Syllabus

CAP4662 Introduction to Robotics, 3 credits

-- Fall 2022

Schedule: T and TH 3:30 pm - 4:45 pm
Location: CHE 101A
Instructor: [Yu Sun](mailto:yusun@usf.edu) (yusun@usf.edu)
Instructor Phones: 8139747508 (O), 8133854612(C)
Office: ENB 331
Office Hours: F 9:00am - 12:00pm
Office Hour Location: Microsoft Teams
TA: Tianze Chen (tianzechen@usf.edu)
TA Hours: TBD
TA Office: Microsoft Teams

Description:

An introduction to the fundamentals of robotics. Students will learn the fundamentals of robotics including kinematics, inverse kinematics, Jacobian, velocity, configuration space, motion planning, and path planning algorithms.

Objectives/Goals:

Students will be taught -
1. fundamentals of robotics, such as coordinate systems, kinematics, and robotic manipulators;
2. algorithms for designing robot motion, such as waterfront, RPM, RRT;
3. Motion trajectories
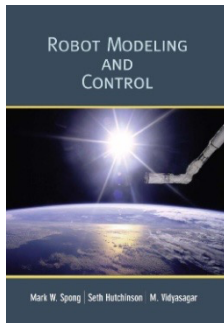4. examples of robotic systems, such as robotic arms and robotic hands.

Pre-Requisites:

COP 4530, EGN 4450

Learning Outcomes:

The students will learn robotics from coordinate system, kinematics, to motion planning. During the learning, the students will apply the new knowledge to a real robot system. At the end, the students will know how to model a robotic system, how to design a robotic system to solve a real world problem, and how to program a robotic system to carry out the required motions. The students will gain end-to-end experience with a real robotic system for designing, programming, and deploying.

Textbooks:

Optional Textbook:

Robot Modeling and Control by Mark M. Spong, Seth
Hutchinso, and M. Vidyasagar
The Version 1 of the book can be found on www.researchgate.net

Assignments

There will be five assignments. They will be assigned to the students every
three weeks. Each student can use a total of 7 late days for all assignments
(not for each assignment). For example, you can use 4 days for HW2 and 3
days for other assignments. Another example, you use all 7 days for HW2 and
have zero no-penalty late days for later assignments.

Grading:

100 pts – Assignments (20 pts each)

Tentative Grading Scale:

The tentative grading scale could be as follows.
86 --   A
70 -- 85 B
60 -- 69 C
0   -- 59 D

USF Standard Policies

http://usf.edu/undergrad/standard-policies.aspx

Departmental Policy:

All students enrolled in courses taught by the Computer Science and Engineering Department are advised that unless an instructor specifies otherwise, all work done in homework, programming, or exams must be the result of a student's individual effort.

The students, who copy, or who provide material for others to copy, or who show dishonesty in their work as described in the university catalog, will be subject to disciplinary action, typically the receipt of a failing grade in the course, but also possible academic dismissal from the program.

Course Policy:

Grade Dissemination:

Graded tests and materials in this course will be returned individually only by request. You can access your scores at any time using "Grades" in Canvas.

It is OK to discuss homework/projects with other students, but outright copying is not acceptable.
· Don't copy anyone else's work.
· Don't let anyone copy your work.
· We will check!
· You will receive FF for the course if you cheat in either the projects or the exam.
· Projects must be submitted on time.
· Late homework/projects will not be graded, get an automatic 0.
· Departmental policy will apply to the projects and the exam.

Attendance policy:

The students should attend the lectures ~~either~~ in person ~~or through provided online meeting room~~. Attendance will be checked regularly.

Communications:

· Canvas (https://my.usf.edu/) will be used for all program submissions.

Be sure you can log in and can find this class under the Courses tab.
Be sure you can find Assignments for this class.

· USF email will be used for any last-minute announcements.

Be sure you can receive messages.
Don't let backlog exceed your quota.

Disabilities, Absences:

Disabilities:

Students with disabilities are responsible for registering with Students with Disabilities Services (SDS) (SVC 1133) in order to receive academic accommodations. SDS encourages students to notify instructors of accommodation needs at least 5 business days prior to needing the accommodation. A letter from SDS must accompany this request.

Religious Observances:

All students have a right to expect that the University will reasonably accommodate their religious observances, practices and beliefs. If you observe religious holidays, you should plan your allowed absences to include those dates.

