



**Oregon State University**  
**Ecampus**

**Course Name:** Analysis of Algorithms

**Course Number:** CS 325

**Credits:** 4

**Instructors:**

Maher Elshakankiri (Sec 400)

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**Instructor email:**

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**Teaching Assistant name and contact info:**

Will be added on canvas.

## **Course Description**

Recurrence relations, combinatorics, recursive algorithms, proofs of correctness.

## **Prerequisites or Corequisites**

CS 261 with C or better and (CS 225 [C] or MTH 231 [C])

## **Communication**

Please post all course-related questions in the Q&A Discussion Forum so that the whole class may benefit from our conversation. Please contact the instructor or TA privately for matters of a personal nature, who will reply to course-related questions within 24 hours during business hours on weekdays, as well as return your assignments and grades for course activities to you within five days of the due date.

## **Technical Assistance**

If you experience any errors or problems while in your online course, contact 24-7 Canvas Support through the Help link within Canvas. If you experience computer difficulties, need help downloading a browser or plug-in, or need assistance logging into a course, contact the IS Service Desk for assistance. You can call (541) 737-8787 or visit the [IS Service Desk](#) online.

## **Learning Resources**

Most of the material is on the canvas site. For a few sections you would refer to the following resources. Additionally, you would use these resources for the optional readings.

Introduction to Algorithms by Cormen, Leiserson, Rivest, Stein, 3<sup>rd</sup> Edition.

The ebook is available at

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

Algorithms by Jeff Erickson, 1<sup>st</sup> Edition. <http://jeffe.cs.illinois.edu/teaching/algorithms/>

This course is offered through Oregon State University Extended Campus. For more information visit:  
<http://ecampus.oregonstate.edu>.

The programming assignments needs to be submitted in Python language. Python language can be learnt or revised at: <https://openbookproject.net/thinkcs/python/english3e/> Or <https://www.pythoncheatsheet.org/>

**Note:** Check with the OSU Beaver Store for up-to-date information for the term you enroll ([OSU Beaver Store website](#) or 800-595-0357). If you purchase course materials from other sources, be very careful to obtain the correct ISBN.

## Measurable Student Learning Outcomes

1. Prove the correctness of algorithms using induction.
2. Define  $O$ ,  $\Omega$ , and  $\theta$  in a rigorous way.
3. Solve simple recurrence relations.
4. Implement a recursive algorithm to solve a simple problem.
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.
8. Compute the time complexity of polynomial-time and exponential-time iterative and recursive algorithms.
9. Design dynamic programming algorithms and analyze their running time.

## Evaluation of Student Performance

- Assignments: 155 points
- Quizzes: 80 points
- Discussions: 50 points
- Midterm Exam: 50 points
- Final Exam: 60 points
- Bonus: 4 points
  - Discussion: Introduce yourself : 1 point
  - Homework: Graph Algorithms : 1 point
  - Homework: Portfolio Project: 2 points

## Letter Grade

Grade	Percent Range
A	94-100
A-	90-94
B+	87-90
B	83-87
B-	80-83
C+	77-80
C	73-77

Grade	Percent Range
C-	70-73
D+	67-70
D	63-67
D-	60-63
F	0-60

## Course Content

Week	Topic	Reading Assignments	Learning Activities
1	Asymptotic Notations and Correctness of Algorithms	Readings and Videos in Canvas Practice problems and practice quiz questions on canvas	Required Assignment and Required Discussion and Required Quiz
2	Recursion, Recurrence Relations and Divide & Conquer	Readings and Videos in Canvas Practice coding problems and practice quiz questions on canvas	Assignment and Quiz
3	Dynamic Programming	Readings and Videos in Canvas Practice coding problems and practice quiz questions on canvas	Assignment and Quiz
4	Dynamic Programming and Backtracking	Readings and Videos in Canvas Practice coding problems and practice quiz questions on canvas	Assignment, Discussion and Quiz
5	Backtracking and Greedy Algorithms	Readings and Videos in Canvas Practice coding problems and practice quiz questions on canvas	Assignment and Quiz
6	Greedy Algorithm & Midterm	Readings and Videos in Canvas Practice coding problems and practice quiz questions on canvas Review material from week 1-5 Explorations, videos, quizzes and assignments.	Midterm Exam

Week	Topic	Reading Assignments	Learning Activities
7	Graph Algorithms	Readings and Videos in Canvas Practice coding problems and practice quiz questions on canvas	Assignment, Discussion and Quiz
8	Graph Algorithms	Readings and Videos in Canvas Practice coding problems and practice quiz questions on canvas	Assignment and Quiz
9	NP-completeness and Heuristic Algorithms	Readings and Videos in Canvas Practice coding problems and practice quiz questions on canvas	Assignment, Discussion and Quiz
Finals	Final's Week	Review material from all Explorations, videos, quizzes, midterm and assignments.	FINAL EXAM

## Course Policies

### Discussion Participation

On alternate weeks there would be group work where students would form themselves into groups and discuss a strategy to solve an assignment problem. Late submission is not accepted on discussion posts.

