

COSC 3325.002 – Algorithm Analysis and Foundations
Fall 2021 Course Syllabus

Schedule:

Lecture: TTH 9:30 AM – 10:50 AM COB 255

Course Description:

Introduction to the foundations and formal techniques used to support the design and analysis of algorithms, focusing on both the underlying mathematical theory and practical considerations of efficiency. Topics include asymptotic complexity bounds, techniques of analysis, algorithmic strategies, basic computability, and complexity classes.

Course Prerequisites:

Data Structures and Algorithms (COSC 2336), Discrete Structures (MATH 2330)

Required Textbook:

The Design and Analysis of Algorithms, Third Edition

Anany Levitin

Addison-Wesley/Pearson Education, Inc.

Contact Information:

Instructor: Dr. Yi Li

Email: yli@uttyler.edu

Office: COB 315.08

Office Hour: Tuesday & Thursday 11:30 am to 1:00 pm on Zoom

Make an appointment via email if you cannot meet during these times

Grading Policy:

Exam 1	20%
Exam 2	20%
Final Exam (Comprehensive)	25%
Assignments	20%
Quizzes	5%
Attendance	10%

Grading Rubric:

<i>Weighted Total</i>	<i>Letter Grade</i>
<hr/> >= 90	A
<hr/> >= 80 and < 90	B
<hr/> >= 70 and < 80	C
<hr/> >= 60 and < 70	D
<hr/> < 60	F

Topics:

1. Introduction to Algorithm Analysis
2. Fundamentals of Analysis of Algorithm Efficiency
3. Analysis of Brute Force Algorithms
4. Analysis of Decrease-and-Conquer Algorithms
5. Analysis of Divide-and-Conquer Algorithms
6. Analysis of Transform-and-Conquer Algorithms
7. Space and Time Tradeoffs
8. Dynamic Programming
9. Greedy Technique
10. Limitations of Algorithm Power
11. Coping with Limitations of Algorithm Power

Course Objectives:

1. Design efficient algorithms and compare competing designs based on their complexities.
2. Be familiar with mathematical and scientific principles relevant to computer science.
3. Explain the mathematical concepts used in describing the complexity of an algorithm.
4. Select and apply algorithms appropriate to a particular situation.
5. Demonstrate basic understanding of some design approaches such as greedy algorithms, dynamic programming and divide-and-conquer.
6. Employ one from a range of strategies leading to the design of algorithms to serve particular purposes.
7. Explain the trade-offs that exist between a range of algorithms that possess the same functionality.
8. Be familiar with advanced and modern topics in computer science.
9. Be able to debug implemented software in a proficient manner.

Course Examinations:

An official one-week notice will be provided preceding each course examination. At least one class period prior to each examination a review guide will be provided, detailing exam format, major topical coverage, problem descriptions and types, etc. Examinations will be graded on as timely a basis as possible with results posted on Canvas. Relevant problems from graded exams will be discussed in a subsequent class. For the remainder of the semester, students are strongly encouraged to talk with the instructor during scheduled online office hours to more fully discuss their examinations.

Missed Assignments and Tests:

Assignments and programs will be due before the beginning of classes on their due dates. Points will be deducted for late assignments. A penalty of 20% will be deducted from your score for the first 24-hour period your assignment is late. A penalty of 50% will be deducted from your score for \geq 24-hour period. No credit for \geq 3 days. Weekend days will be counted.

Tests must be taken when scheduled. Make-up exams will be granted at the discretion of the instructor. Make-ups will be given only under extremely unusual circumstances, will be different from exams given during the regular class time and may be discounted by up to 50% of the grade. Permission for a makeup exam must be obtained PRIOR to the regular exam and must include written documentation of the student's absence.

