TEXAS A&M UNIVERSITY
SAN ANTONIO

CSCI 5343:001, Algorithms, Spring 2025, CRN: 22804

Department of Computational, Engineering, and Mathematical Sciences
College of Arts and Sciences

Course Syllabus

Class Meeting Time & Place:	**T 04:00 - 06:45 PM, STEM 279**
Class Duration:	01/21/2025 - 05/13/2025
Instructor:	Dr. Jeong Yang Office: STEM 211 R Tel: 210-784-2315 E-Mail: jeong.yang@tamusa.edu Student emails will receive a reply within two business days.
Course Blackboard:	https://tamusa.blackboard.com/
Office Hours:	R 11:00 am – 1:00 pm in person W 1:00 pm – 3:00 pm via Zoom or by appointment

Catalog Course Description: This course examines the range of algorithms for various computational problems, recognizing their strengths and weaknesses, and their suitability in particular contexts. Algorithm design techniques with time and space efficiency are a pervasive theme throughout this course. Course will cover sorting, manipulation of data structures, graphs, matrix multiplication, and pattern matching.

Prerequisite: A grade of "B" or better in each of: MATH 2314, CSCI 1437, CSCI 2325, and CSCI 2436 or equivalents of each of these courses as determined by the program graduate coordinator. Students who do not meet the pre-requisites must contact the instructor immediately.

Course Objectives: The objective of the course is to provide an understanding of analyzing and designing algorithms including the following: Analyze the asymptotic performance of algorithms. Demonstrate a familiarity with major algorithms and their complexity. Apply important algorithmic design paradigms and methods of analysis. Synthesize efficient algorithms in common engineering design situations.

Student Outcomes: Graduates of the program will have an ability to:
1. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.

After successful completion of this course, students will be able to:

1) Explain big O notation to express asymptotic upper and lower bounds on time complexity of algorithms
2) Determine the time complexity of different algorithms
3) Apply recurrence relations that describe the time complexity of recursively defined algorithms, solving elementary recurrence relations

4) Apply various algorithm strategies, including greedy, divide and conquer, backtracking, branch and bound, and heuristic
5) Explain how some problems have no algorithmic solution and provide examples that illustrate the concept of uncommutability.

Required Materials:

- **Textbook:** Introduction to Algorithms, Fourth Edition, MIT Press, 2022, by Thomas Cormen, Charles Leiserson, Ronald Rivest, and Clifford Stein, ISBN: 9780262046305.
- **Blackboard:** Connect to http://tamusa.blackboard.com. You will have lecture notes and other supplementary materials in Blackboard. All class communications will be through Blackboard and students should monitor this several times a day.
- **Time:** You are expected to spend 4-8 hours per week for the course. Based on the background, some students may require more time. Time spent may be longer when assignment/exams are due.

Course Requirements every student must fulfill in order to succeed in course:

1. Students should check the Course Calendar, Announcements, Lectures, and Assignments on Blackboard on a regular basis.
2. Students should keep current with all course lectures, assignments, and examinations.
3. Students should ask questions and communicate with the instructor either in class, online, off-line or during office hours.
4. For all classwork, exams, etc., if a student is completing it off-campus, then they are responsible for the availability of internet connectivity. Extensions will **not** be granted for lack of availability of internet connections.

Grading Policy: The final course grade will be based on your performance on the quizzes, exams, assignments and class participation using the following weights:

Quizzes	10%
Term Paper & Topic Presentation	15%
Assignments	25%
Midterm Exam	25%
Final Exam (as per University Schedule)	25%
Total	100%

The final letter grades will be assigned as follows: Above 90% ⇒ A; 80 – 89% ⇒ B; 70 – 79% ⇒ C; 60 – 69% ⇒ D; Below 60% ⇒ F.

Examinations: There will be mandatory Midterm Exam and Final Exam (as per university schedule). Being absent for an exam will result in a grade of zero for that exam and may result in a fail grade in the course. The exams will consist of conceptual problem-solving questions, and short essay questions. The exam materials will come from lecture notes, text, and class discussions. Questions will emphasize understanding and applications of concepts and topics covered in class.

Assignments: There will be several assignments during the course. Individual assignment statements and due dates will be posted through Blackboard. For all assignments, ALL intermediate work of the problem solution steps MUST be shown. This includes the use of the formula, the values substituted in the formulas for problem solution, as well the intermediate steps of the arithmetic computation. The units of measurement are extremely important and MUST be shown at each stage of the computation. Considerable points will be taken off for not following these requirements.