Athletic Events:
Students who must miss an exam due to participating in a varsity athletic event should contact me two weeks in advance in order to make alternative arrangements.

University Policies:

Standard University Policies

Policies about disability access, religious observances, academic grievances, academic integrity and misconduct, academic continuity, food insecurity, and sexual harassment are governed by a central set of policies that apply to all classes at USF. These may be accessed at:
https://www.usf.edu/provost/faculty/core-syllabus-policy-statements.aspx

Covid-19 Procedures

All students must comply with university policies.

Additional details are available on the University's Core Syllabus Policy Statements page: https://www.usf.edu/provost/faculty/core-syllabus-policy-statements.aspx

Grades of "Incomplete": Offer specifics about your policy on incomplete grades. The current university policy concerning incomplete grades will be followed in this course.
For undergraduate courses: An "I" grade may be awarded to a student only when a small portion of the student's work is incomplete and only when the student is otherwise earning a passing grade. The time limit for removing the "I" is to be set by the instructor of the course. For undergraduate students, this

time limit may not exceed one academic semesters, whether or not the student is in residence, and/or graduation, whichever comes first. For graduate students, this time limit may not exceed one academic semester. "I" grades not removed by the end of the time limit will be changed to "IF" or "IU," whichever is appropriate.

<u>For graduate courses:</u> An Incomplete grade ("I") is exceptional and granted at the instructor's discretion only when students are unable to complete course requirements due to illness or other circumstances beyond their control. The course instructor and student must complete and sign the "I" Grade Contract Form that describes the work to be completed, the date it is due, and the grade the student would earn factoring in a zero for all incomplete assignments. The due date can be negotiated and extended by student/instructor as long as it does not exceed two semesters for undergraduate courses and one semester for graduate courses from the original date grades were due for that course. An "I" grade not cleared within the two semesters for undergraduate courses and one semester for graduate courses (including summer semester) will revert to the grade noted on the contract.

Academic Integrity of Students:

Academic integrity is the foundation of the University of South Florida System's commitment to the academic honesty and personal integrity of its university community. Academic integrity is grounded in certain fundamental values, which include honesty, respect, and fairness. Broadly defined, academic honesty is the completion of all academic endeavors and claims of scholarly knowledge as representative of one's own efforts. The process for faculty reporting of academic misconduct, as well as the student's options for appeal, are outlined in detail in USF System Regulation 3.027: http://www.usf.edu/undergrad/documents/academic-policies/1academic-integrity-of-students.pdf. The final decision on an academic integrity violation and related academic sanction at any USF System institution shall affect and be applied to the academic status of the student throughout the USF System, unless otherwise determined by the independently accredited institution.

Disruption to Academic Process:

Disruptive students in the academic setting hinder the educational process. Disruption of the academic process is defined as the act, words, or general conduct of a student in a classroom or other academic environment which in the reasonable estimation of the instructor: (a) directs attention away from the academic matters at hand, such as noisy distractions, persistent, disrespectful or abusive interruption of lecture, exam, academic discussion, or general University operations, or (b) presents a danger to the health, safety, or well-being of self or other persons.

Student Academic Grievance Procedures:

The purpose of these procedures is to provide all undergraduate and graduate students taking courses within the University of South Florida System an opportunity for objective review of facts and events pertinent to the cause of the academic grievance. An "academic grievance" is a claim that a specific academic decision or action that affects that student's academic record or status has violated published policies and procedures, or has been applied to the grievant in a manner different from that used for other students.

Sexual Misconduct/Sexual Harassment Reporting:

USF is committed to providing an environment free from sex discrimination, including sexual harassment and sexual violence (USF System Policy 0-004). The USF Center for Victim is a confidential resource where you can talk about incidents of sexual harassment and gender-based crimes including sexual assault, stalking, and domestic/relationship violence. This confidential resource can help you without having to report your situation to either the Office of Student Rights and Responsibilities (OSSR) or the Office of Diversity, Inclusion, and Equal Opportunity (DIEO), unless you request that they make a report. Please be aware that in compliance with Title IX and under the USF System Policy, educators must report incidents of sexual harassment and gender-based crimes including sexual assault, stalking, and domestic/relationship violence. If you disclose any of these situations in class, in papers, or to me personally, I am required to report it to OSSR or DIEO for investigation. Contact the USF Center for Victim Advocacy and Violence Prevention: (813) 974-5757.

* Every part of this syllabus is subject to adjustment.