Attendance Policy:

Attendance is a critical factor for student success. We will take attendance at the beginning of each class. The 10% attendance grade will count as follows for a Tu-Th class: 1-2 absences = 10%; 3 absences = 8%; 4 absences = 6%; 5 = 4%; 6 = 2% and 7 = 0%; having more than 7 absences is considered excessive and the student will be asked to withdraw, or I will no longer grade any assignments and tests. I assume that if you miss a class, you have a very important reason; you do not have to give any explanation. But follow the assignment calendar when you return. This grading policy is meant to reward good attendance and discourage spotty attendance. I am reasonable and understand true emergencies. Contact me promptly to discuss your absence if you are absent two classes in a row. Prolonged illness or each absence for campus sports team events requires a written excuse from a doctor or coach.

Classroom and Lab Rules:

- Please do not surf the Web during class unless instructed to access the Internet.
- Do not access inappropriate Web sites during class. This will lead to dismissal from the class.
- Please do not work on other computer assignments during class.
- Please do not talk to your neighbor during class.
- Please do not bring food or an uncovered drink into the computer classroom lab.
- Please do not order food to be delivered to the classroom.
- Do not use your phone during class.

TA Information:

Will be updated later on Canvas.

Important Dates:

Date	Day	Description
08/23/2021	Monday	Courses Begin
09/03/2021	Friday	Census Date
09/06/2021	Monday	Labor Day holiday, no class
10/01/2021	Friday	Final filing deadline for Fall 2021 graduation
11/01/2021	Monday	Registration for Spring 2022 begins
11/01/2021	Monday	Last day to withdraw from 15-week courses
11/22 – 11/27		Thanksgiving Holiday
12/06/2021	Monday	Study day & Final exam week begins

Tentative Test Dates:

Date	Description
10/07 or 10/12	Exam1
11/11 or 11/16	Exam2
TBD*	Final Exam

*Exam is administered based on the Fall 2021 Final Exam Schedule.

Plagiarism:

Plagiarism will result in disciplinary actions. To spare yourself accusations of plagiarism review the following statements: (Adapted from SFSU Department of Computer Science cheating and plagiarism policy)

Plagiarism occurs when a student:

- submits the work of another student representing it as their own.
- allows another student to replicate or submit their work.
- submits code or portions of code with modifications in an effort to make it look original.
- fails to inform the instructor of collaborating with others on code or projects.
- posts assignments on internet sites for solutions.
- submits code found online and modified without proper citation.
- submits code found online with and used verbatim regardless of proper citation.

Plagiarism does not occur when a student

- has permission to collaborate on a program or project and list all collaborators.
- receives guidance from instructors or teaching assistants
- help with errors or provide tips on programming that will help others in the learning process.
- discuss requirements of an assignment and strategies for implementation
- inclusion of code copied from another source when properly cited and specifically allowed by instructor

Tentative Course Schedule:

Week	Dates	Lecture Topics	Chapter
1	08/24, 26	Introduction to Algorithm Analysis	1
2	08/31, 09/02	Fundamentals of Analysis of Algorithm Efficiency	2
3	09/07, 09	Chapter 2 (cont'd) & Analysis of Brute-Force Algorithms	2, 3
4	09/14, 16	Analysis of Brute-Force Algorithms (cont'd)	3
5	09/21, 23	Decrease-and-Conquer Algorithms	4
6	09/28, 30	Chapter 4 (cont'd) & Divide-and-Conquer Algorithms	5
7	10/05, 07	Divide-and-Conquer Algorithms (cont'd) & Exam 1 Review	5
8	10/12, 14	Exam 1 & Transform-and-Conquer Algorithms	
9	10/19, 21	Transform-and-Conquer Algorithms (cont'd)	6
10	10/26, 28	Space and Time Tradeoffs	7
11	11/02, 04	Dynamic Programming	8
12	11/09, 11	Exam 2 Review & Exam 2	
13	11/16, 18	Greedy Technique	9
14	11/23, 25	Thanksgiving Holiday	
15	11/30, 12/2	Limitations of Algorithm Power & Coping W/Limitations of Algorithms	11, 12
16	12/07, 09	Final Exam (Date to be determined)	

*Dates may vary depending on the pace of class.