Make Up and Late Assignment/Exam policy:
All assignments will have a clearly indicated due date. Late assignments will be penalized 10% per day, but no assignments will be accepted for more than three days. As a general rule, make-ups or late submissions will **NOT** be offered or accepted for any missed exams. Late submissions or make-ups may be accepted/administered only in extra-ordinary circumstances such as an excused official university activity, a severe illness, or a dire emergency. However, you must provide comprehensive documentation before the missed assignment/exam.

Use of Generative AI Permitted Under Some Circumstances or With Explicit Permission
There are situations and contexts within this course where you may be asked to use artificial intelligence (AI) tools to explore how they can be used. Outside of those circumstances, you should not use AI tools to generate content (text, video, audio, images) that will end up in any student work (assignments, activities, discussion responses, etc.) that is part of your evaluation in this course. Any student work submitted using AI tools should clearly indicate with attribution what work is the student's work and what part is generated by the AI. In such cases, no more than 25% of the student work should be generated by AI. If any part of this is confusing or uncertain, students should reach out to their instructor for clarification before submitting work for grading. Use of AI-generated content without the instructor's permission and/or proper attribution in this course qualifies as academic dishonesty and violates Texas A&M-San Antonio's standards of academic integrity.

Violations of Academic Conduct (Section 14.5 Student Handbook)
As a member in an academic community, students at Texas A&M University-San Antonio are expected to exhibit a high level of honesty and integrity in their pursuit of higher education, be mature, be self-directed and be able to manage their own affairs. Students who are unwilling to abide by these basic expectations will find themselves facing academic and/or disciplinary sanctions. Students are expected to share in the responsibility and authority with faculty and staff to challenge and make known acts that violate the Texas A&M University-San Antonio Code of Conduct. For more information, please visit the Office of Student Rights &Responsibilities website http://bit.ly/TAMUSAStudentRR.

Students engaging in an act that violates the standards of academic integrity will find themselves facing academic and/or disciplinary sanctions. Academic misconduct is any act, or attempt, which gives an unfair advantage to the student. Additionally, any behavior specifically prohibited by a faculty member in the course syllabus or class discussion may be considered as academic misconduct. Academic misconduct includes, but is not limited to, cheating, plagiarism, prohibited use of artificial intelligence, multiple submissions, collusion, lying and bribery. For more information, refer to the Student Code of Conduct, Article III: Conduct Rules and Regulations. Texas A&M University-San Antonio faculty has the discretion to impose grade penalties as deemed necessary.

Faculty members are required to report such serious breaches of academic honesty to their chair, their dean and the Office of Student Rights and Responsibilities. In cases of academic misconduct, students may be subject not only to grade sanctions in courses but to disciplinary action. Grade sanctions may be imposed only by faculty members, but suspension or expulsion may be imposed only by the Vice President for Student Affairs. If a student wishes to appeal the decision of suspension or expulsion due to violations of academic misconduct, they must initiate their appeal as outlined within the Student Code of Conduct. Extenuating circumstances may cause the University to deviate from the defined time frames.

All student term papers, and other written assignments are subject to analysis by anti-plagiarism and anti-AI software. Posting of any class work given to students, or solutions, or discussion, on publicly accessible forums, social media, or artificial intelligence is not permissible.

Considering the potential consequences of academic misconduct, it is obviously in students' best interests to avoid even the appearance of such behavior. If a student is unclear whether a specific act might constitute academic misconduct, please she/he should contact the instructor for an assessment of the situation.

Spring 2025 CSCI 5343:001 Class Schedule

The provisions and information set forth in the schedule below are intended to be informational and not contractual in nature. The instructor reserves the right to amend, alter, change, delete or modify the provisions of the schedule.

