CPE 349: COURSE SYLLABUS Spring 2022

Professor: **Tim Kearns, Ph.D.**
Physical Office: **14-245**
Office Hours: **Office Hours: Tues 2:00 to 3:00, Thurs 2:00 to 3:00, 14-245**
Weds 11-12, Fri 11-12 -- Zoom ID 434 531 8325 https://calpoly.zoom.us
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Prerequisites: CPE/CSC 102 and CPE/CSC 103 or CPE/CSC 202 and CPE/CSC 203; MATH 142; and CSC 248, CSC 348, or MATH 248.- (Programming, data structures and their use, Discrete Math for CSC, basic differential and integral calculus

Textbooks:

- Roughgraden, Algorithms Illuminated Parts 1**,** 2 and 3.
- Levitin, The Design and Analysis of Algorithms (3rd edition.)
- Cormen et al., Introduction to Algorithms, 2009 (3rd edition) Sign in through the portal and go to http://site.ebrary.com/lib/calpoly/detail.action?docID=10397652
- Kleinberg/Tardos, *Algorithm Design*, 2005.

Class Structure

Research in learning and cognitive science indicates that active participation significantly improves learning and retention. Learning takes place when people think hard about how to apply the material they are trying to learn. Thus, this course is structured to encourage active and continuous learning.

This course has been designed around the idea of the **Flipped Classroom.** A flipped classroom uses class time (both lecture and lab) for active learning. Screencasts, the text, and notes provide much of the basic knowledge that you need that is normally given and discussed in lecture. During lecture and lab you will expected to ask questions, work on problems, developing and implementing algorithms.

- You are expected to watch assigned screencasts and readings before class. While preparing for class write down any questions you have and make notes about what you do not understand so that these may be addressed in class or office hours. Some classes will begin with a short quiz to assess your understanding of the material.
- Watching screencasts rather than attending a lecture has advantages and disadvantages.
  - Advantages include: 1. Watching the video at a time and speed you find helpful. 2. Being able to pause the screencast to think, take notes, or take a break. 3. Reviewing material on demand.
  - The main disadvantages are: 1. You are unable to ask questions in real time. 2. You do not hear other students' questions and listen to discussions prompted by other students' questions or comments.
- This approach provides more time for you to work with your peers on problems that extend and illuminate the topics being covered. Also, there is more time to ask questions and get immediate feedback.

The flipped classroom has proven to be improve student learning in many courses. Since working with your peers and interacting with me and the TA's is so important **attendance at lecture and lab is mandatory.** On many days labs or quizzes will be collected in class or lab**. Use of electronic devices during lecture portion of the class is not permitted. It is not only a distraction to the person using the device but is also a distraction to others in the class.**

Course work

This is a challenging course and the best way to learn the material is by solving problems and writing down solutions. On exams and quizzes, the problems given will be very similar to the homework problems, assignments, labs, examples from the text, and problems solved and discussed in class. Working together on homework problems is encouraged; however, **you are responsible for being able to solve all problems on your own.** One of the most effective ways to study is to attempt to solve problems on your own until you can solve it without any help, that is, not asking anyone or referring to notes etc.

The midterm and final will **be in class and the final may have an oral component**. Exams will require solving problems and developing algorithms on demand. Exams require an in-depth understanding of the idea behind the algorithm and writing a correct detailed description of the algorithm. Many students are **overconfident** in their ability to do this. **You need to test yourself before taking the midterm or final.**

GRADING Note: The following grade weightings may change slightly during the term.

Labs and Quizzes	15%
Assignments	20%
Final Project	15%
Midterm	15%
Final Exam	35%

- Midterm: Tentative May 3
- Final: Tuesday June 7 4:10pm –7:00pm

Only a documented emergency or medical issue will justify postponing an exam or a late submissions with no penalty. You must **notify me in advance of the exam or due date of a lab or assignment.** The penalty for late submissions of labs and assignments is **10% per day.**

The final project must be submitted on time. Credit for late final projects (without either early permission from me or a documented medical reason) will not be granted.

Course Goals

The goal of the course is for you to be able to apply algorithm design paradigms, analyze algorithms, and understand their limitations. PolyLearn has a detailed course description. Main Course Learning Outcomes are: Student should be able to

- Be able to implement and use classical algorithms of computer science.
- Understand the meaning and significance of the problem classes P, NP, NP-complete
- Design correct and efficient iterative, divide and conquer, greedy, dynamic programming and iterative improvement algorithms to solve problems.
- Apply these design strategies to solve problems appropriately.
- Prove algorithms are correct, find counterexamples that show a proposed algorithm is incorrect.
- Analyze algorithms performance analytically and express it in terms of Θ, O and Ω notation.

ADMINISTRATIVE POLICIES

Professional Behavior

You are expected to act professionally and respectfully to your colleagues and the instructor. This includes **being on time for class**, not having side conversations, and fully present during class,

Academic Integrity

Collaboration in lab, homework, and assignments is allowed unless otherwise noted. However, the write-ups of labs, assignments, and programs to be submitted **must be individual work**. (You may not submit assignments jointly or cut and paste material.) Quizzes, exams, and some assignments are individual work. Collaboration on quizzes, exams, and designated assignments is not permitted. Any violation of this policy may result in an F in the course and be reported to Academic Affairs. See the campus statement on Academic Dishonesty: Cheating and Plagiarism

Communications

Email and Canvas will frequently be used to communicate important information. **You are responsible for reading emails and announcements.** You are encouraged to use the discussion boards and office hours.

Drop/Withdrawal policy.

You may use CPReg to drop this course any time during the drop add period. Carefully evaluate your schedule and determine if you will remain in the class before the end of the add/drop period. After the drop date, "withdrawing" from the course; this requires a documented "serious and compelling" reason, such as a medical emergency.

Students with special learning needs

If you are having difficulty with some aspect of the course due to any special learning needs you may have, I encourage you to contact me. If you have a disability for which you are or may be requesting an accommodation, you should contact me and the Disability Resource Center, Building 124, Room 119, at (805) 756-1395, as early as possible in the term.

COVID-19 Compliance, Classroom, and Campus Safety

Cal Poly is committed to protecting the health and safety of the campus community. Taking preventative steps, as well as monitoring your health and staying home if you are feeling unwell, will help protect the entire Cal Poly community.

By participating in this course, you agree to abide by all campus safety protocols. Please note that safety protocols may change throughout the quarter. You must follow all protocols as outlined in the most recent campus updates .

Email me as soon as you know you will be unable to complete coursework for a known COVID-19 related issue and include proof of yellow (quarantine) or red (isolation) campus pass status and/or a screenshot of the campus pass for the day of the absence(s).

Face Coverings

While not required, please feel free to wear a mask based on your personal preference, informed by your personal level of risk tolerance. The Center for Disease Control (CDC) offers helpful information on face coverings.