Important Covid-19 Information for Classrooms and Laboratories:

Students are expected to wear face masks covering their nose and mouth in public settings (including classrooms and laboratories). The UT Tyler community of Patriots views adoption of these practices consistent with its [Honor Code](#) and a sign of good citizenship and respectful care of fellow classmates, faculty, and staff.

Students who are feeling ill or experiencing symptoms such as sneezing, coughing, digestive issues (e.g. nausea, diarrhea), or a higher than normal temperature should stay at home and are encouraged to use the [UT Tyler COVID-19 Information and Procedures](#) website to review protocols, check symptoms, and report possible exposure. Students needing additional accommodations may contact the Office of Student Accessibility and Resources at University Center 3150, or call (903) 566-7079 or email saroffice@uttyler.edu.

University Policies

The following pages may be revised without notice. These policies can be found on UT Tyler's website: <http://www.uttyler.edu/academicaffairs/files/syllabuspolicy.pdf>

UT Tyler Honor Code – Every member of the UT Tyler community joins together to embrace: Honor and integrity that will not allow me to lie, cheat, or steal, nor to accept the actions of those who do.

Student Standards of Academic Conduct – Disciplinary proceedings may be initiated against any student who engages in scholastic dishonesty, including, but not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.

“Cheating” includes, but is not limited to:

- copying from another student's test paper or homework assignment;
- using, during a test, materials not authorized by the person giving the test;
- failure to comply with instructions given by the person administering the test;
- possession during a test of materials which are not authorized by the person giving the test, such as class notes or specifically designed “crib notes”. The presence of textbooks constitutes a violation if they have been specifically prohibited by the person administering the test;
- using, buying, stealing, transporting, or soliciting in whole or part the contents of an unadministered test, test key, homework solution, or computer program;
- collaborating with or seeking aid from another student during a test or other assignment without authority;
- discussing the contents of an examination with another student who will take the examination;
- divulging the contents of an examination, for the purpose of preserving questions for use by another, when the instructor has designated that the examination is not to be removed from the examination room or not to be returned or to be kept by the student;
- substituting for another person, or permitting another person to substitute for oneself to take a course, a

test, or any course-related assignment;

- paying or offering money or other valuable thing to, or coercing another person to obtain an unadministered test, test key, homework solution, or computer program or information about an unadministered test, test key, home solution or computer program;
- falsifying any academic work offered for credit;
- taking, keeping, misplacing, or damaging the property of The University of Texas at Tyler, or of another person, if the student knows or reasonably should know that an unfair academic advantage would be gained by such conduct; and
- misrepresenting facts, including providing false grades or resumes, for the purpose of obtaining an academic or financial benefit or injuring another student academically or financially.

Unless otherwise specified, all work submitted for a grade must be completed by yourself. You are not to submit another person's work and claim it as your own. Plagiarism and/or collusion will result in disciplinary actions. To spare yourself accusations of plagiarism:

1. Do not show another student a copy of your work before it has been graded. The penalties for permitting your work to be copied are the same as the penalties for copying someone else's work.
2. Do not leave printouts of your work where other students may pick them up.

Students Rights and Responsibilities – To know and understand the policies that affect your rights and responsibilities as a student at UT Tyler, please follow this link:

<http://www.uttyler.edu/wellness/rightsresponsibilities.php>

Campus Carry – We respect the right and privacy of students 21 and over who are duly licensed to carry concealed weapons in this class. License holders are expected to behave responsibly and keep a handgun secure and concealed. More information is available at <http://www.uttyler.edu/about/campus-carry/index.php>

UT Tyler a Tobacco-Free University – All forms of tobacco will not be permitted on the UT Tyler main campus, branch campuses, and any property owned by UT Tyler. This applies to all members of the University community, including students, faculty, staff, University affiliates, contractors, and visitors. Forms of tobacco not permitted include cigarettes, cigars, pipes, water pipes (hookah), bidis, kreteks, electronic cigarettes, smokeless tobacco, snuff, chewing tobacco, and all other tobacco products. There are several cessation programs available to students looking to quit smoking, including counseling, quitlines, and group support. For more information on cessation programs please visit www.uttyler.edu/tobacco-free.

