Data Structures, COSC 2437
Department of Computing Sciences
Fall 2020

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: OCNR-116 (Blended Instruction*);
Labs are fully online, CI-226 will be available only to those who
need computer/internet access during lab time. Signing up is
required.
Course Website: bb9.tamucc.edu

*This course is offered as a blended course. About 85 percent of the planned instruction will be
conducted virtually in a synchronous manner. In case of any face-to-face meetings, the date and
details will be announced ahead of time, however, face-to-face attendance will be optional and a
synchronous virtual option will be available.

B. INSTRUCTOR INFORMATION
Instructor: Marwa Hassan
Office location: RFEB 316J
WebEx Room: https://tamucc.webex.com/meet/mhassan
Office hours: Office hours will be held virtually via WebEx
M 02:00 PM - 03:00 PM
T 01:00 PM - 03:00 PM
F 08:00 AM - 10:00 AM
Telephone: (361) 825-3248
e-mail: marwa.hassan@tamucc.edu
Appointments: Please email for appointments (for either in-person or virtual)

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)**

**Optional Textbook(s) or Other References**

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:

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1</td>
<td>15</td>
</tr>
<tr>
<td>Exam 2</td>
<td>15</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20</td>
</tr>
<tr>
<td>Assignments</td>
<td>15</td>
</tr>
<tr>
<td>Programming Quizzes</td>
<td>15</td>
</tr>
<tr>
<td>Lab Activities</td>
<td>10</td>
</tr>
<tr>
<td>Class Participation and Quizzes*</td>
<td>10</td>
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</tbody>
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**Grading scale:** A: 100-90, B: 89-80, C: 79-70, D: 69-60, and F: 59-0.

*Class Participation and Quizzes require **synchronous (virtual)** attendance.

I. COURSE CONTENT/SCHEDULE

<table>
<thead>
<tr>
<th>WEEK</th>
<th>TOPIC</th>
<th>CHAPTER(S)</th>
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</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Introduction and Overview</td>
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<tr>
<td>Week 2</td>
<td>Software Engineering Principles, Object-Oriented Design (OOD)</td>
<td>1, 2</td>
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<tr>
<td>Week</td>
<td>Topic</td>
<td>Section</td>
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<tr>
<td>3</td>
<td>Object-Oriented Design (OOD), Pointers</td>
<td>2, 3</td>
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<td>4</td>
<td>Linked Lists</td>
<td>5</td>
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<tr>
<td>5</td>
<td>Recursion</td>
<td>6</td>
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<tr>
<td>6</td>
<td>Recursion - <strong>Exam 1</strong></td>
<td>-</td>
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<tr>
<td>7</td>
<td>Stacks</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>Queues</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>Searching and Hashing Algorithms</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>Searching and Hashing Algorithms – <strong>Exam 2</strong></td>
<td>9</td>
</tr>
<tr>
<td>11</td>
<td>Sorting Algorithms</td>
<td>10</td>
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<tr>
<td>12</td>
<td>Binary Trees and B-Trees</td>
<td>11</td>
</tr>
<tr>
<td>13</td>
<td>Binary Trees and B-Trees</td>
<td>11</td>
</tr>
<tr>
<td>14</td>
<td>Graphs</td>
<td>12</td>
</tr>
<tr>
<td>15</td>
<td>Graphs</td>
<td>12</td>
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**Final Exam: Thursday, December 3rd**
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**

**COVID-19**

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. Extra masks will be made available if needed.

**Attendance/Tardiness**

The students are expected to attend class on time every day the class meets, either virtually or face-to-face. 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.

*Any planned face-to-face meetings require following university safety protocols including wearing face masks and maintaining social distancing.*

**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.

**Electronics**

- Turn off all electronic devices including cell phones when you enter the classroom.
- Use of computers is only allowed for taking notes and class-related activities. Surfing the Internet, playing games, or otherwise participating in distracting behavior are not allowed and will result in automatic grade reduction and/or being asked to leave class.

**Food in Class**
No food is allowed in the class or labs.

K. COLLEGE AND UNIVERSITY POLICIES

- 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/](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.