

Data Structures, COSC 2437
Department of Computing Sciences
Fall 2021

A. COURSE INFORMATION

Course number/section: COSC 2437.001
Class meeting time: TR 09:30 - 10:45 AM (Lecture)
R 11:00 - 12:50 PM (Lab) Section 2437.201
R 01:00 - 02:50 PM (Lab) Section 2437.301
Class location: CI-126 (Lecture); CI-228 (Lab Section 2437.201);
CI-228 (Lab Section 2437.301)
Course Website: bb9.tamucc.edu

B. INSTRUCTOR INFORMATION

Instructor: Marwa Hassan
Office location: RFEB 316M
WebEx Room: <https://tamucc.webex.com/meet/mhassan>
Office hours: M 12:30 PM - 02:30 PM
T 12:30 PM - 02:30 PM
F 09:00 AM - 10:00 AM
Telephone: (361) 825-3248
e-mail: marwa.hassan@tamucc.edu
Appointments: Please email for appointments

C. COURSE DESCRIPTION

This course provides a thorough study of standard structures used in the storing and retrieving of data and the process by which these structures are created and manipulated.
Topics include: abstract data types, linked lists, trees, hashing, stacks, queues, sorting, searching, and recursion.

D. PREREQUISITES AND COREQUISITES**Prerequisites**

COSC 1436 and MATH 2305

Corequisites

None

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES**Required Textbook(s)**

- Data Structures Using C++, 2nd Edition by D. S. Malik (ISBN: 0-32-478201-2)

Optional Textbook(s) or Other References

- Starting Out with C++: From Control Structures through Objects, 9th Edition by Tony Gaddis, Addison-Wesley (ISBN-13: 9780134498379)

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT

Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course's student learning outcomes that describe what students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.

- Understand and use searching and sorting algorithms.
- Understand the concept of algorithm efficiency and be able to determine the Big-O efficiency of an algorithm.
- Understand the concept of object-oriented programming through the use of abstract data types.
- Understand and use dynamic memory allocation to create list, stack, and queue data structures.
- Understand and use dynamic memory allocation to create tree data structures.
- Be able to analyze and select appropriate data structures to implement a solution to a problem.
- Understand and use recursion to solve a problem.
- Understand the basic concepts of graph data structures and some of the algorithms associated with graphs.

By the end of this course, students should be able to:

1. Use knowledge of both computing and mathematics to obtain an efficient and cost-effective solution for a computing problem
2. Analyze a given problem or a system
3. Design a computer-based system, process, component, or program to meet desired needs
4. Apply current software development methodologies or techniques
5. Understand the differences in space/time complexity of algorithms.
6. Apply software principles to solutions to problems of varying complexity

Assessment of objectives will be conducted through homework assignments, quizzes and exams.

G. INSTRUCTIONAL METHODS AND ACTIVITIES

This is an intermediate level course. However, this is a difficult course that demands all students attend all classes! Regular completion of all reading, homework, and other outside assignments, are absolutely essential for success in this course.

The methods and activities for instruction will include but not limited to:

- Presentation of new material and concepts in the classroom using lecture, tutorials, and sample programs.
- Classroom and lab discussions.
- Lab assignments to review and reinforce topics covered in the classroom.

H. MAJOR COURSE REQUIREMENTS AND GRADING

Your course grade will be decided on your performance in the lab activities, assignments, quizzes, two midterm exams, and the final exam. The distribution of points is as follows:

ACTIVITY	% of FINAL GRADE
Exam 1	15
Exam 2	15
Final Exam	20
Assignments	20
Programming Quizzes	10
Lab Activities	10
Class Participation and Quizzes	10

Grading scale: A: 100-90, B: 89-80, C: 79-70, D: 69-60, and F: 59-0.