Wk.	***Dates***	***Chapter and Topic***	***Note***
1	Jan 21 – Jan 26	Ch. 1&2 Roles of Algorithms, analyzing & designing algorithms Ch. 3 Characterizing Times: asymptotic & standard notations Ch. 4 Divide-and-Conquer: methods for solving recurrences Ch. 6 Heapsort: heap property & algorithm, priority queues Ch. 14 Dynamic Programming: its key elements & rod cutting problem Ch. 15 Greedy Algorithms: making greedy choices, elements of greedy strategy, knapsack problem Ch. 18 B-Trees: definition of B-trees and their operations **Midterm Exam 1 (Tuesday, March 4)**	• Quizzes 1 & 2 before Midterm Exam • Quizzes 3 & 4 before Final Exam • Multiple Assignments throughout the semester • Topic Presentation at the end of the semester • Mar 10-15: Spring Break • May 5: Last day of classes • May 6: Study day
2	Jan 27 – Jan 31		
3	Feb 3 – Feb 9		
4	Feb 10 - Feb 16		
5	Feb 17 - Feb 23		
6	Feb 24 - Feb 28		
7	Mar 3 - Mar 9		
8	Mar 17 - Mar 23	Ch. 20 Graph Algorithms: Graphs representations, BFS, DFS Ch. 21 Minimum Spanning Trees: growing a minimum spanning tree, Kruskal's & Prim's algorithms Ch. 22 Single-Source Shortest Paths: Single-source shortest paths in directed acyclic graphs, Dijkstra's algorithm Ch. 35 Approximation Algorithms: Traveling Salesman Problem (TSP), Hamiltonian Cycle Ch. 33 Machine-Learning Algorithms: Clustering Ch. 31 Num.-Theoretic Algorithm: RSA pub-key cryptosystem **Topic Presentations**, **Final Exam** – As per University Schedule	
9	Mar 24 – Mar 30		
10	Mar 31 – Apr 6		
11	Apr 7 – Apr 13		
12	Apr 14 – Apr 20		
13	Apr 21 – Apr 27		
14	Apr 28– May 4		
15	May 7 – May 13		

IMPORTANT POLICIES AND RESOURCES

Academic Accommodations for Persons with Disabilities: Texas A&M University-San Antonio is committed to providing all students with reasonable access to learning opportunities and accommodations in accordance with The Americans with Disabilities Act, as amended, and Section 504 of the Rehabilitation Act. If you experience barriers to your education due to a disability or think you may have a disability, please contact Disability Support Services in the Central Academic Building, Suite 210, or at (210) 784-1335 or visit https://www.tamusa.edu/index.html or email us at **dss@tamusa.edu**. Disabilities may include, but are not limited to, attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability-related needs with Disability Support Services and their instructors as soon as possible.

Academic Learning Center: The Academic Learning Center provides free course-based tutoring to all currently enrolled students at Texas A&M University-San Antonio. Students wishing to work with a tutor can make appointments through the Brainfuse online tutoring platform. Brainfuse can be accessed in the *Tools* section of Blackboard. You can contact the Academic Learning Center by emailing tutoring@tamusa.edu, calling (210) 784-1307, or visiting the Central Academic Building, room 202.

Counseling/Mental Health Resources: As a college student, there may be times when personal stressors interfere with your academic performance and/or negatively impact your daily functioning. If you are experiencing emotional difficulties or mental health concerns, support is available to you through the Student Counseling Center (SCC). To schedule an appointment call 210-784-1331 or visit Modular C, Room 166 (Rear entrance). All mental health services provided by the SCC are free and confidential (as the law allows). The Student Counseling Center provides brief individual and group therapy, crisis intervention, consultation, case management, and prevention services**.**

Crisis support is available 24/7 by calling the SCC at 210-784-1331 (after-hours select option '2'). For more information and self-help resources, please visit www.tamusa.edu/studentcounseling
Emergency Preparedness: JagE Alert is Texas A&M University-San Antonio's mass notification. In the event of an emergency, such as inclement weather, students, staff and faculty, who are registered, will have the option to receive a text message, email with instructions and updates. To register or update your information visit: https://tamusa.bbcportal.com/.

More information about Emergency Operations Plan and the Emergency Action Plan can be found here: https://www.tamusa.edu/about-us/campus-information/safety/university-police-department/documents/emergency-operations-plan.pdf and https://www.tamusa.edu/about-us/campus-information/safety/university-police-department/documents/emergency-action-plan.pdf

Download the SafeZone App for emergencies or call (210) 784-1911. Non-Emergency (210) 784-1900

Financial Aid and Verification of Attendance: According to the following federal regulation, 34 CFR 668.21: U.S. Department of Education (DoE) Title IV regulation, a student can only receive Title IV funds based on Title IV eligibility criteria which include class attendance. If Title IV funds are disbursed to ineligible students (including students who fail to begin attendance), the institution must return these funds to the U.S. DoE within 30 days of becoming aware that the student will not or has not begun attendance. Faculty will provide the Office of Financial Aid with an electronic notification if a student has not attended the first week of class. Any student receiving federal financial aid who does not attend the first week of class will have their aid terminated and returned to the DoE. Please note that any student who stops attending at any time during the semester may also need to return a portion of their federal aid.

