

# Syllabus

## Course Information

**Course Number:** CSCE 221

**Course Title:** “Data Structures and Algorithms”

**Sections:** 501–512

**Time:** MWF 8:00 am – 8:50 am, 9:20 am – 10:10 am, 10:40 am – 11:30 am

**Location:** Lectures provided remotely (synchronously); Labs are in-person facilitated by Zoom

**Credit Hours:** 4

## Instructor Details

**Instructor:** Dr. Teresa Leyk

**Office:** 311D HRBB Bldg.

**Phone:** (979) 845-4456 (*Office #*)

**E-Mail:** [teresal9@tamu.edu](mailto:teresal9@tamu.edu)

**Office Hours:** see eCampus

## Course Description

Specification, analysis and implementation of abstract data types for lists, stacks, queues, trees, hash tables, graphs, and their associated algorithms. Performance trade-offs of different implementations; asymptotic analysis of running time and memory usage. Includes the execution of students programs written in C++; emphasis on adherence to good software engineering principles.

## Course Prerequisites/Corequisites

- CSCE 121 “*Introduction to Program Design and Concepts*”
- CSCE 222 “*Discrete Structures*” or MATH 302 “*Discrete Mathematics*”

## Course Learning Outcomes

At the end of this course students should be able to

1. Design and implement diverse data structures that allow easy access and manipulation of data using C++ programming language.
2. Apply the Big-O asymptotic notation to analyze and select an efficient algorithm for solving a given problem with respect to runtime and memory usage.
3. Identify the latest developments in the Computer Science area or be familiar with Turing awards winners.

## Textbook and Resource Materials

- **Required Textbook:** “Data Structures and Algorithm Analysis in C++,” 4th Edition, Mark A. Weiss, 2014, Pearson, ISBN-13: 978-0132847377 or ISBN-10: 013284737X. Also, you may need a textbook on C++ language from the previous semester, or any good C++ reference book(s).
- **Required: A computer with a web camera:** A computer that you need to use during the labs and lectures to take in-class quizzes and tests.
- **Required: Web, Zoom, and eCampus access:** The course material, assignments turn-in, and posting grades are handled through eCampus. The recommended browsers to access eCampus are Mozilla Firefox and Google Chrome.

## Grading Policy

### Grading Criteria

Homework Assignments	9%
Programming Assignments	27%
Culture Assignment	4%
Quizzes	15%
Exam I	15%
Exam II	15%
Exam III	15%

### Grading Scale

90–100	A
80–89.9	B
70–79.9	C
60–69.9	D
0–59.9	F

- Your final grade will be determined based on written homework, programming assignments, cultural assignment, quizzes, and exams.
- The assignment handout will provide points distribution. Each programming assignment will be graded focused on: algorithm design, usage of data structures and/or new user-defined types and their implementation, its correctness, tests, a typed report describing implemented algorithms and data structures, and results of computational experiments.
- **All grade appeals must be made no later than one week after the grade is posted.**

### Graded Attendance

- The students lab attendance is required and will be taken on regular basis using the Zoom records.
- The lecture attendance will be taken by pop quizzes. The students are responsible to learn all material covered in class, read the assigned text from the textbook and do homework assignments.
- The 2 bonus points will be added to your final score if you have a perfect lab attendance, or 1 point if you have only one lab absence.
- Make-up exams and quizzes will only be given with documented University-approved excuses, see [University Regulations](#). The student Rule 7 explains attendance policies and excused absences. Please discuss unusual circumstances in advance with the instructor.

### Notes about graded materials

- All homework assignments will be announced in class and posted on eCampus. See the course calendar for deadlines.
- The written part of homework assignments or programming reports, and the Cover Page should be typed preferably using LyX (document processor based on LaTeX), see the class webpage for a tutorial. The homework (LyX and PDF formats) should be submitted to eCampus.
- All programming assignments should be implemented in C++, compiled and run on a CSE departmental computer (Linux machine), and transferred to eCampus for grading. You should use Cisco to get access to the Computer Science servers.
- Culture assignments allow you to explore the latest developments in Computer Science and Engineering or learn about the famous computer scientists like Turing Award winners. The homework should be submitted to eCampus.
- Quizzes are over material covered during the lectures and assigned reading from the textbook.

