeworks, there will be one take-home quiz and three in-class quizzes. Each in-class quiz should take 10-15 minutes to complete. The take-home quiz is similar to a homework - you may collaborate on general concepts with other students but you are expected to submit work reflecting only your efforts and understanding.

The midterm will be in class and the final will be conducted at the registrar appointed time. You will be informed of the exact midterm time at least one week prior to the exam. As most students often wonder, the final is not technically cumulative. It will primarily focus on material presented after the midterm though material will naturally build on previous concepts.

Computer projects are the last assignment category and are a chance to truly apply concepts covered throughout the semester. Both computer projects will make use of programs you need to write in MATLAB. If you are not familiar with writing scripts in MATLAB, begin looking at online tutorials and work through the *MATLAB Introduction* handout located in the Computer Project Material folder of the course website. More information about each project and the due date will be provided when the project is assigned but general information can be found in the *Project Guidelines* document, also in the Computer Project Material folder.

Grading Policy: Work throughout the course will be divided into five separate categories with percentages as follows:

- Homeworks: 10%

- Quizzes (4): 20%

- Computer Projects (2): 30%

- Midterm: 20%

- Final: 20%

After determining the percentage of points accumulated (score), grades will be assigned in the standard +/- manner where, for example:

- 97%≤score: A+

- 93%≤score<97%: A

- 90%≤score<93%: A-
  $\vdots$

- score<60%: F

Academic Integrity: To quote the National Society of Professional Engineers Code of Ethics, "Engineering has a direct and vital impact on the quality of life for all people. Accordingly, the services provided by engineers require honesty, impartiality, fairness, and equity...Engineers must perform under a standard of professional behavior that requires adherence to the highest principles of ethical conduct." As future engineers, you are held to the same code of conduct.

Homeworks, quizzes, computer projects, and exams will be used to evaluate your performance throughout the course. Homework assignments are intended as tools to help you put lecture material into practice and reasonable collaboration is allowed; however, the work you submit must represent your effort and understanding. Similarly, concepts behind the computer projects can be discussed with classmates but all code implemented must be yours alone. Quizzes and exams will be conducted during class time and are not group activities.

This course will adhere to the CSU Academic Integrity Policy as found in the General Catalog, Section 1.6, as well as the Student Conduct Code. If it is discovered you have submitted work that you do not fully understand or which represents the work of another student, that is justification for failing the assignment, failing the course, and/or facing disciplinary action by the university. At a minimum, violations will result in a grading penalty in this course and a report to the Office of Conflict Resolution and Student Conduct Services.

Special Accommodations: There are no make-ups for quizzes or exams. A penalty of 10% per day is accrued for a late homework assignment. In-class quizzes and the midterm will start promptly at the beginning of class. If you are experiencing difficult situations that are affecting, or could potentially affect, your academic success, please contact **Student Case Management** as soon as possible (www.studentcasemanagement.colostate.edu, E203 Newsom Hall, 970-491-8051). Difficult situations can include issues such as medical, mental health, personal or family crisis, illness, or injury. If students request extensions or considerations due to difficult situations, I typically require documentation from SCM. In addition, I urge students to contact me in advance of deadlines about such issues.

Statement of Inclusivity: I consider this classroom to be a place where you will be treated with respect, and I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class.

Honest Disclaimer: All information about the course (including but not limited to grading policy, exam dates, office hours, and course schedule) may be superseded by information given in class at any time. Regular attendance and active participation in the class is expected. A lot of work has gone in to preparing material for this course and providing you with the tools to succeed but it is ultimately up to you to take advantage of the resources so roll up those sleeves and let's have a great semester!