Syllabus: CS 200 Algorithm Analysis - Spring 2023

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| **Class Time:** | MWF 12 – 12:50 pm (Section 1) & MWF 1-1:50 pm (Section 2) in Taylor 200 |
| **Website:** | <http://csweb.wooster.edu/hguarnera/cs200/> |
| **Professor:** | Heather Guarnera (hguarnera@wooster.edu) |
| **Office:** | Taylor 303 |
| **Office Hours:** | [Book an appointment](https://outlook.office365.com/owa/calendar/ProfHGuarnera%40live.wooster.edu/bookings/) |



**Textbook:**Introduction to Algorithms, 4th Edition, by Thomas Cormen, Charles Leiserson, Ronald Rivest, and Clifford Stein (ISBN-13: 978-0262033848). *Unlimited digital copies are available for free on OhioLink; see course website for details.*

**Course Description:** This course covers standard and advanced algorithms for problem solving in computer science. Brute force, recursion, greedy strategies and dynamic programming techniques are applied to real world problems. Time-space analysis is performed for various algorithm and data structure pairings. The limitations of algorithms are also studied in the context of NP-completeness.

We will discuss techniques for proof of correctness and asymptotic analysis of algorithm time and space complexity. We will apply different algorithm design techniques to derive algorithms for a variety of commonly encountered problems in computer science. For the final project, you will have the opportunity to do a deep exploration of a computer science problem of your own choosing.

**Prerequisites:** [MATH 110, MATH 120, MATH 130] and [CS 230 or CS120+W]. Offered annually in spring.

**Grading:** Your final grade will be calculated as follows.

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| 10% | *Attendance and Quizzes*. At the beginning of class session, I’ll pose a question to the class using plickers. Each class session will be worth one point, plus one point for each question that has an answer I expect you to know based on the reading for the day. This will serve as an attendance mechanism and as a way to give small quizzes. You will not be able to make up plicker points. If you lose your plicker card or forget to bring it to class, you will not earn any plicker points for that day. If your card is lost, you can come to my office and I’ll print you out another one, but I won’t bring replacement plicker cards to class for you. At the end of the semester, I will drop your lowest 3 plicker scores. As such, every student has 3 times throughout the semester when they can miss class without penalty to their attendance/quizzes grade. If you miss more than 3 classes, you should contact me to discuss how you can move forward in the course. |
| 20% | *Homework*. You are expected to spend 7-11 hours each week outside of class on homework, reviewing, and studying. Implicit in every homework assignment is the reading of the section of the text from which the homework assignment is taken. **You may turn your homework in groups of two or three.** Many students find group work to be an extremely effective way to review concepts and develop a solid understanding of class material. When helping a classmate with a homework problem, explain the problem and help your classmate to understand the concept as best you can. Do not copy others’ work and submit it as your own, and do not allow your work to be copied blindly. This would be considered a violation of the honor code. Only one copy will be submitted to represent the work of the group, but each student should have their own individual copy kept for their studying purposes. Write the name of all participating students at the top of the assignment. All group members must fully understand and collaborate for *each* problem. At the end of the semester, I will drop your single lowest HW score. |
| 45% | *Written Exams.* There will be three written midterm exams.See course schedule on website for tentative times.  |
| 25% | *Research Project.* A semester-long individual research project. There will be several deliverables for this project throughout the semester towards individual work on the project. It will culminate in a final paper, a piece of software, and a presentation. |

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| A | A- | B+ | B | B- | C+ | C | C- | D | F |
| 93% | 90% | 87% | 83% | 80% | 77% | 73% | 70% | 60% | below |

This class uses the standard grading scale:

Note that the main purpose of homework assignments is to give students opportunities to practice what they learn. It is expected that much of your learning will come from practice! I hope that you understand the value of this work, and do not regard it solely as a grading source. With this in mind, the instructor will choose to grade a subset of homework assignments. The remaining subset may be graded partially or based on whether the work was submitted.