### Late Work Policy

- A late homework assignment will be accepted **up to 2 weekdays with a 5% penalty for each late day**. Once solutions have been discussed or handed out the assignments will not be accepted. Please discuss unusual circumstances in advance with the instructor. Work submitted by a student as makeup work for an excused absence is not considered late work and is exempted from the late work policy. (See Rule 7.)

## Course Schedule

No.	Week	Day	Topic
1	Aug. 19	W	Introduction to Data Structures Pointers, Arrays, Vectors
2	Aug. 24	M	Introduction to Analysis of Algorithms Complexity of Search and Sort Algorithms
3	Aug. 31	M	Algorithms – Best, Worst, Average Cases The Lower Bound Theorem Linear Sort Algorithms
4	Sept. 07	M	Stack ADT – Array Based Implementation Amortized Analysis
5	Sept. 14	M	Queue ADT – Array Based Implementation Stack and Queue Applications. Parser
	Sept. 16	W	<b>Exam 1</b> Linked Lists in C++
6	Sept. 21	M	Linked List Based Stack Linked List Based Queue Deque
7	Sept. 28	M	Recursive Algorithms Analysis of Divide-and-Conquer Algorithms Iterating and Master Methods
8	Oct. 05	M	Trees   Binary Search Trees AVL Trees
9	Oct. 12	M	2-4 Trees   Red-Black Trees Skip Lists   Hashing
10	Oct. 19	M	<b>Exam 2</b> Priority Queues   Heap Huffman Tree
11	Oct. 26	M	Graphs BFS DFS   Digraph Algorithms
12	Nov. 02	M	Shortest Path Algorithms Dijkstra's Algorithm
13	Nov. 09	M	Minimum Spanning Trees Disjoint sets ADT
14	Nov. 16	M	Kruskal Algorithm
15	Nov. 23	M	Review
16	Dec. 01-09		<b>Final Exams</b>

- The topics and related chapters from the textbook:

Introduction	
C++ Overview: Arrays, Vectors, Strings, Matrices	Chap. 1
Introduction to Analysis of Algorithms	Chap. 2
Lists, Stacks, and Queues	Chap. 3
Trees and Search Trees	Chap. 4
Balanced Search Trees	Chap. 12.2
Hashing	Chap. 5
Priority Queues. Heaps.	Chap. 6
Sorting	Chap. 7
Disjoint Sets	Chap. 8
Graphs	Chap. 9
Algorithms Design	Chap. 10

- All changes in the schedule will be announced in class and at the class calendar. Please see also University Academic Calendar .
- Use eCampus to get an access to the lecture notes, quizzes and tests, to submit your assignments, and check your grades during the semester.

## Optional Course Information Items

### Learning Resources

- You may have noticed from the syllabus that this course focuses on obtaining a computer science background and developing programming skills. Programming is not something you can learn overnight by reading a textbook or lecture notes; it requires a lot of practice. The TAs assigned and I are willing to help you to learn and understand the course material, and help you to master your programming skills so please see us during our office hours. A few hints about how to succeed in this course:
  - attend class and lab meetings regularly
  - read lecture notes and related material in the textbook, and feel free to ask questions.
  - study for quizzes and tests.
  - retype and implement in C++ examples from the lecture notes and textbook.
  - complete all labs and projects.
  - if you have any course related questions please visit us during our office hours, see times on the e-Campus.
  - use the online Piazza to ask questions and participate in discussions. You are responsible for the posted information.

In general, Computer Science is not an easy subject but it will pay off after graduation.

## 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).

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).

**Copyrights:** The course materials used in this course are copyrighted. All handouts prepared for this class, which include syllabi, in-class exercises, lecture notes or slides, exams, quizzes, programming assignments, samples of code, homework, review sheets, problem sets, and solutions provided by the instructor. Because it is a copyrighted work, you do not have the rights to copy or distribute the course material, unless the author expressly grants permission.

