

## Course Information

CS 4349.HON

Advanced Algorithm Design and Analysis

Fall 2025

Tuesday & Thursday 1:00pm - 2:15pm, AD 3.216

## Professor Contact Information

Professor: Dr. James Willson

Email Address: jkw053000@utdallas.edu

Office location: ECSS 4.608

Office Hours: Drop-in office hours Tuesday & Thursday, 2:30AM-4:30PM, in ECSS 4.608.

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

Prerequisites: (CE/CS 2305 with a grade of C or better) and (CE/CS/SE/TE 3345)

## Course Description

Advanced Algorithm Design and Analysis (3 semester credit hours). Asymptotic 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.

## 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 Greedy techniques

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

Ability to design, analyze and prove correctness of graph algorithms

## Required Textbooks and Materials

Introduction to Algorithms, 3rd or 4th ed., Cormen, Leiserson, Rivest, and Stein. MIT Press

Textbooks and some other bookstore materials can be ordered online or purchased at the UT Dallas Bookstore (<https://www.bkstr.com/texasatdallasstore/home>).

## Academic Calendar

There will be assigned work most weeks.

Tentative Test Dates:

Exam 1, October 14

Exam 2, November 11

Exam 3, December 9

## Grading Policy

25% Exam 1;

25% Exam 2;

25% Exam 3;

20% Homework;

5% Attendance

The exact score needed to receive a particular letter grade will not be determined until all grades are in.

## Course Policies

There is no extra credit.

Exams are to be individual efforts.

You may discuss assignments with other students, but must write up your solutions yourself.

You may not post course content to Chegg or similar venues.

## **Class Materials**

The instructor may provide class materials that will be made available to all students registered for this class as they are intended to supplement the classroom experience. These materials may be downloaded during the course; however, these materials are for registered students' use only. Classroom materials may not be reproduced or shared with those not in class, or uploaded to other online environments except to implement an approved Accessibility Resource Center accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

## **Class Attendance**

The University's attendance policy requirement is that individual faculty set their course attendance requirements. Regular and punctual class attendance is expected. Students who fail to attend class regularly are inviting scholastic difficulty. In some courses, instructors may have special attendance requirements; these should be made known to students during the first week of classes.

## **Class Participation**

Regular class participation is expected. Students who fail to participate in class regularly are inviting scholastic difficulty. A portion of the grade for this course is directly tied to your participation in this class. It also includes engaging in group or other activities during class that solicit your feedback on homework assignments, readings, or materials covered in the lectures (and/or labs). Class participation is documented by faculty. Successful participation is defined as consistently adhering to University requirements, as presented in this syllabus. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

## **Class Recordings**

Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Unless the AccessAbility Resource Center 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 AccessAbility Resource Center accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

## **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.”

## **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>.

## **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.

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