

CS 361 Algorithms and Data Structures

Syllabus – Fall 2019

Course Description

This course is an introduction to the design and analysis of algorithms for fundamental problems that arise in computer science. Students will learn about techniques such as greedy algorithms, divide-and-conquer, and dynamic programming along with more advanced topics (e.g. NP-completeness). Students will also learn how to analyze the complexity of an algorithm using asymptotic analysis, and how to prove the correctness of an algorithm using proof techniques such as induction. In addition to algorithms, this course also covers more advanced data structures – e.g., balanced trees.

Algorithms sits at the intersection of computer science and mathematics. As such, students can expect to spend time reading and examining mathematical proofs as well as writing their own proofs. At the end of this course, students should be able to articulate what the study of algorithms entails as well as design and analyze an appropriately efficient algorithm for a given problem.

Course Details

Instructor: Professor Chambers (alchambers@pugetsound.edu, Thompson 405)

Office Hours: Monday 10:00-11:30, Wednesday 12:00-1:30, Friday 10:00-11:00

Other Availability: You are welcome to stop by if my office door is open. I am not available on Tuesdays and I don't respond to emails at night or on Saturdays.

Course Time and Place: MWF 2:00 - 2:50pm in Thompson 395

Course webpage: <http://mathcs.pugetsound.edu/~alchambers/cs361>

Textbook: Jon Kleinberg, and Eva Tardos. *Algorithm Design*. 1st Edition. (Required)

Course Breakdown

Grading: Grades in the course are based on four components:

50%	Homework Assignments
20%	Midterm
20%	Final
10%	Friday Quizzes

Your work in this course will fall into several major areas:

Readings: Each week will have an accompanying reading assignment taken from the textbook. *It is imperative that you get into the habit of doing the reading!* Many confusions and difficulties can be resolved by simply doing the reading. I recommend that you at least skim the reading before coming to class so you can make effective use of class time. The readings for each week will be posted in advance on the course webpage.

Homework Assignments: There will be 8 homework assignments throughout the semester. Homework assignments will be a mix of problem sets (involving the design and analysis of algorithms) and programming projects. It is assumed that you are proficient at programming in Java. Assignments are posted on the course webpage. See the “Class Policies” section below for the late policy.

Friday Quizzes: There will be regular quizzes during the first 5 minutes of every Friday class. This is a great way for you to gauge your understanding of the material on a regular basis. Friday quizzes cannot be made up but your two lowest scores will be dropped. There will be approximately 10 quizzes throughout the semester.

Exams: There will be a midterm and a final exam in this class. The final exam time can be found on myPugetSound. The midterm is *tentatively* scheduled for the week before Fall break. Details will be given closer to the exam dates.

How can I compute my grade? At any point during the semester, you can estimate your grade as follows. First, compute your average grade for each component of the course. For the homework component of your grade, you would average all of your homework scores together. For the quiz component of your grade, you would average all of your quiz scores together. Your exam grades do not need to be averaged together.

Once you have the average grade for each component, you can then weight them using the breakdown provided above. For example, suppose that:

- You have completed 5 out of 8 homework assignments so far with an average homework grade of 86%
- You have completed 5 out of 10 Friday quizzes so far with an average quiz grade of 100%
- You earned a 90% on the midterm exam

Then your grade is:

$$\frac{(50 \cdot \frac{5}{8}) 86 + (10 \cdot \frac{5}{10}) 100 + (20) 90}{(50 \cdot \frac{5}{8}) 100 + (10 \cdot \frac{5}{10}) 100 + (20) 100} = 88.66\%$$

where the numerator represents your points and the denominator represents the total points possible.

Of the 50% of your grade that comes from the homeworks, only $\frac{5}{8}$ has been completed so far. And of that amount, you earned 86%. Similarly, of the 10% of the grade that comes from quizzes, only $\frac{5}{10}$ have been completed so far. And of that amount, you earned 100%. Of the 20% of the grade that comes from the midterm exam, you earned 90%.

Homework Policies

- Late homework assignments will be penalized by $3^n\%$ for $n \leq 4$ where n is the number of days the assignment is submitted late. The only extensions¹ given are for unexpected medical or family emergencies. In the case of an emergency, I will direct you to talk with the Assistant Dean of Students, Sarah Shives. This preserves your privacy and allows you to coordinate not just with me but with all of your professors.
- Please indicate on each homework assignment with whom you worked.

¹An extension is when a student is allowed to turn in an assignment after the due date with no late penalty assessed.

In-Class Policies

- Laptops and cell phones are not allowed in class. Please leave your phone in your backpack. I have found that students with open laptops and phones are a distraction to themselves and to the students sitting around them. If you have an accommodation in which you require a laptop, please let me know.
- For most class periods, I will use the white board. (Any code will be posted on the course webpage.) You will need a notebook and a pen or pencil to take notes. If you miss class, please ask a fellow student if you can copy their class notes.
- Please prepare yourself to be in class and attentive for the full class period. Students getting up and leaving in the middle of class are a distraction both to the other students who are trying to learn and to me as I endeavor to use this time effectively. In particular, this means you should fill your water bottles and use the restroom before coming to class. If you do need to leave class, you do not need to ask permission – quietly get up and go.
- Although I will not take attendance, attendance is often correlated with a student's grade in the course.

Academic Accommodations

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Peggy Perno, Director of the Office of Student Accessibility and Accommodations, Howarth 105, pperno@pugetsound.edu, 253.879.3395. She will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.

Academic Honesty

I encourage you to discuss the homework problems with your fellow classmates. However, there is a clear difference between working with someone on a homework problem and copying some else's solution. Most instances of academic dishonesty are clear cut and students know when they have violated the rules.

In general, you should never read, copy, or distribute another person's solution or share your own solution. This includes copying from a past student, a current student in the course, or copying from an online source. You should not hand in work done by someone else under your own name. This applies to any code you submit as well. You should never read, copy, or distribute someone else's code, exchange computer files, post/share your own code, or use code from the internet.

Failure to abide by these rules is considered plagiarism. Any instances of plagiarism will be reported to the Registrar's Office and the possible consequences include failure in the course. Please read the University of Puget Sound's Academic Integrity policy (<http://www.pugetsound.edu/student-life/personal-safety/student-handbook/academic-handbook/academic-integrity/>) for further information.