Writing, Language, and Digital Composing Center: The Writing, Language, and Digital Composing Center supports graduate and undergraduate students in all three colleges as well as faculty and staff. Tutors work with students to develop reading skills, prepare oral presentations, and plan, draft, and revise their written assignments. Our language tutors support students enrolled in Spanish courses and students composing in Spanish for any assignment. Our digital studio tutors support students working on digital projects such as eportfolios, class presentations, or other digital multimedia projects. Students can schedule appointments through JagWire under the Student Services tab. Click on "Writing, Language, and Digital Composing Center" to make your appointment. The Center offers face-to-face, synchronous

online, and asynchronous digital appointments. More information about what services we offer, how to make an appointment, and how to access your appointment can be found on our website at https://bit.ly/WLDCCenter.

Meeting Basic Needs: Any student who has difficulty affording groceries or accessing sufficient food to eat every day, or who lacks a safe and stable place to live, and believes this may affect their performance in the course, is urged to contact the Dean of Students (DOS@tamusa.edu) for support. Furthermore, please notify the professor if you are comfortable in doing so. This will enable them to provide any resources they may possess.

Military Affairs: Veterans and active-duty military personnel are welcomed and encouraged to communicate, in advance if possible, and special circumstances (e.g., upcoming deployment, drill requirements, disability accommodations). You are also encouraged to visit the Patriots' Casa in-person room 202, or to contact the Office of Military Affairs with any questions at military.va@tamusa.edu or (210)784-1397.

Religious Observances: Texas A&M University-San Antonio recognizes the diversity of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holidays according to their tradition. Under the policy, students are provided an opportunity to make up any examination, study, or work requirements that may be missed due to a religious observance provided they notify their instructors before the end of the second week of classes for regular session classes.

The Six-Drop Rule: Students are subject to the requirements of Senate Bill (SB) 1231 passed by the Texas Legislature in 2007. SB 1231 limits students to a maximum of six (6) non-punitive course drops (i.e., courses a student chooses to drop) during their undergraduate careers. A non-punitive drop does not affect the student's GPA. However, course drops that exceed the maximum allowed by SB 1231 will be treated as "F" grades and will impact the student's GPA.

Statement of Harassment and Discrimination: Texas A&M University-San Antonio is committed to the fundamental principles of academic freedom, equality of opportunity and human dignity. To fulfill its multiple missions as an institution of higher learning, A&M-San Antonio encourages a climate that values and nurtures collegiality and the uniqueness of the individual within our state, nation, and world. All decisions and actions involving students and employees should be based on applicable law and individual merit. Texas A&M University-San Antonio, in accordance with applicable federal and state law, prohibits discrimination, including harassment, on the basis of race, color, sex, religion, national origin, age, disability, genetic information, veteran status, sexual orientation, gender identity, gender expression, or pregnancy/parenting status. Individuals who believe they have experienced harassment or discrimination prohibited by this statement are encouraged to contact the appropriate offices within their respective units.
Texas A&M University-San Antonio faculty are committed to providing a safe learning environment for all students and for the university as a whole. If you have experienced any form of sex- or gender-based discrimination or harassment, including sexual assault, sexual harassment, domestic or dating violence, or stalking, know that help and support are available. A&M-San Antonio's Title IX Coordinator can support those impacted by such conduct in navigating campus life, accessing health and counseling services, providing academic and housing accommodations, and more. The university strongly

encourages all students to report any such incidents to the Title IX Coordinator. Please be aware that all A&M-San Antonio employees (other than those designated as confidential resources such as counselors and trained victim advocates) are required to report information about such discrimination and harassment to the university. This means that if you tell a faculty member about a situation of sexual harassment or sexual violence, or other related misconduct, the faculty member must share that information with the university's Title IX Coordinator (titleix@tamusa.edu, 210-784-2061, CAB 439K). If you wish to speak to a confidential employee who does not have this reporting requirement, you can contact the Student Counseling Center at (210) 784-1331 or visit them in Madla 120.