I. COURSE CONTENT/SCHEDULE

WEEK	TOPIC	CHAPTER(S)
Week 1	Introduction and Overview	
Week 2	Software Engineering Principles, Object-Oriented Design (OOD)	1, 2
Week 3	Object-Oriented Design (OOD), Pointers	2, 3
Week 4	Linked Lists	5
Week 5	Recursion	6
Week 6	Recursion - Exam 1	-
Week 7	Stacks	7
Week 8	Queues	8

Week 9	Searching and Hashing Algorithms	9
Week 10	Searching and Hashing Algorithms – Exam 2	9
Week 11	Sorting Algorithms	10
Week 12	Binary Trees and B-Trees	11
Week 13	Binary Trees and B-Trees	11
Week 14	Graphs	12
Week 15	Graphs	12
Final Exam: Thursday, December 9th 8:00 a.m. – 10:30 a.m.		

Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor.

J. COURSE POLICIES

Attendance/Tardiness

The students are expected to attend on time every day the class meets. Attendance and active participation are crucial. Read the chapter to be discussed before attending class. Ask questions of material you do not understand. If I cannot explain the answers to your satisfaction, make an appointment with me to discuss the question. You are responsible for all material presented in class. Demonstrate integrity, maturity, and ethical behavior.

Make-up Exams

Makeup exams will not be given under normal circumstances. If you notify me immediately that serious, unavoidable, documentable (e.g., with a letter from your doctor) circumstances have arisen, I will discuss options for replacing the missing grade. (For example, I may allow the grade earned on the comprehensive final to replace the grade for the missed exam.) Excused absences due to school sponsored activities, religious observations, family rituals, etc. should be discussed in advance.

Assignments

Due dates are listed in each assignment. Assignments are accepted until the specified due date.
- Late work penalty: 25% if one day late (up to 24 hours late); 50% if two days late (from 24 to 48 hours late); zero credit if more than two days.

Be sure to backup copies of all your programs. Note that any kind of hardware or software failure or machine unavailability in the lab does not merit an extension on the assignment.

Collaboration

The assignments are to be completed individually unless instructed otherwise. You may ask each other for general advice, but do NOT share final answers and/or source code. Be sure to protect your work.

Working with others without the specific permission of the instructor on assignments that will be submitted for a grade is considered unauthorized collaboration and will be treated as copying. Action will be taken as discussed under the academic honesty policy.

If unsure about the limits, students must seek the instructor's permission before working with one another.

Professional Conduct & Behavior

Inappropriate behavior or misconduct in the classroom or any correspondence with the instructor, the TA(s) or peer students in the classroom or in the lab will result in automatic 0 grade for the respective coursework and may result in an automatic final grade of F. Inappropriate conduct includes, but not limited to, irrelevant comments, profanity, unprofessional language, etc. Correspondences include exam papers, quizzes, submitted assignments, Blackboard comments, emails, etc.

Student Safety Trainings

Required safety trainings and/or lab safety seminars must be successfully completed once every academic year, normally in the Fall. Students will be required to take the course from Blackboard in either the first lecture or first lab to complete their training assignments and show the certificate of completion before the end of the class or lab. Students who are still covered by having taken the safety training earlier should show their certificate of completion. For students unable to attend first day of class/lab (or still registering for the class), a reasonable completion date will be flagged in Starfish. A possible grade penalty can be enforced for non-completion.

K. COLLEGE AND UNIVERSITY POLICIES**Campus Emergencies***

At TAMU-CC, your safety is a top concern. We actively prepare for natural disasters or human-caused incidents with the ultimate goal of maintaining a safe and secure campus.

- For any emergency, dial the University Police Department (UPD) at **361-825-4444** or dial 911. It's a good idea to have the UPD emergency number (and non-emergency number 361-825-4242) saved in your cell phone.
- There are nearly 200 classroom telephones throughout campus. If you feel threatened or need help and don't have a cell phone, dial 4444 (emergency) or 4242 (non-emergency) to be connected to UPD.
- If we hear a fire alarm, we will immediately evacuate the building:
 - Proceed to the nearest building exit or evacuation stairway. Do not use the elevator. Persons who need help navigating stairs should proceed to a marked Area of Rescue Assistance, if possible.

