

Course Information

Course Number:	CSCE-411
Course Title:	Design and Analysis of Algorithms
Section:	502
Time:	MWF 11:30 am – 12:20 pm
Location:	EABB 106
Credit Hours:	3

Instructor Details

Instructor:	Jianer Chen
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Office Hours:	MW 1:30 pm – 3:00 pm

Course Description

Study of computer algorithms for computational problems; design paradigms; analysis of time and space requirements of algorithms; proof for correctness of algorithms; NP-completeness and undecidability of problems.

Course Prerequisites

Junior or senior classification or approval of instructor.

Course Learning Outcomes

This course will teach you how to:

- understand fundamental algorithms and algorithmic techniques,
- analyze correctness, running time, and space complexity of a given algorithm,
- judge which algorithmic technique is best for a given problem,
- apply known algorithms and learned algorithmic techniques to new problems,
- use NP-completeness theory to study difficult computational problems, and
- understand computability theory and identify unsolvable problems.

Textbook and/or Resource Materials

- T. Cormen, C. Leiserson, R. Rivest, and C. Stein (2009), *Introduction to Algorithms*, 4th Edition, The MIT Press.

Thanks to the support of Texas A&M University Libraries, you can access the following course materials for free: CSCE_411_502 - EBK INTRO.TO ALGORITHMS

<http://proxy.library.tamu.edu/login?url=https://search.ebscohost.com/login.aspx?direct=true&scope=site&db=nlebk&db=nlabk&AN=2932690>

- Supplementary reading materials to be handed out in class.

Grading Policy

- Grading Scale: A = 90-100%, B = 75-89%, C = 65-74%, D = 60-64%, F = 0-59%
- The course will have 7 homework assignments, 2 midterm exams, and a final exam.
- Homework assignment: 35%, Midterm exams: 15% each, Final exam 35%.

Late Work Policy

The assignments are due on the designated due dates at the beginning of class. No late submissions will be accepted. Discuss unusual circumstances in advance with the instructor.

Course Schedule

- Week 1: Introduction, recurrences, divide-and-conquer
- Week 2: Heapsort, lower bounds for sorting and searching
- Week 3: Sorting and selection in linear time, homework #1 due
- Week 4: Dynamic programming, data structures for graphs
- Week 5: Graph algorithms, DFS and BFS, homework #2 due, midterm #1
- Week 6: Topological sorting, strongly connected components
- Week 7: Dijkstra's algorithm, Kruskal's algorithm, homework #3 due
- Week 8: Bellman-Ford algorithm, Floyd-Warshall algorithm
- Week 9: Spring break
- Week 10: Johnson's algorithm, matching algorithms, homework #4 due
- Week 11: Randomized algorithms, midterm #2
- Week 12: The classes P and NP, polynomial-time reductions, homework #5 due
- Week 13: Proving NP-completeness
- Week 14: Proving NP-completeness (continued), homework #6 due
- Week 15: Approximation algorithms, parameterized algorithms
- Week 16: Computability Theory, homework #7 due
- May 6, 10:30 am – 12:30 pm: Final exam

Optional Course Information Items

- The course webpage can be accessed by the following link:
<https://people.engr.tamu.edu/j-chen3/courses/411/2025/courseweb.html>, or
You can go to the instructor's home page then click the course link. The course webpage publishes course syllabus, lecture notes, homework assignments, exams, and other course handouts.
- This course is using Canvas learning management system. Students submit their homework via Canvas.

University Policies

Attendance Policy

The university views class attendance and participation as an individual student responsibility. Students are expected to attend class and to complete all assignments.

Please refer to [Student Rule 7](#) in its entirety for information about excused absences, including definitions, and related documentation and timelines.

Makeup Work Policy

Students will be excused from attending class on the day of a graded activity or when attendance contributes to a student's grade, for the reasons stated in Student Rule 7, or other reason deemed appropriate by the instructor.

Please refer to [Student Rule 7](#) in its entirety for information about makeup work, including definitions, and related documentation and timelines.

Absences related to Title IX of the Education Amendments of 1972 may necessitate a period of more than 30 days for make-up work, and the timeframe for make-up work should be agreed upon by the student and instructor" ([Student Rule 7, Section 7.4.1](#)).

"The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence" ([Student Rule 7, Section 7.4.2](#)).

Students who request an excused absence are expected to uphold the Aggie Honor Code and Student Conduct Code. (See [Student Rule 24](#).)

Academic Integrity Statement and Policy

"An Aggie does not lie, cheat or steal, or tolerate those who do."

This course assumes that all work submitted by students will be generated by the students themselves. Students should not have another person/entity do the writing of any substantive portion of an assignment for them, which includes hiring a person or a company to write assignments and using artificial intelligence tools like ChatGPT.

"Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that student. Students must keep appropriate records at all times. The inability to authenticate one's work, should the instructor request it, may be sufficient grounds to initiate an academic misconduct case" ([Section 20.1.2.3, Student Rule 20](#)).

You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities at aggiehonor.tamu.edu.

Americans with Disabilities Act (ADA) Policy

Texas A&M University is committed to providing equitable access to learning opportunities for all students. If you experience barriers to your education due to a disability or think you may have a disability, please contact Disability Resources in the Student Services Building or at (979) 845-1637 or visit disability.tamu.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 Resources and their instructors as soon as possible.

Title IX and Statement on Limits to Confidentiality

Texas A&M University is committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws prohibit gender-based discrimination and sexual

harassment, including sexual assault, sexual exploitation, domestic violence, dating violence, and stalking.

With the exception of some medical and mental health providers, all university employees (including full and part-time faculty, staff, paid graduate assistants, student workers, etc.) are Mandatory Reporters and must report to the Title IX Office if the employee experiences, observes, or becomes aware of an incident that meets the following conditions (see [University Rule 08.01.01.M1](#)):

- The incident is reasonably believed to be discrimination or harassment.
- The incident is alleged to have been committed by or against a person who, at the time of the incident, was (1) a student enrolled at the University or (2) an employee of the University.

Mandatory Reporters must file a report regardless of how the information comes to their attention – including but not limited to face-to-face conversations, a written class assignment or paper, class discussion, email, text, or social media post. Although Mandatory Reporters must file a report, in most instances, you will be able to control how the report is handled, including whether or not to pursue a formal investigation. The University’s goal is to make sure you are aware of the range of options available to you and to ensure access to the resources you need.

Students wishing to discuss concerns in a confidential setting are encouraged to make an appointment with [Counseling and Psychological Services](#) (CAPS).

Students can learn more about filing a report, accessing supportive resources, and navigating the Title IX investigation and resolution process on the University’s [Title IX webpage](#).

Statement on Mental Health and Wellness

Texas A&M University recognizes that mental health and wellness are critical factors influencing a student’s academic success and overall wellbeing. Students are encouraged to engage in healthy selfcare practices by utilizing the resources and services available through [University Health Services](#). The [TELUS Health Student Support](#) app provides access to professional counseling in multiple languages anytime, anywhere by phone or chat, and the 988 Suicide & Crisis Lifeline offers 24-hour emergency support at 988 or [988lifeline.orgLinks](#) to an external site.

Texas A&M College Station

Students needing a listening ear can contact University Health Services (979.458.4584). 24-hour emergency help is also available through the 988 Suicide & Crisis Lifeline (988) or at [988lifeline.orgLinks](#) to an external site.