

CS 325 Analysis of Algorithms

4 credits

OSU catalog course description including pre-requisites/co-requisites: Recurrence relations, combinatorics, recursive algorithms, proofs of correctness. **Prerequisites:** CS 261 and (MTH 232 or CS225)

Instructor: Julianne Schutfort

Section: 001, MTWR 3:00 – 3:50pm, Kelley 1003

Office: 1103 Kelley Engineering Center **Office Hours:** Posted on Canvas weekly

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Textbook: *Introduction to Algorithms* by Cormen, Leiserson, Rivest, Stein, 3rd Edition.

Canvas: Announcements, office hours, weekly homework assignments, group activities, readings and other course information will be placed on Canvas. For technical assistance see

Course Content:

- Analyzing algorithms for correctness and running time.
- Divide and Conquer and the use of recurrences to analyze recursive algorithms.
- Dynamic Programming
- Linear programming
- Complexity Classes
- Heuristics and Approximation Algorithms

Measureable Student Learning Outcomes:

At the completion of this course, students will be able to:

1. Use O , Ω , Θ and simple recurrences to analyze time complexity of iterative and recursive algorithms.
2. Prove the correctness of algorithms.
3. Implement recursive, iterative and heuristic algorithms.
4. Prove that a problem is NP-complete using reductions.

Course Policies:

Makeup Exams – Makeup exams take a considerable effort to schedule, so they will not be given under normal circumstances. Any requests for makeup exams must occur in the first week of classes to be considered.

Incompletes –I will only consider giving an incomplete grade for emergency cases such as a death in the family, major disease, or child birth, while also having a passing grade. If you have a situation that may prevent you from completing the coursework, let me know as soon as you can.

Grading:

Scores for coursework items will be posted on Canvas as they are graded. Feedback will be provided when available. You will turn in all coursework items through **both** Canvas and TEACH **before 23:59 (TEACH server time, Pacific Time Zone)** on the date they are due (generally Sunday unless otherwise specified), be sure you give yourself an hour or more to submit coursework. To receive a passing grade in this course you must demonstrate at least basic proficiency in each of the following course work item grading categories:

Grade Evaluation: Your course grade will be based on the following:

Homework/Participation -----	20%
Projects/Presentation -----	35%
Midterm Exam -----	20%
Final Exam -----	25%
TOTAL -----	100%

Homework and Discussion Groups:

There are four written homework assignments. Students can discuss the homework questions with each other but must independently write up a solution. Assignments are to be individually submitted in Canvas in **by 11:59pm** on the due date. A subset of the homework problems will be graded. Assignments that are not neatly written up using a word processor/text editor will not be graded.

Students will be randomly placed into Homework Discussion Groups in Canvas of 6-7 students to discuss the homework problems and other discussion questions (not submitted for grading).

Exams:

There are 2 exams for this course,

- The Midterm Exam during Week 4.
- The Final Exam at the end of Week 8.

You will have 110 minutes to complete each of these exams. You will be allowed one 8.5"x11", double-sided, typed-or-handwritten note sheet for each of the Exams.

REMINDER: A passing grade for classes in CS is a C or above. A C- in a CS course is not considered a passing grade toward a CS degree.

Projects:

- Projects **must** be completed in a group of 3 individuals. Project Groups are different than Homework Groups. It is recommended that programs associated with the projects be written in C. However, you may use C++ or Python.
- Form your group within the first week of class and send me an email with your group members by Sunday night (end of week 1). You may elect to enter a pool to be automatically assigned to a group. Students not in a Project Group by Monday of Week 2 will be randomly placed in a group.
- A project is generally scored on the following categories:
 - understanding
 - design
 - implementation

- testing
 - reflection
- Projects are graded on how well they demonstrate understanding of the problem, approach and solve the problem, how well they show that you have tested all possible states of a problem, meet specification, and follow an easy to read, academically acceptable, and consistent style in any code that is submitted
- Programs submitted must compile and run on our servers or they will not be graded, (to help ensure that you have a working program at the end of your assignment, be sure to start with a simple program that you can get to work, then add to it, expanding its capabilities, so that if at some point it stops compiling you might know where an error was introduced)
- Each group will elect 1 member to hand in the project code, documentation, necessary files, and report to TEACH. This is the only TEACH submission that should be made for your group. This member will also make the Canvas group submission (REPORT ONLY).
- Be sure to submit all relevant files (all reports, source files, and files used in IO) for each project with each submission to TEACH, (this includes files provided to you, a program should be able to compile and run from just the files you submit)
- Note: Project groups may be reformed/changed during the term due to students dropping the class, time conflicts among group members and to add a variety of perspectives to the problem solving process. You may be asked to privately evaluate the members in your group.
- Each group will present at least one project to the class.