### Weekly Homework Assignments

A homework assignment is due every week of the term, at the indicated date and time (Pacific time). Each student must complete the assignments without referring to any other student's code. Online instructors and/or teaching assistants will generally be available to answer questions online during normal business hours on weekdays. Regrade requests will be considered within one week of releasing the grade. Grading TA should be approached first for any grading related clarifications for the assignments. Any submission requests outside of the due date will not be considered. It is advisable to double check the files that are being submitted as part of the assignment submissions.

### Late Work Policy

The course material for each week is released one week in advance with the intent to allow both full time and part time students to be able to complete the homeworks, quizzes, discussions well before the deadline. The quizzes and discussions will be closed post due date. Homeworks may be submitted late by 24hrs after this official due date, but they will be penalized at a rate of 10% of points. Later than that homework submissions will not be accepted. Online instructors and/or teaching assistants will generally be available to answer

questions online during normal work hours on weekdays. They will not necessarily be available over the weekend. Plan ahead. If any extension is required it should be informed atleast 3 days before due date.

### **Using Proctorio automated proctoring for exams:**

This course will use an automated online proctoring system called Proctorio, where your exam session is recorded for instructor review. You will **not** need to schedule proctoring appointments, and there is **no cost to you** to use Proctorio.

**Please note that a functioning webcam and microphone are required for using Proctorio.** If you do not have these, you will need to locate and submit an alternative proctor through the [exams and proctoring form](#) and pay for any associated proctoring fees.

Your security and privacy are important. You can read more about Proctorio's [privacy](#) and [data security](#) policies on their website, and more information about using this tool can be found in the course site.

### **Makeup Exams**

Makeup exams will be given only for missed exams excused in advance by the instructor. Excused absences will not be given for airline reservations, routine illness (colds, flu, stomach aches), or other common ailments. Excused absences will generally not be given after the absence has occurred, except under very unusual circumstances.

### **Incompletes**

Incomplete (I) grades will be granted only in emergency cases (usually only for a death in the family, major illness or injury, or birth of your child), and if the student has turned in 80% of the points possible (which basically doesn't happen unless the student encounters a major problem during the final exam).

### **Establishing a Positive Community:**

It is important you feel safe and welcome in this course. If somebody is making discriminatory comments against you, sexually harassing you, or excluding you in other ways, contact the instructor, your academic advisor, and/or report what happened at <https://studentlife.oregonstate.edu/studentconduct/reporting> so we can connect you with resources.

### **Statement Regarding Religious Accommodation**

Oregon State University is required to provide reasonable accommodations for employee and student sincerely held religious beliefs. It is incumbent on the student making the request to make the faculty member aware of the request as soon as possible prior to the need for the accommodation. See the [Religious Accommodation Process for Students](#).

## **Guidelines for a Productive and Effective Online Classroom**

(Adapted from Dr. Susan Shaw, Oregon State University)

Students are expected to conduct themselves in the course (e.g., on discussion boards, email) in compliance with the university's regulations regarding civility. Civility is an essential ingredient for academic discourse. All communications for this course should be conducted constructively, civilly, and respectfully. Differences in beliefs, opinions, and approaches are to be expected. In all you say and do for this course, be professional. Please bring any communications you believe to be in violation of this class policy to the attention of your instructor.

Active interaction with peers and your instructor is essential to success in this online course, paying particular attention to the following:

- Unless indicated otherwise, please complete the readings and view other instructional materials for each week before participating in the discussion board.
- Read your posts carefully before submitting them.
- Be respectful of others and their opinions, valuing diversity in backgrounds, abilities, and experiences.
- Challenging the ideas held by others is an integral aspect of critical thinking and the academic process. Please word your responses carefully, and recognize that others are expected to challenge your ideas. A positive atmosphere of healthy debate is encouraged.

## **Expectations for Student Conduct**

Student conduct is governed by the university's policies, as explained in the Student Conduct Code (<https://beav.es/codeofconduct>). Students are expected to conduct themselves in the course (e.g., on discussion boards, email postings) in compliance with the university's regulations regarding civility.