Pregnant/Parenting Students: Texas A&M-San Antonio does not require a pregnant or parenting student, solely because of that status or issues related to that status, to (1) take a leave of absence or withdraw from their degree or certificate program; (2) limit the student's studies; (3) participate in an alternative program; (4) change the student's major, degree, or certificate program; or (5) refrain from joining or cease participating in any course, activity, or program at the University. The university will provide reasonable accommodations to pregnant students that would be provided to a student with a temporary medical condition and that are related to the health and safety of the student and the student's unborn child. These could include maintaining a safe distance from substances, areas, and activities known to be hazardous to pregnant individuals and their unborn child; excused absences because of illness or medical appointments; modified due dates for assignments; rescheduled tests/exams; taking a leave of absence; and being provided access to instructional materials and video recordings of lectures for excused absences, if these would be provided to any other student with an excused absence. Pregnant/parenting students are encouraged to contact the Title IX Coordinator with any questions or concerns related to their status (titleix@tamusa.edu; 210-784-2061; CAB 439K).

Texas A&M-San Antonio has also designated the Title IX Coordinator as the liaison officer for current or incoming students who are the parent or guardian of a child younger than 18 years of age. The Title IX Coordinator can provide students with information regarding support services and other resources.

Students' Rights and Responsibilities: The following statement of students' rights and responsibilities is intended to reflect the philosophical base upon which University Student Rules are built. This philosophy acknowledges the existence of both rights and responsibilities, which is inherent to an individual not only as a student at Texas A&M University-San Antonio but also as a citizen of this country.

Students' Rights

1. A student shall have the right to participate in a free exchange of ideas, and there shall be no University rule or administrative rule that in any way abridges the rights of freedom of speech, expression, petition and peaceful assembly as set forth in the U.S. Constitution.
2. Each student shall have the right to participate in all areas and activities of the University, free from any form of discrimination, including harassment, on the basis of race, color, national or ethnic origin, religion, sex, disability, age, sexual orientation, or veteran status in accordance with applicable federal and state laws.
3. A student has the right to personal privacy except as otherwise provided by law, and this will be observed by students and University authorities alike.
4. Each student subject to disciplinary action arising from violations of university student rules shall be assured a fundamentally fair process.

Students' Responsibilities

1. A student has the responsibility to respect the rights and property of others, including other students, the faculty and administration.
2. A student has the responsibility to be fully acquainted with the published University Student Rules found in the Student Handbook, Student Code of Conduct, on our website, University Catalog and to comply with them, as well as federal, state, and local laws.
3. A student has the responsibility to recognize that student actions reflect upon the individuals involved and upon the entire University community.
4. A student has the responsibility to recognize the University's obligation to provide an environment for learning.
5. A student has the responsibility to check their university email for any updates or official university notification.

We expect that students will behave in a manner that is dignified, respectful, and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

Students are expected to exhibit a high level of honesty and integrity in their pursuit of higher education. Students engaging in an act that violates the standards of academic integrity will find themselves facing academic and/or disciplinary sanctions. Academic misconduct is any act, or attempt, which gives an unfair advantage to the student. Additionally, any behavior specifically prohibited by a faculty member in the course syllabus or class discussion may be considered as academic misconduct. For more information on academic misconduct policies and procedures please review the Student Code of Conduct.

Key Dates For Spring 2025 Semester: The complete academic calendar is available online: https://www.tamusa.edu/academics/documents/AY2025-Academic-Calendar.pdf.

Spring 2025 Regular 16-Week Session		
January 17	Friday	Last day for students withdrawing to receive 100% refund (0% responsibility) for tuition
January 20	Monday	Martin Luther King, Jr. Day - No classes
January 21	Tuesday	First class day
January 28	Tuesday	Last day to register
February 5	Wednesday	Census Date
February 6	Thursday	Drop for non-payment
February 24-March 7	Monday-Friday	Midterm grading period
March 10-March 15	Monday-Saturday	Spring Break
April 18	Friday	Study day - No classes
April 21	Monday	Last day to drop with an automatic grade of "W"
April 28	Monday	Last day to withdraw from the university
May 5	Monday	Last day of scheduled classes for weekday classes
May 6	Tuesday	Study day - No classes
May 7-May 13	Wednesday-Tuesday	Final examinations
May 13	Tuesday	End of term
May 16	Friday	All grades due by noon
May 19	Monday	Grades available in JagWire
May 20	Tuesday	Commencement