

CS 325-002 Analysis of Algorithms

4 credits

CRN 40640 - Winter 2020

OSU catalog course description including pre-requisites/co-requisites: Recurrence relations, combinatorics, recursive algorithms, proofs of correctness. **Prerequisites:** CS 261 and (MTH 231 or CS225)

Instructor: Julianne Schutfort

Office: 1103 Kelley Engineering Center

Office Hours: Posted on Canvas

Meetings: MWF 9 -9:50am in WITH Hall 109

E-mail: schutfoj@engr.oregonstate.edu

Email should be a secondary contact for course questions with the primary contact being Canvas messaging.

TA Info:

Prateek Dasgupta dasguptp@oregonstate.edu

Marjan Adeli adelima@oregonstate.edu

Yichuan Yin yinyic@oregonstate.edu

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

The ebook is available at

<https://ebookcentral.proquest.com/lib/osu/detail.action?docID=3339142>

Algorithms by Jeff Erickson, 1st Edition.

<http://jeffe.cs.illinois.edu/teaching/algorithms/>

Canvas: Announcements, office hours, weekly homework assignments, readings and other course information will be placed on Canvas.

Course Content:

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

Measureable Student Learning Outcomes:

1. Define O , Ω , and θ in a rigorous way
2. Solve simple recurrence relations
3. Implement a recursive algorithm to solve a simple problem
4. Prove the correctness of algorithms using induction
5. Implement a divide-and-conquer algorithm to solve a problem of intermediate difficulty
6. Implement a polynomial-time heuristic algorithm to solve an NP-hard problem
7. Explain how a problem is shown to be NP-complete

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 – In this online program, there will rarely be cases where an incomplete is appropriate. 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 5 @10%	-----	50%
Project	-----	20%
Quizzes 3 @ 10%	-----	30%
TOTAL	-----	100%

Homework:

There are five individual homework assignments. The assignments are a combination of written problems and short programming exercises. Programs must be written in C, C++ or Python and run on flip. For each assignment you will be told which libraries you can use. Students can discuss the homework questions with each other but must independently write up a solution. Assignments are to be individually submitted to Canvas (written answers) and Teach (code) **by 11:59pm** on the date.

Grading Policies:

- 1) Any requests for extensions/special accommodations must be made in advance, in writing and sent to the instructor via Canvas messaging.
- 2) Assignments that are not neatly written up using a word processor/text editor will not be graded.
- 3) A subset of the homework problems will be graded.
- 4) Homework submitted up to 24 hours late will receive a 10% penalty.
- 5) Any **disagreement in scoring** must be addressed within one week of the work being graded. All questions about grading must be placed in the "Assignment Comments" section of the Canvas submission for that assignment. If a response to your comment is not posted within 48 hours you can email a TA requesting that they review the comments.

Project:

- The project **may** be completed in a group of up to 3 individuals. Projects can be written in any language that compiles and runs on the flip server.
- Form your group by the fifth week of class by joining a Project Group in Canvas. Groups cannot be changed by students after the fifth week of class.

- 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.
- The project is due the last day of class.

Quizzes:

There are 3 quizzes for this course,

- Week 4.
- Week 8
- Finals Week

You will have 50 minutes to complete each quiz. You will be allowed one 3"x5" note card for each quiz.

Grading Scale: 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 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.

EECS Code Sharing Policy webpage: <http://eecs.oregonstate.edu/online-cs-students/current-students/class-resources/policies>

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.