Grade Replacement/Forgiveness and Census Date Policies – Students repeating a course for grade forgiveness (grade replacement) must file a Grade Replacement Contract with the Enrollment Services Center (ADM 230) on or before the Census Date of the semester in which the course will be repeated. (For Spring, the Census Date is Jan. 30.) Grade Replacement Contracts are available in the Enrollment Services Center or at <http://www.uttyler.edu/registrar>. Each semester's Census Date can be found on the Contract itself, on the Academic Calendar, or in the information pamphlets published each semester by the Office of the Registrar. Failure to file a Grade Replacement Contract will result in both the original and repeated grade being used to calculate your overall grade point average. Undergraduates are eligible to exercise grade replacement for only three course repeats during their career at UT Tyler; graduates are eligible for two grade replacements. Full policy details are printed on each Grade Replacement Contract. The Census Date (Jan. 30th) is the deadline

for many forms and enrollment actions of which students need to be aware. These include:

- Submitting Grade Replacement Contracts, Transient Forms, requests to withhold directory information, approvals for taking courses as Audit, Pass/Fail or Credit/No Credit.
- Receiving 100% refunds for partial withdrawals. (There is no refund for these after the CensusDate)
- Schedule adjustments (section changes, adding a new class, dropping without a “W” grade)
- Being reinstated or re-enrolled in classes after being dropped for non-payment
- Completing the process for tuition exemptions or waivers through Financial Aid

State-Mandated Course Drop Policy – Texas law prohibits a student who began college for the first time in Fall 2007 or thereafter from dropping more than six courses during their entire undergraduate career. This includes courses dropped at another 2-year or 4-year Texas public college or university. For purposes of this rule, a dropped course is any course that is dropped after the census date (See Academic Calendar for the specific date). Exceptions to the 6-drop rule may be found in the catalog. Petitions for exemptions must be submitted to the Enrollment Services Center and must be accompanied by documentation of the extenuating circumstance. Please contact the Enrollment Services Center if you have any questions.

Student Accessibility and Resources – In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA) the University offers accommodations to students with learning, physical and/or psychiatric disabilities. If you have a disability, including non-visible disabilities such as chronic diseases, learning disabilities, head injury, PTSD or ADHD, or you have a history of modifications or accommodations in a previous educational environment you are encouraged to contact the Student Accessibility and Resources (SAR) office and schedule an interview with the Accessibility Case Manager/ADA Coordinator, Cynthia Lowery Staples. If you are unsure if the above criteria apply to you, but have questions or concerns please contact the SAR office. For more information or to set up an appointment please visit the SAR office located in the University Center, Room 3150 or call 903.566.7079. You may also send an email to cstaples@uttyler.edu.

Student Absence due to Religious Observance – Students who anticipate being absent from class due to a religious observance are requested to inform the instructor of such absences by the second class meeting of the semester.

Student Absence for University-Sponsored Events and Activities – If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify the instructor at least two weeks prior to the date of the planned absence. At that time, the instructor will set a date and time when make-up assignments will be completed.

Social Security and FERPA Statement - It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students have an identification number. The electronic transmission of grades (e.g., via e-mail) risks violation of the Family Educational Rights and Privacy Act; grades will not be transmitted electronically.

Emergency Exits and Evacuation - Everyone is required to exit the building when a fire alarm goes off. Follow your instructor’s directions regarding the appropriate exit. If you require assistance during an evacuation, inform your instructor in the first week of class. Do not re-enter the building unless given permission by University Police, Fire department, or Fire Prevention Services.

UT Tyler Resources for Students

[UT Tyler Writing Center](#) (903.565.5995), writingcenter@uttyler.edu

[UT Tyler Tutoring Center](#) (903.565.5964), tutoring@uttyler.edu

The Mathematics Learning Center, RBN 4021, this is the open access computer lab for math students, with tutors on duty to assist students who are enrolled in early-career courses.

[UT Tyler Counseling Center](#) (903.566.7254)