**Learning Goals:** The following learning outcomes are expected at the successful completion of the course.

* Communication - Students should be able to effectively communicate their ideas in written, oral and electronic form.The student will be able to:
	1. give effective presentations to a general audience
	2. communicate technical information in written form
* Synthesis and Application - Students should be able to critically apply concepts, theories and practices to the development of creative solutions to complex computing problems.The student will be able to:
	1. explain core concepts in computer science and the contexts within which they are relevant.
	2. identify and clearly describe the nature of a problem to be solved.
	3. decompose a complex problem into simpler problems and apply known solutions to simple problems.
	4. design and evaluate alternative solutions to a problem.
* Software Methods - Students should be able to define, plan, implement and test a significant software project using an appropriate software engineering process.The student will be able to:
	1. analyze implementation correctness and efficiency

**Pass/Fail option.** Students are permitted to elect the equivalent of four courses (in addition to Senior Independent Study) graded S/NC out of 32 courses required for graduation [excluding courses taken S/NC in Spring 2020, Fall 2020, and Spring 2021]. The minimum equivalent grade to earn S in courses graded S/NC is C-. The deadline for electing a Pass-Fail grading option is one week after final grades are posted.

**Course Drop.** The College is temporarily extending the deadline for dropping a course. Students may drop any course without petition by February 20. The minimum enrollment of 3.0 credits remains in effect. Requests to drop enrollment below 3.0 credits will require additional documentation via [Other academic petitions](https://forms.office.com/Pages/ResponsePage.aspx?id=2RfwngV_JUKYOPks_1e3qyGMbTo3DZ5BlJYQew--6eRUODBSRFc2N0RGT0FJMEpCRlNaOEZUWjFJVC4u).

**Attendance:** We work best as a learning community when everyone participates. As such, it is expected that you will attend class at scheduled times and in accordance with health and safety protocols. If you are unable to attend, I encourage you to check the course website and get notes from a classmate to catch up on missed materials. I will communicate to you in a timely manner any changes to this schedule.

 The College of Wooster expects regular class attendance as it is necessary for students to achieve the essential learning objectives of their courses. A student may not miss more than 25% of class meetings through any combination of excused and unexcused absences. If this occurs, the instructor will notify Dean for Curriculum and Academic Engagement and Dean of Students for consultation.

**Technology:** Our class works best when we use our devices to further our learning. I encourage you to only use technology during class time to enable, rather than to distract from, our learning and community building.

In this course, my expectation is that you will not use any artificial intelligence (AI)-powered programs (e.g., ChatGPT or DALL-E) to help you with your assignments. Any use of AI-generated work to outline, write, create, or edit your assignments will be considered an academic integrity violation. These programs may provide inaccurate or biased information, but more importantly, they do not serve your development as a student. In this course you will learn valuable skills from outlining, generating, and editing your own work. If you have any questions about this policy or are not sure if a resource you have found will violate this policy, please ask.

**Communication:** Communication is the key to success. Contact me as soon as possible if you are struggling with material or if a conflict arises. The best way to contact me outside of class by coming to my office hours, or via email. I respond to email between the hours of 8am-4pm on weekdays. You should allow at least 48 hours response time for any communication. I usually respond faster than that, but you should not count on it. Please keep this in mind when contacting me late at night or over the weekend.

**Late Policy:** I will do my best to grade and return assignments to you as soon as I can. Late submissions make timely grading much more difficult. As such, late assignments will be subject to a 25% penalty if it is up to 8 hours late, and a 50% penalty if it is up to 24 hours late. **No late assignments are accepted after 24 hours.**

**Accommodations:** Your success in this class is important to me. We all need accommodations to learn effectively. If there are aspects of this course that prevent you from learning or exclude you, please let me know as soon as possible. You do not need to share specifics, but we can work together to develop strategies to meet both your needs and the requirements of the course, and to identify specific resources that may assist you.

**Names and Pronouns.** All people have the right to be addressed and referred to in accordance with their personal identity. We include pronoun introductions to avoid gender-based assumptions and to ensure that the correct pronoun is used when referring to you. I will do my best to address and refer to all students by the names and pronouns shared in class, regardless of what is listed on the roster, and I support classmates doing so as well.