Grading Policies and Scale:

- 1) Any requests for extensions/special accommodations must be made in advance, in writing (email).
- 2) Homework and Projects will be accepted up to 1 day late for a 10% penalty.
- 3) Any **disagreement in scoring** must be addressed within one week of the work being graded.

Note: Numerical scores will be rounded to the nearest integer

Grade	Average
A	93 or greater
A-	90 - 92
B+	87 - 89
B	83 - 86
B-	80 - 82
C+	77 - 79
C	73 - 76
C-	70 - 72
D+	67 - 69
D	63 - 66
D-	60 - 62
F	less than 60

Students With Disabilities: Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098.

Expectations for Student Conduct:

Academic Integrity: Students in academic studies are expected to demonstrate their own knowledge and capabilities. This means that a student will be graded on the work that is clearly their own work and that additional materials will be excluded from consideration of the grading of that submission. Work that is not created by the student or cited by the student, but still submitted will be considered plagiarized material and may result in a failed submission and may result in administrative action.

- You May openly discuss the presented learning materials and participation category materials at any time with any party as long as they explicitly know that it is for an academic assignment,
- You May openly discuss the demonstration category of coursework and exams category of coursework after grading of the item is complete with any party as long as they explicitly know that it is an academic assignment and that the discussion is accompanied by an explanation of any materials presented,
- You MAY openly discuss the meaning of assignments, general approaches, and strategies with other students in the course; you may do this even before the grading date of the assignment has passed.
- You MAY (and should) use the Internet and other resources to research how to solve a problem, and you should share what you find for others in the course to learn from, but be sure to cite your sources!
- You MAY share source code, but only if it is accompanied by an explanation on how each piece of code works,
- You MUST include a citation in the form of a comment in your source code to indicate the source of any help you received (otherwise you will be claiming that you authored the work, and that is unfair and possibly a misrepresentation of your own direct skills); you should do this even if the source is an instructor or TA. This basically means that a citation will save you from most situations that may get you in trouble with plagiarism, but that I will exclude any work by others from grading consideration,
- You MUST write your own code for your assignments; this means that you should take notes on anything you do with others and use your notes instead of any shared code when working on the assignments at hand. If you cite your sources, then instead of confronting you about possible plagiarism, we will grade you based on the work that you authored.

We want to encourage collaboration and building upon the work of others in an honest way, this means that instead of strictly disallowing working with others (or their work) we will primarily be using your exams as a gauge of your individual work and the other coursework

(labs, assignments, tutorials, and lectures) should be viewed as preparatory material for the exams.

We may use plagiarism-detection software check your code against other code-bases, reduce the likelihood that we will use these tools by citing your sources and recreating the desired behavior by recreating the code you learn from (in the very least it will give you more practice)!

If you are found in violation of any of the above policies, whether you are the giver or the receiver of noncited help, you may be given a zero on the assignment, failed from the course, or receive higher administrative action. The academic dishonesty charge will be documented and sent to your school's dean and the Office of Student Conduct. The first offense may result in a warning; the second offense results in an academic dishonesty charge on your transcript, a disciplinary hearing, and possible expulsion.

Course Evaluation:

OSU Student Evaluation of Teaching – Course evaluation results are extremely important and are used to help me improve this course and the learning experience of future students. Results from the multiple choice questions are tabulated anonymously and go directly to instructors and department heads. Student comments on the open-ended questions are compiled and confidentially forwarded to each instructor, per OSU procedures. The online Student Evaluation of Teaching form will be available toward the end of each term, and you will be sent instructions through ONID. You will login to “Student Online Services” to respond to the online questionnaire. The results on the form are anonymous and are not tabulated until after grades are posted.