

## Course Information

Course Number: CSCE 411  
Course Title: Design and Analysis of Algorithms  
Section: 501  
Time: MWF 1:50-2:40pm  
Location: ZACH 310  
Credit Hours: 3

## Instructor Details

Instructor: Nate Veldt  
E-Mail: [nveldt@tamu.edu](mailto:nveldt@tamu.edu)  
Office: PETR 306  
Office Hours: Monday, 3-4pm

Senior Grader: Venkata Sameer Kumar Betana Bhotla  
Grader: Ravi Pranjali

## Course Description

This course presents standard techniques for designing algorithms to solve computational problems, proving their correctness, and analyzing their space and runtime requirements. NP-completeness and hardness reductions will also be covered.

## Course Prerequisites

CSCE 221 and CSCE 222

## Course Learning Outcomes

- Students will learn about fundamental methods for designing and analyzing algorithms for computational problems.
- Students will be able to prove correctness and analyze the space and runtime requirements of an algorithm
- Students will be able to prove a problem is NP-complete using appropriate reductions

## Textbook and/or Resource Materials

**Required textbook:** Cormen, Leiserson, Rivest, Stein: *Introduction to Algorithms*, 3rd edition, The MIT Press, 2009.

**Resources:** Check Canvas multiple times each week for updates.

## Grading Policy

- |                                       |     |
|---------------------------------------|-----|
| • Participation                       | 2%  |
| • Homework assignments                | 25% |
| • Algorithm History/Application Essay | 3%  |
| • Midterm 1                           | 23% |
| • Midterm 2                           | 23% |
| • Final exam                          | 24% |

The grading scale will be:  $A \geq 91\% > B \geq 81\% > C \geq 71\% > D \geq 61\% > F$ .

If the course average is slow, a slight upward curve may be applied.

Your lowest homework assignment will be dropped

## Attendance and participation

Attendance will be taken indirectly via in-class polls. Participation grade can be met by in-class participation (e.g., answering questions, presenting answers to in-class activities, answering polling questions), and out-of-class engagement (e.g., answering questions on course messaging boards, submitting intro video). Students can guarantee full points for participation if they satisfy one of the following: (1) Uploading an intro video, plus participation in in-class polls on 10 different days, or (2) participating in in-class polls on 20 different days.

## Late Work and Makeup Work Policy

**Homework.** Homework assignments may be submitted up to 24 hours late with a penalty of 25%. If it is submitted within 5 hours of the deadline, it will be graded with a smaller penalty of  $5\% \times (\text{number of hours since deadline})$ . Work submitted more than 24 hours after the deadline will not be accepted. (Recall that your lowest homework assignment will be dropped.)

**Tests.** No make-up tests will be given. If a student needs to be absent from class on a test day due to an unavoidable and acceptable excused absence, that student needs to get approval from the instructor in advance. The absence must be acceptable as defined by TAMU's policy and will require formal verification (e.g., a doctor's note). If any tests are missed, the final grade will be computed using the weighted average of remaining assignments in the course (which includes other tests, homework assignments, and quizzes).

## Homework policy

Although it is not required, you are *encouraged* to work on and complete all homework assignments on your own without consulting peers or outside sources.

You are allowed, under a very specific set of guidelines, to consult outside sources and discuss homework problems with other students. However, the write-up must be entirely in your own words—copying is strictly prohibited and can result in academic integrity violations. Additionally, if you receive any type of help from outside resources or discuss problems with others, you are required to list all resources and collaborators in your homework write-up (e.g., existing webpages, textbooks, discussion with other students in the course or students outside the course, etc.). Discussing problems includes both receiving help or giving help of any kind. Posting homework questions or soliciting help in online sites or forums is strictly prohibited. E.g., while reading an existing post about a similar problem is okay, creating a new post asking for the answer to your question is not okay.

### Course Schedule

This schedule is tentative and likely to change slightly during the semester

<b>Week</b>	<b>Date</b>	<b>Topic</b>
1	Jan 17 – Jan 21	Divide and conquer
2	Jan 24 – Jan 28	Dynamic Programming
3	Jan 31 – Feb 4	Dynamic Programming
4	Feb 7 – Feb 11	Amortized Analysis
5	Feb 14 – Feb 18	Elementary Graph Algorithms
6	Feb 21 – Feb 25	Elementary Graph Algorithms (Test 1)
7	Feb 28 – Mar 4	More Graph Algorithms
8	Mar 7 – Mar 11	More Graph Algorithms
9	Mar 14– Mar 18	<b>Spring break, no class</b>
10	Mar 21– Mar 25	Max Flow
11	Mar 28 – Apr 1	Max Flow
12	Apr 4 – Apr 8	Linear programming (Test 2)
13	Apr 11 – Apr 15	Linear programming
14	Apr 18– Apr 22	NP-completeness
15	Apr 25 – Apr 29	NP-completeness
16	May 2 – May 6	Approximation algorithms

### Exams

The midterm exams will be given in class. These are *tentative* dates for the midterms:

Midterm 1: February 25

Midterm 2: April 8

The final exam will be on Monday, May 9, 3:30-5:30pm.