- Persons with disabilities should speak with their faculty about how to best assist them in case of an emergency.
 - Review the evacuation route (see specific Building Emergency Plan).
- TAMU-CC employs the Code Blue Emergency Notification System, an alert system which connects the campus community during emergency situations.
 - The notifications include emails, text and pre-recorded messages, as appropriate.
 - Code Blue emergencies may include severe weather warnings, threats, school closures, delays, evacuations and other incidents which disrupt regular campus activities.
 - Students can update personal contact information anytime at <https://emergency.tamucc.edu/contactform/>
- Shelter in Place via Code Blue.
 - "Shelter-in-place" means to take immediate shelter where you are and may be implemented for severe weather, hazardous material spills, active shooters or other dangerous situations.
 - If there is a shelter in place for a **tornado warning**, our preferred location is the bottom floor of this building, away from windows and doors.
- Active Threat Protocol. There are three things you could do that make a difference if there is an active threat: Run, Hide, and/or Fight. For more information about the Run, Hide, Fight protocol, including what to do when law enforcement arrives, visit <http://safety.tamucc.edu/ems/activethreat.html>

For the *Quick Campus Guide to Campus Emergencies* (including a list of Areas of Rescue Assistance and additional protocols on assisting persons with physical disabilities, hurricanes, bomb threats, animal bites, crime reporting, elevator entrapment, etc.), visit <https://safety.tamucc.edu/uploads/Site/finalbooklet.pdf>

- **Academic Integrity (University)**

University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one's own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a failing grade.

- **Classroom/Professional Behavior**

Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor's ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms,

labs, discussion groups, field trips, etc.

- **Statement of Civility**

Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high-quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state and federal government. We expect that you 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.

- **Deadline for Dropping a Course with a Grade of W (University)**

I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. ***Please consult with your academic advisor, the Financial Aid Office, and me, before you decide to drop this course.*** Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Please consult the Academic Calendar (<http://www.tamucc.edu/academics/calendar/>) for the last day to drop a course.

- **Grade Appeals (College of Science and Engineering)**

As stated in University Procedure 13.02.99.C0.03, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is required to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C0.03, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at

http://academicaffairs.tamucc.edu/rules_procedures/assets/13.02.99.c0.03_student_grade_appeals.pdf). For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

- **Disability Services**

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.

If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

<http://disabilityservices.tamucc.edu/>

- **Civil Rights Complaints**

Texas A&M University-Corpus Christi is committed to fostering a culture of caring and respect that is free from discrimination, relationship violence and sexual misconduct, and ensuring that all affected students have access to services. For information on reporting Civil Rights complaints, options and support resources (including pregnancy support accommodations) or university policies and procedures, please contact the University Title IX Coordinator, Sam Ramirez (Samuel.ramirez@tamucc.edu) or Deputy Title IX Coordinator, Rosie Ruiz (Rosie.Ruiz@tamucc.edu) x5826, or visit website at [Title IX/Sexual Assault/Pregnancy](#).

Limits to Confidentiality. Essays, journals, and other materials submitted for this class are generally considered confidential pursuant to the University's student record policies. However, students should be aware that University employees, including instructors, are not able to maintain confidentiality when it conflicts with their responsibility to report alleged or suspected civil rights discrimination that is observed by or made known to an employee in the course and scope of their employment. As the instructor, I must report allegations of civil rights discrimination, including sexual assault, relationship violence, stalking, or sexual harassment to the Title IX Coordinator if you share it with me.

These reports will trigger contact with you from the Civil Rights/Title IX Compliance office who will inform you of your options and resources regarding the incident that you have shared. If you would like to talk about these incidents in a **confidential** setting, you are encouraged to make an appointment with counselors in the [University Counseling Center](#).

- **Statement of Academic Continuity**

In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

L. OTHER INFORMATION

- **Academic Advising**

The College of Science & Engineering requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. Meetings are by appointment only; advisors do not take walk-ins. Please call or stop by the Advising Center to check availability and schedule an appointment. The College's Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

GENERAL DISCLAIMER

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.