In this class, we will have the chance to indicate the name that you would like to be called and, if we choose, to identify pronouns with which we would like to be addressed. The name and pronoun(s) that you use may change and, if they do, please let us know you would like us to change how we address you. If you are interested in changing your chosen name and pronoun(s) in the College of Wooster system, you can find additional information [here](https://www.wooster.edu/offices/sgi/resources/name/).

**Other Class Policies & Academic Integrity:** You are expected to know and abide by the rules of the institution as described in The Scot’s Key and the Handbook of Selected College Policies (found [here](https://inside.wooster.edu/academic-affairs/policies/)). Dishonesty in any of your academic work is a serious breach of the Code of Academic Integrity and is grounds for an F in this course. Such violations include turning in another person’s work as your own, sharing code, copying from any source without proper citation, and violating expectations for a group project. You may discuss ideas with your peers. However, sharing your code or accepting code from other students is not allowed under any circumstance.

For this class to be effective, you must be an active learner. You are expected to contribute to each class session. This includes arriving on time, actively working on the in-class activity, asking questions, and answering others' questions. Students that are successful in this course are those who are responsible in their preparation. This means reading the assigned chapters, checking the course website for updates and upcoming deadlines, and completing assignments in a timely manner.

Behavior that is discouraged includes but is not limited to disrespectful interactions such as yelling/cursing, intolerant language, tardiness, and misuse of technology for purposes unrelated to the class. Students who don't abide by my standards of classroom interaction and who engage in behaviors that disrupt and distract in the learning environment will be subject to the procedures laid out in the Scot's Key.

**Conflicts with Academic Responsibilities:** When conflicts arise between academic commitments and complementary programs (including athletic, cultural, educational, and volunteer activities), students, faculty, staff, and administrators all share the responsibility of minimizing and resolving them. The College expects students to give the highest priority to their academic responsibilities. As a student you have the responsibility to inform me of potential conflicts as soon as you are aware of them, and to discuss and work with me to identify alternative ways to fulfill your academic commitments without sacrificing the academic integrity and rigor of the course.

**Title IX:** The College is committed to fostering a campus community based on respect and nonviolence. To this end, we recognize that all Wooster community members are responsible for ensuring that our community is free from discrimination, gender bias, sexual harassment, and sexual assault. In accordance with Title IX, Wooster is legally obligated to investigate incidents of sexual harassment and sexual assault that occur on our campus. Faculty who become aware of an incident of sexual violence, including harassment, rape, sexual assault, relationship violence, or stalking, are required by law to notify Wooster’s Title IX Coordinator. The purpose of this disclosure is to ensure that students are made aware of their reporting options and resources for support. For more information about your rights and reporting options at Wooster, including confidential and anonymous reporting options, please visit [here](http://www.wooster.edu/offices/title-ix/).

**MCS Department:** The College of Wooster is committed to inclusive excellence in undergraduate education, and our department seeks to actively foster a welcoming learning environment in which diversity and individual differences are valued, respected, and celebrated. Diversity comes in many forms, including but not limited to, race, color, national origin, ancestry, sex, gender identity and expression, sexual orientation, socioeconomic status, religion, age, and physical and/or mental abilities. The diversity that students and staff bring to the classroom is an invaluable resource, strength, and benefit to everyone at the College of Wooster. As such, we are vigilant and attentive about issues of diversity, equity, and inclusion in the classroom. Expressions or actions disparaging others are contrary to the mission of the department and will not be tolerated.

**Additional Resources.** Please view the course website for additional links and resources, including information on Moodle, the Academic Resource Center, Library Support, health and safety guidelines, Title IX, and discriminatory or bias-related harassment reporting. The [General College Policies for all Syllabi](https://inside.wooster.edu/academic-affairs/policies/) also apply. This schedule, and the schedule as posted on the course website, is subject to change. If the syllabus or schedule must change at any time this will be communicated to you via Moodle.