### 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."

"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](#)).

### Texas A&M at College Station

*You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities at [aggiehonor.tamu.edu](http://aggiehonor.tamu.edu).*

### Texas A&M at Galveston

*You can learn more about the Honor Council Rules and Procedures as well as your rights and responsibilities at [tamug.edu/HonorSystem](http://tamug.edu/HonorSystem).*

### Texas A&M at Qatar

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You can learn more about academic integrity and your rights and responsibilities at Texas A&M University at Qatar by visiting the [Aggie Honor System](#) website.

## 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 the Disability Resources office on your campus (resources listed below). 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.

### **Texas A&M at College Station**

Disability Resources is located in the Student Services Building or at (979) 845-1637 or visit [disability.tamu.edu](http://disability.tamu.edu).

### **Texas A&M at Galveston**

Disability Resources is located in the Student Services Building or at (409) 740-4587 or visit [tamug.edu/counsel/Disabilities](http://tamug.edu/counsel/Disabilities).

### **Texas A&M at Qatar**

Disability Services is located in the Engineering Building, room 318C or at +974.4423.0316 or visit <https://www.qatar.tamu.edu/students/student-affairs/disability-services>.

## 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, a person who is subjected to the alleged conduct 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.

### **Texas A&M at College Station**

*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](#).*

### **Texas A&M at Galveston**

*Students wishing to discuss concerns in a confidential setting are encouraged to make an appointment with the Counseling Office in the Seibel Student Center, or call (409) 740-4587. For additional information, visit [tamug.edu/counsel](http://tamug.edu/counsel).*

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

### **Texas A&M at Qatar**

*Texas A&M University at Qatar students wishing to discuss concerns in a confidential setting are encouraged to visit the [Health and Wellness](#) website for more information.*

*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 that influence a student's academic success and overall wellbeing. Students are encouraged to engage in healthy self-care by utilizing available resources and services on your campus

### **Texas A&M College Station**

*Students who need someone to talk to can contact Counseling & Psychological Services (CAPS) or call the TAMU Helpline (979-845-2700) from 4:00 p.m. to 8:00 a.m. weekdays and 24 hours on weekends. 24-hour emergency help is also available through the National Suicide Prevention Hotline (800-273-8255) or at [suicidepreventionlifeline.org](http://suicidepreventionlifeline.org).*

### **Texas A&M at Galveston**

*Students who need someone to talk to can call (409) 740-4736 from 8:00 a.m. to 5:00 p.m. weekdays or visit [tamug.edu/counsel](http://tamug.edu/counsel) for more information. For 24-hour emergency assistance during nights and weekends, contact the TAMUG Police Dept at (409) 740-4545. 24-hour emergency help is also available through the National Suicide Prevention Hotline (800-273-8255) or at [suicidepreventionlifeline.org](http://suicidepreventionlifeline.org).*

### **Texas A&M at Qatar**

*Texas A&M University at Qatar students wishing to discuss concerns in a confidential setting are encouraged to visit the [Health and Wellness](#) website for more information.*

## Campus-Specific Policies

### **Texas A&M at Galveston**

#### Classroom Access and Inclusion Statement

Texas A&M University is committed to engaged student participation in all of its programs and courses and provides an accessible academic environment for all students. This means that our classrooms, our virtual spaces, our practices and our interactions are as inclusive as possible and we work to provide a welcoming instructional climate and equal learning opportunities for everyone. If you have an instructional need, please notify me as soon as possible.

The Aggie Core values of respect, excellence, leadership, loyalty, integrity and selfless service in addition to civility, and the ability to listen and to observe others are the foundation of a welcoming instructional climate. Active, thoughtful and respectful participation in all aspects of the course supports a more inclusive classroom environment as well as [our mutual](#) responsibilities to the campus community.

#### Statement on the Family Educational Rights and Privacy Act (FERPA)

FERPA is a federal law designed to protect the privacy of educational records by limiting access to these records, to establish the right of students to inspect and review their educational records and to provide guidelines for the correction of inaccurate and misleading data through informal and formal hearings. Currently enrolled students wishing to withhold any or all directory information items may do so by going to [howdy.tamu.edu](http://howdy.tamu.edu) and clicking on the "Directory Hold Information" link in the Student Records channel on the MyRecord tab. The complete [FERPA Notice to Students](#) and the student records policy is available on the Office of the Registrar webpage.

Items that can never be identified as public information are a student's social security number, citizenship, gender, grades, GPR or class schedule. All efforts will be made in this class to protect your privacy and to ensure confidential treatment of information associated with or generated by your participation in the class.

Directory items include name, UIN, local address, permanent address, email address, local telephone number, permanent telephone number, dates of attendance, program of study (college, major, campus), classification, previous institutions attended, degrees honors and awards received, participation in officially recognized activities and sports, medical residence location and medical residence specialization.