**Scholastic Dishonesty:** Discussion of solutions is encouraged, but all assignments must be done on your own. If you use sources other than the textbook or lecture notes, list them in a [homework cover page](#). Any homework or project, which in the opinion of the instructor shows evidence of copying, will receive a lower grade or even zero. See the latest issue of the “*Texas A&M University Student Rules*” under the section “*Scholastic Dishonesty*” posted on [Student Rules website](#).

**Campus Emergencies or Code Maroon:** see [CodeMaroon.tamu.edu](http://CodeMaroon.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](http://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 that influence a student’s academic success and overall wellbeing. Students are encouraged to engage in proper self-care by utilizing the resources and services available from Counseling & Psychological Services (CAPS). Students who need someone to talk to can 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).

## **COVID-19 (Temporary Amendment)**

### **Campus Safety Measures**

To promote public safety and protect students, faculty, and staff during the coronavirus pandemic, Texas A&M University has adopted policies and practices for the Fall 2020 academic term to limit virus transmission. Students must observe the following practices while participating in face-to-face courses and course-related activities (office hours, help sessions, transitioning to and between classes, study spaces, academic services, etc.):

- Self-monitoring—Students should follow CDC recommendations for self-monitoring. **Students who have a fever or exhibit symptoms of COVID-19 should participate in class remotely and should not participate in face-to-face instruction.**
- Face Coverings—Face coverings (cloth face covering, surgical mask, etc.) must be properly worn in all non-private spaces including classrooms, teaching laboratories, common spaces such as lobbies and hallways, public study spaces, libraries, academic resource and support offices, and outdoor spaces where 6 feet of physical distancing is difficult to reliably maintain. Description of face coverings and additional guidance are provided in the Face Covering policy and Frequently Asked Questions (FAQ) available on the Provost website.
- Physical Distancing—Physical distancing must be maintained between students, instructors, and others in course and course-related activities.
- Classroom Ingress/Egress—Students must follow marked pathways for entering and exiting classrooms and other teaching spaces. Leave classrooms promptly after course activities have concluded. Do not congregate in hallways and maintain 6-foot physical distancing when waiting to enter classrooms and other instructional spaces.
- To attend a face-to-face class, students must wear a face covering (or a face shield if they have an exemption letter). If a student refuses to wear a face covering, the instructor should ask the student to leave and join the class remotely. If the student does not leave the class, the faculty member should report that student to the Student Conduct office for sanctions. Additionally, the faculty member may choose to teach that day's class remotely for all students.
- The CSCE 221 specific policy: *The lectures are remote-synchronous and the labs are face-2-face based on the students comfort level. The plan is to facilitate the lectures and labs over Zoom to give everyone access during lecture/lab time. The social distancing will still be enforced in the labs and students who attend in person will be required to be on Zoom when needing assistance. The face covering in classrooms is required. Please find more details at the Provost's messages website: Fall 2020 Courses at Texas A&M University*

### **Personal Illness and Quarantine**

Students required to quarantine must participate in courses and course-related activities remotely and must not attend face-to-face course activities. Students should notify their instructors of the quarantine requirement. Students under quarantine are expected to participate in courses and complete graded work unless they have symptoms that are too severe to participate in course activities.

Students experiencing personal injury or Illness that is too severe for the student to attend class qualify for an excused absence (See Student Rule 7, Section 7.2.2.) To receive an excused absence, students must comply with the documentation and notification guidelines outlined in Student Rule 7. While Student Rule 7, Section 7.3.2.1, indicates a medical confirmation note from the student's medical provider is preferred, **for Fall 2020 only, students may use the Explanatory Statement for Absence from Class form in lieu of a medical confirmation. Students must submit the Explanatory Statement for Absence from Class within two business days after the last date of absence.**

### **Operational Details for Fall 2020 Courses**

For additional information, please review the FAQ on Fall 2020 courses at Texas A&M University.