

Algorithms Honors Syllabus (Tentative)

The syllabus may change until the end of the first week of class.

Course Prefix and Number: CS 3511

Course Name: Algorithms Honors

Instructor: van den Brand, Jan

Semester: Fall 2026

Instructor Information

Instructor: van den Brand, Jan

Email: vdbrand at gatech edu Please always ask your questions on the Piazza discussion board rather than by email. (You can make private posts if needed.)

General Course Information

Description

Basic techniques of design and analysis of efficient algorithms for standard computational problems.

- O-notation
- Divide&Conquer
- FFT Applications
- Graph Search (BFS, DFS, Prim, Dijkstra, A*)
- Dynamic Programming
- Fine-grained complexity
- P/NP complexity
- Matching, Flow, Min-Cut
- Linear Programming

Comparison to CS 3510

This course (CS 3511) is the Honors version of the regular undergrad algorithms course (CS 3510). The pace in CS 3511 is higher and successful participation will require more work/practice at home than CS 3510. This allows us to cover additional more advanced topics: FFT, A*, fine-grained complexity, matching/flow/min-cut, linear programs. CS 3510 typically covers only a subset of these topics.

Please be aware that, since we have fewer midterms than CS3510, each midterm will count more towards your final grade.

Course Learning Outcomes

1. Analyze Algorithm Efficiency and Correctness

Students learn to:

- Evaluate time complexity using asymptotic analysis (Big-O, recurrences).
- Prove correctness and efficiency of algorithms.

2. Formulate and Solve Computational Problems

Throughout the course, students practice:

- Modeling computational problems in terms of well-known algorithmic frameworks.
- Designing pseudocode-level solutions adhering to correctness and complexity constraints.

3. Reason About Complexity and Hardness

Students should be able to:

- Identify NP-complete problems
- Use reductions to show hardness
- Understand limits of efficient computation

4. Communicate Algorithmic Ideas Clearly

The course emphasizes:

- Writing formal arguments (proofs, correctness, complexity)
- Producing clear pseudocode or structured algorithmic solutions

Required Course Materials

There are no required books.

Grading Policy:

Final grade is the average of

- 1/3 - Exam 1
- 1/3 - Exam 2

- 1/3 - Exam 3
- There is an optional fourth/final exam that you can use to replace one of the midterm exams.
- Up to +5% extra credit for submitting weekly practice problems.
- Up to +2% extra credit for random pop quizzes.

Grade thresholds are A - 90%, B - 80%, C - 70%, D - 60%. The thresholds may change in the future, but they can only change in your favor.

Description of Graded Components

- Weekly practice problems are submitted via Gradescope. These are not graded. As long as an honest attempt was made at solving, you will get credit for the submission.
- Each exam (including the optional final exam) is 1h in length. Exams 1-3 take place during the usual lecture time and in the usual lecture hall (dates: Mon 9/14, Mon 10/19, Wed 11/18). The day/time for the final exam is listed in [Georgia Tech's Final Exam Matrix](#).
- The final exam topics are a selection from all covered topics.

Course Policies

Attendance and/or Participation

- Exams are in-person.
- Class attendance is expected.
 - Not attending class means missing out on the quiz extra credit.
 - Students are fully responsible for taking or obtaining notes and ensuring they are aware of all material covered in class.

Collaboration, Group Work, and Use of Generative AI

- You are encouraged to collaborate and work in groups on the practice problems, but you must write your own solutions.
- You may look up reference material online and in textbooks to help with your homework but you may not copy, or paraphrase answers to practice questions.
- You can use AI like ChatGPT as a “personal TA”, e.g., ask it how to approach a problem or ask it to explain a concept from class. However, you must not ask it for solutions to the practice problems. AI generated submissions will be considered cheating.

The policy would be violated, for example, if you were copying a solution you found on the internet/AI/another student, or just paraphrasing it/shuffling words around.

It is easy to not violate this policy: Take your own notes when working in a group, when reading relevant material, or discussing things with a TA. Later you write a solution based on your own understanding.

The main purpose of the practice problems is for you to learn the material. If you explain to another student your idea for solving some problem, then you both improve your understanding. That's great! But if they just copy your text, then they don't learn anything. We don't want that.

Extensions, Late Assignments, & Re-Scheduled/Missed Exams

- Late submissions of practice problems will not be accepted.
- The lowest of the four exam grades is dropped. So the final exam is effectively a make-up exam. If additional make-up is needed, contact me with a Dean of Student note.

Academic Integrity

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 [Georgia Tech's Honor Code](#) and the student [Code of Conduct](#).

Any student suspected of cheating or plagiarism 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.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, [contact the Office of Disability Services](#) (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter.

Student-Faculty Expectations Agreement

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. [The Student-Faculty Expectations](#) articulate 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.

Campus Resources for Students

Undergraduate Student Academic Success Resources:

Academic Support: Academic Success and Advising (a unit in the Office of Undergraduate Education & Student Success) provides free support for your courses. Students can attend scheduled supplemental review (PLUS) sessions, stop by Drop-In Tutoring, or schedule a one-on-one appointment through Knack. To explore what options work best for you, please visit us online at success.gatech.edu/tutoring, email us at tutoring@gatech.edu, or come see us at Clough Undergraduate Learning Commons, Suite 283.

Student Well-Being:

At Georgia Tech, we are concerned about your overall physical, social, and mental well-being. A [comprehensive list](#) of wellness related resources has been compiled and maintained by the Office of the Vice President for Student Engagement and Well-being ([student-resource-guide \(gatech.edu\)](#))