## **Academic Integrity**

Integrity is a character-driven commitment to honesty, doing what is right, and guiding others to do what is right. Oregon State University Ecampus students and faculty have a responsibility to act with integrity in all of our educational work, and that integrity enables this community of learners to interact in the spirit of trust, honesty, and fairness across the globe.

Academic misconduct, or violations of academic integrity, can fall into seven broad areas, including but not limited to: cheating; plagiarism; falsification; assisting; tampering; multiple submissions of work; and unauthorized recording and use.

It is important that you understand what student actions are defined as academic misconduct at Oregon State University. The OSU Libraries offer a [tutorial on academic misconduct](#), and you can also refer to the [OSU Student Code of Conduct](#) and [the Office of Student Conduct and Community Standard's website](#) for more information. More importantly, if you are unsure if something will violate our academic integrity policy, ask your professors, GTAs, academic advisors, or academic integrity officers.

## **TurnItIn**

Your instructor may ask you to submit one or more of your writings to Turnitin, a plagiarism prevention service. Your assignment content will be checked for potential plagiarism against Internet sources, academic journal articles, and the papers of other OSU students, for common or borrowed content. Turnitin generates a report that highlights any potentially unoriginal text in your paper. The report may be submitted directly to your instructor or your instructor may elect to have you submit initial drafts through Turnitin, and you will receive the report allowing you the opportunity to make adjustments and ensure that all source material has been properly cited. Papers you submit through Turnitin for this or any class will be added to the OSU Turnitin database and may be checked against other OSU paper submissions. You will retain all rights to your written work. For further information, visit [Academic Integrity for Students: Turnitin – What is it?](#)

## **Statement Regarding Students with Disabilities**

Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval, please contact DAS immediately at 541-737-4098 or at <http://ds.oregonstate.edu>. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

## **Accessibility of Course Materials**

All materials used in this course are accessible *with the exception of certain low-stakes Active Learning Materials such pseudocode text entry boxes*. These activities **will not** influence your final grade.

If you require accommodations please contact [Disability Access Services \(DAS\)](#).

Additionally, Canvas, the learning management system through which this course is offered, provides a [vendor statement](#) certifying how the platform is accessible to students with disabilities.

## **Tutoring and Writing Assistance**

TutorMe is a leading provider of online tutoring and learner support services fully staffed by experienced, trained and monitored tutors. Access TutorMe from within your Canvas course menu.

The Oregon State [Online Writing Suite](#) is also available for students enrolled in Ecampus courses.

## **Ecampus Reach Out for Success**

University students encounter setbacks from time to time. If you encounter difficulties and need assistance, it's important to reach out. Consider discussing the situation with an

instructor or academic advisor. Learn about [resources that assist with wellness and academic success](#).

Ecampus students are always encouraged to discuss issues that impact your academic success with the [Ecampus Success Team](#). Email [ecampus.success@oregonstate.edu](mailto:ecampus.success@oregonstate.edu) to identify strategies and resources that can support you in your educational goals.

If you feel comfortable sharing how a hardship may impact your performance in this course, please reach out to me as your instructor.

- **For mental health:**

Learn about [counseling and psychological resources for Ecampus students](#). If you are in immediate crisis, please contact the Crisis Text Line by texting OREGON to 741-741 or call the National Suicide Prevention Lifeline at 1-800-273-TALK (8255).

- **For financial hardship:**

Any student whose academic performance is impacted due to financial stress or the inability to afford groceries, housing, and other necessities for any reason is urged to contact the Director of Care for support (541-737-8748).

## **Academic Calendar**

All students are subject to the registration and refund deadlines as stated in the Academic Calendar: <https://registrar.oregonstate.edu/osu-academic-calendar>.

## **Student Bill of Rights**

OSU has twelve established student rights. They include due process in all university disciplinary processes, an equal opportunity to learn, and grading in accordance with the course syllabus: <https://asosu.oregonstate.edu/advocacy/rights>.

## **Student Learning Experience Survey**

During Fall, Winter, and Spring term the online Student Learning Experience surveys open to students the Wednesday of week 9 and close the Sunday before Finals Week. Students will receive notification, instructions, and the link through their ONID email. They may also log into the survey via MyOregonState or directly at <https://beav.es/Student-Learning-Survey>. Survey results are extremely important and are used to help improve courses and the learning experience of future students. Responses are anonymous (unless a student chooses to "sign" their comments, agreeing to relinquish anonymity of written comments) and are not available to instructors until after grades have been posted. The results of scaled questions and signed comments go to both the instructor and their unit head/supervisor. Anonymous (unsigned) comments go to the instructor only.