

CS3510 Design and Analysis of Algorithms

Disclaimer

This syllabus is subject to modifications as needed before the drop/add deadline.

Course Information

- **Instructor:** Rose McCarty (rmccarty3@gatech.edu)
- **Course:** CS 3510 Section B (CRN 88385)
- **Term:** Fall 2026
- **Meeting time:** Tuesday and Thursday, 2:00pm to 3.15pm

Course Description

This is a course in the fundamentals of algorithm design and analysis. Algorithms are ubiquitous and govern the modern world through data analysis, search, machine learning, and cryptography. The ability to design correct and efficient algorithms is the key to unlocking their power. The mathematical analysis of algorithms provides the rigorous foundation needed to evaluate and compare different algorithms' performance and scalability to large instances. By the end of this course, you will have a strong foundation in the principles of algorithm design and the ability to analyze their performance.

Course Learning Outcomes

Upon successful completion of this course, you should be able to

- describe the run-time of an algorithm using big-O notation;
- recognize which technique is likely to lead to a fast algorithm for solving a problem;
- apply techniques such as divide and conquer and dynamic programming;
- perform graph algorithms for problems such as shortest paths and minimum spanning tree;
- understand the meaning of P versus NP and prove that a problem is NP-complete.

Additional topics that we may cover include linear programs, approximation, and randomness.

Required Course Materials

The book *Algorithms* by S. Dasgupta, C. Papadimitriou, and U. Vazirani is required, and so is the book *Introduction to Algorithms, third edition* by T. Cormen, C. Leiserson, R. Rivest, and C. Stein.

Grading

Your overall score in the class is formed by your **exam score** (worth 95%) and your **homework score** (worth 5%). There will also be **in-class pop quizzes** worth, in total, 2% bonus on your overall course grade; thus it is possible to earn a maximum of 102% in the course. To get the grades A, B, C, D, you need to earn 90%, 80%, 70%, and 60% in the course, respectively. The overall score in the course will be rounded to the nearest integer. So for instance an 89.5% will be rounded up to an A, while an 89.49% is still a B.

Attendance Policy

Lecture attendance is **expected**. This means that if you miss class, it is solely your responsibility to make up the material on your own. I will update a **course calendar on Canvas** as we go through the course. Each day's material will be updated by the end of the day on which the lecture is given. Typically, this calendar will list 1) the general topic covered and 2) any corresponding reading.

Exams. There are **four in-class exams** plus a **final exam**, each worth 19% of the overall course grade. NO exam is dropped. The final exam is not cumulative; it only consists of material after the fourth exam.

Homework. Most weeks will have a homework assignment. NO late homeworks will be accepted. Homework will be graded on **completion only**; any honest attempt at the problem will receive full credit. **You may request feedback for up to one problem on each homework**; the TAs will then let you know what your score on this problem would have been if it was an exam question. Homework must be turned in on **Grade-scope**. You can find the link on Canvas. Solutions **must be typewritten**; handwritten solutions will not be accepted. LaTeX is recommended, and you can find templates at overleaf.com. You are encouraged to collaborate and work in groups, but you must write your own solutions. Each homework will be worth an equal percentage of the homework grade, even though some may be shorter than others.

AI policy. You can use AI to help with both homework and studying, however you should NOT ask it to directly solve a problem for you. (For instance, you can ask chatGPT to give you an interactive quiz based on the topic list for an exam.) This policy is intended to reflect the growing impact that AI is likely to have on the day-to-day performance of your job once you graduate. However, please note that you will NOT have access to any of this material on the exams! It IS considered cheating to use any outside resource on an exam (besides scratch paper). I *strongly* recommend that you attempt to do the homework without any outside materials first. If you get stuck on a problem, it is more helpful for you to think it through with the aid of your classmates and the TAs than to just ask AI to solve the question.

Missed exam policy. If you miss an exam for an officially excused reason (such as sickness or presenting research at a conference – please note things like a planned vacation or a missed alarm are not excused), you must get a letter from the [Office of the Dean of Students](#) as soon as possible. You also need to email me to confirm that I received the letter and have scheduled you for a make-up exam. I will only schedule a make-up exam if I have received the letter in a timely fashion. **The make-up exam will be during the final period.** The final exam is roughly 75 minutes long, and so is each make-up exam, so there is time for both during the final period.

Regrade requests. Regrade requests must be submitted within **1 week** from when the grade was returned. Regrade requests must be submitted on **Gradescope** and must **include a justification**. Regrade

requests will not be considered on the basis of a grader not understanding your solution. It is your responsibility to make your answers clear for the graders to understand. We reserve the right to lower your grade on any problem for which a regrade request is submitted.

Academic Honesty/Integrity Statement

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review the [Student Code of Conduct](#) and the [Academic Honor Code](#). Any student suspected of cheating or plagiarizing on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations. Allegations of scientific or scholarly misconduct are handled in accordance with the procedures outlined by the [Policy for Responding to Allegations of Scientific or Other Scholarly Misconduct](#).

Core IMPACTS

Not applicable.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, [contact the Office of Disability Services](#) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter.

Student-Faculty Expectations

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgment, and responsibility between faculty members and the student body. [The Student-Faculty Expectations](#) articulates some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.