

# Course Syllabus

## Course Information

CS 4349.004

Advanced Algorithm Design and Analysis

Fall 2023

Tuesday, Thursday 2:30pm–3:45pm

ECSS 2.305

**Website:** <https://personal.utdallas.edu/~emily.fox/courses/cs4349.004.23f/>

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## Professor Contact Information

**Instructor: Emily Fox**

**Phone:** (972) 883-4168

**Email:** [emily.fox@utdallas.edu](mailto:emily.fox@utdallas.edu)

**Office:** ECSS 4.224

**(Tentative) Office Hours:** Tuesdays 4:00pm–5:00pm in ECSS 4.224 (shared with CS 3345.HON) and Wednesdays 3:00pm–4:00pm via MS Teams (CS 4349.004 only); additional and in-person office hours available upon request

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## TA Contact Information

**TA Name: Jihan Wang**

**Email:** [Jihan.Wang@UTDallas.edu](mailto:Jihan.Wang@UTDallas.edu)

**Office:** ECSS 4.612

**Office Hours:** Wednesdays 10:00am–12:00pm

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## Course Pre-requisites, Co-requisites, and/or Other Restrictions

CS 3305 with a grade of C or better, and (CE 3345 or CS 3345 or SE 3345)

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## Course Description

Asymptomatic analysis, recurrences, and graph algorithms. Algorithm design techniques such as greedy method, dynamic programming, and divide-and-

conquer. Issues from computational complexity. Course emphasizes a theoretical approach.

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### **Student Learning Objectives/Outcomes**

Ability to use asymptotic notations, solve recurrences, perform algorithm analysis

Ability to design, analyze, and prove correctness of algorithms based on Divide-and-Conquer techniques

Ability to design, analyze, and prove correctness of algorithms based on Dynamic Programming techniques

Ability to design, analyze, and prove correctness of algorithms based on Greedy techniques

Ability to design, analyze and prove correctness of graph algorithms

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### **Required Textbooks and Materials**

Jeff Erickson: **Algorithms**. Available at <http://jeffe.cs.illinois.edu/teaching/algorithms/>.

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### **Suggested Course Materials**

Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein: **Introduction to Algorithms, 3rd Edition**. MIT Press 2009 (required book for most CS 4349 sections)

Links to additional lecture notes will be provided on the course website.

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### **Assignments & Academic Calendar**

Topics and deadlines will be added to the course website as the semester progresses. Students should expect one homework assignment to be released

roughly once a week due one week after release with exceptions based mostly on university closures and exam dates.

### **Tentative Exam Schedule**

Midterm 1: Thursday, October 5th  
Midterm 2: Thursday, November 16th  
Final Exam: Sometime December 9th–15th

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### **Course & Grading Policies**

Nine or ten homework assignments will be released during the semester. There will be two midterm exams and a cumulative final exam.

Each homework assignment will be given equal weight, except each student's lowest scoring assignment will be ignored when calculating final grades. Grades are determined with a weighted sum of homework worth 30%, each midterm exam worth 20%, and the final exam worth 30%.

Pairs of students may work together and turn in homework as a single submission. Individual submissions are fine as well. Homework should be turned in via eLearning. eLearning is not well designed for group submission, so each group should have exactly one of its members turn in the assignment. The grade for one submission will be given to all group members.

It is expected that students be able to solve homework problems using only course material and the work within their homework group. If necessary, students are permitted to use any outside source or person as long as they **cite the source** and **rewrite the solution in their own words**. They may also work with students outside their group, but again, they must cite all collaboration with other students in the class outside their group. Properly cited and rewritten outside material is still worth full credit. Material not cited or not rewritten in students' own words will be considered an act of academic dishonesty and suspected incidents will be reported to the Office of Community Standards and Conduct. Students do not need to cite anything from this course or prerequisite courses, but when in doubt, they should cite anyway just to be safe.

Students must request extensions via email for any late work they plan to submit. Extensions of up to 24 hours for all assignments will be automatically approved, but the student must still make an explicit request. Longer extensions may be approved at the instructor's discretion based on the circumstances involved.

Exams are closed book, and no other sources, collaboration, or cheat sheets are allowed. If you know about a conflict with the scheduled exam dates, please inform Emily at least one week in advance to set a conflict exam time. Makeup

exams for unexpected conflicts will be scheduled if you have a documented medical excuse. If you have or believe you may have a disability that requires a reasonable accommodation in the structure or administration of an exam, please consult with and get written documentation from the Office of Student AccessAbility (OSA) at least one week in advance of the exam.

Final grades for each student are determined either by their scores passing predetermined percentage thresholds or their performance relative to the class average, whichever results in a higher grade. In other words, if everybody performs well, then everybody gets a good grade. Please talk to Emily about grades before considering dropping the course.

There may be a small amount of extra credit available through additional work during assignments. Outside sources cannot be used for extra credit work. The existence of extra credit points will not affect the percentage cutoffs for students' final grades.

Requests for a regrade must be made within one week of the homework assignment or exam being returned. The problem in question will be completely regraded, so the score may actually go down.

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### **Class Attendance and Participation**

Regular class attendance is expected, and students who fail to attend class regularly are inviting scholastic difficulty. Your attendance helps Emily to gauge how well the lecture is going, and it gives you an opportunity to ask questions as the lecture is being delivered.

However, we understand you may not be able to attend all classes for any number of reasons. Emily will upload a video of each lecture to be made available via MS Teams. If you unable to attend class in person or simply want to review lectures you've attended, please watch these videos. **You do not need to ask permission or offer an explanation for missing class.**

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### **Class Recordings**

Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Unless the Office of Student AccessAbility has approved the student to record the instruction, students are expressly prohibited from recording any part of this course. Recordings may not be published, reproduced, or shared with those not in the class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the [Student Code of Conduct](#).

The instructor may record meetings of this course. These recordings will be made available to all students registered for this class if the intent is to supplement the classroom experience. If the instructor or a UTD school/department/office plans any other uses for the recordings, consent of the students identifiable in the recordings is required prior to such use unless an exception is allowed by law.

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### **Comet Creed**

*This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:*

*“As a Comet, I pledge honesty, integrity, and service in all that I do.”*

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### **Academic Support Resources**

The information contained in the following link lists the University’s academic support resources for all students.

Please see <http://go.utdallas.edu/academic-support-resources>.

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### **UT Dallas Syllabus Policies and Procedures**

The information contained in the following link constitutes the University’s policies and procedures segment of the course syllabus. Please review the catalog sections regarding the [credit/no credit](#) or [pass/fail](#) grading option and withdrawal from class.

Please go to <http://go.utdallas.edu/syllabus-policies> for these policies.

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*The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.*