



## **COSC 2336 02W Data Structures and Algorithms**

COURSE SYLLABUS: Spring 2021

### **INSTRUCTOR INFORMATION**

Instructor:	Derek Harter, Ph.D., Professor
Office Location:	Science 355
Office Hours:	Zoom/by appointment
University Email Address:	Derek.Harter@tamuc.edu
Preferred Form of Communication:	e-mail

### **COURSE INFORMATION**

Materials – Textbooks, Readings, Supplementary Readings

#### **Textbook(s) Required**

Malik, D. S. “C++ Programming: From Problem Analysis to Program Design”, 6ed. (or higher) Cengage Learning, 2013. (ISBN: 978-1133626381). (7 th edition published in 2014, and 8 th edition published in 2017).

Shaffer, C.A. “Data Structures and Algorithm Analysis”, Dover Publications.  
<http://people.cs.vt.edu/~shaffer/Book/>

#### **Software Required**

You will be given a virtual class development box for this class. You are required to have a computer with at least 4GB of memory, running Windows, MacOS or Linux operating systems. You will need to install git, VirtualBox and Vagrant software (see getting started instructions).

### **Course Description**

This course continues with the concept of abstract data structures (classes) begun in COSC 1337 Programming II and concentrates on building programming tools known as container classes which can be used to store and manipulate data. Topics covered

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include address variables, linked lists, stacks, queues, recursion, analysis of algorithm efficiency, binary search trees, and hash tables.

## **Student Learning Outcomes**

After completion of this course, you will be able to use classes to implement the basic data structures (stacks, queues, linked lists, trees, and hash tables) and to use predefined classes from the Standard Template Library. You will be able to design and code a program for application areas in which these data structures would be useful. Given multiple algorithms to solve the same problem, you will be able to estimate which algorithm would be more efficient in terms of time and memory required.

1. Use address variables.
2. Use the linked list data structure.
3. Use the stack data structure.
4. Use the queue data structure.
5. Design, code, and use recursive functions.
6. Understand Big-O notation (for algorithm efficiency): what it means, how it is determined, and why it should be considered in effective programming.
7. Use the binary tree data structure and a hash table.
8. Integrate the use of container classes (user-created or STL) into a moderately complex program solution.

## **COURSE REQUIREMENTS**

### **Minimal Technical Skills Needed**

- Must be familiar with creating programs in a C++ IDE, using a debugger, and able to write simple programs in C/C++ (declaring variables, loops, condition statements, functions, etc.)
- CSCI 152 or COSC 1337 minimum grade C

### **Instructional Methods**

All materials, assignments and tests will be conducted through the D2L MyLeo Online learning system. We will have weekly programming assignments, quizzes and tests delivered online through our course learning management system. Please check MyLeo Online regularly. All assignments and tests will be uploaded and submitted online through the D2L MyLeo Online system.

### **Student Responsibilities or Tips for Success in the Course**

1. Read all assigned textbook and supplemental materials.
2. Check D2L at least once a day.
3. Read the textbook before and after every lecture, and use the provided materials and videos as guidelines for your self-study.

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4. Start your homework assignments early. There will be many assignments and you will not receive credit for late assignments.
5. Do your own work, unless you are otherwise working on an assigned team project or program. If you have difficulties in an assignment, ask the instructor. Do not copy other people's work.
6. Contact the instructor when you are confused.
7. Seek help from lab tutors in Jour 101 or 200 when you need.

## **GRADING**

Final grades in this course will be based on the following scale:

A = 90%-100%

B = 80%-89%

C = 70%-79%

D = 60%-69%

F = 59% or Below

Your weighted total grade will be computed using the following weights.

- Two exams (Midterm and Final Exams): 20% each (40% total for course)
- Online Quizzes: 10% (10-14, or one each week).
- Programming Assignments: 50% (also 10-14, or one each week).

There will usually be a weekly quizzes due by Saturday of the week. Quizzes will consist of multiple choice and true/false questions, taken from the review and exercise questions from our textbook chapters. Part of the exams will also consist of similar questions, so quizzes are meant to be a practice for this portion of the class exams.

Likewise there will be regular programming assignments. Programming assignments will be due on the end of the week (Sundays/weekends). There will be some longer programming questions on the exams, so these programming assignments will serve as preparation for that portion of the exams. In addition, programming assignments are worth a significant portion of your total grade, so you must at least attempt and do well on all of the programming assignments in order to receive a good grade in this course.

## **Assessments**

Assignments will be graded on the following:

- meet specification of assignment
- have good organization and logic

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- demonstrate good form, including remarks and indentation
- on-time (Late submission subject to the penalty.)

Quizzes and exams are graded based on the correctness of the answers. All exams are comprehensive. The time of each exam will be announced one week before the exam. Exams will be timed, usually for 1 to 2 hours, but you will have usually a 24 hour period on MyLeo Online in which to start and attempt the exam. Quizzes are not comprehensive unless otherwise specified. Likewise quizzes will be short, and will usually be due on Thursday of the week.

All work is individual work unless a group project is specifically assigned. Plagiarism in code or in working together on tests or quizzes is a violation of university academic ethics, and if you are found guilty of inappropriate collaboration or copying of others work, you may be subject to failure of the class and possible university ethics violation proceedings.

## **Assignments**

It is acceptable to work on the programming assignments for this class in small groups. You can work by yourself if you prefer, or have a group of 2 or 3 other fellow students to discuss and work on the assignments together. I know some students work and learn better this way when they can form small study groups. If your group will be larger than 3 students please run it by me and get permission first.

However your work, whether as an individual or a small group must be original. You must start all of your solutions without using past posted solutions or student submissions to refer to and/or make up parts or wholes of your assignments. This also includes that teams this semester should also work only with their own team members, and not share or show code with other students not in the team. Discussion of general approaches is fine, but people should not be looking at other peoples code (not in their group) from current or past attempts at the assignments.

Your group can change from assignment to assignment. You do not need to keep the same group for all assignments if you don't wish to, or if you want to do an assignment on your own sometimes, but form a group for some others.

If you are submitting an assignment as a team, make sure that all files created have a correct file header at the top, and that you list all student members of the team (in alphabetical order) in the @authors tag at the top. You should omit any @cwid information for a group as you really should not be sharing your campus wide id with other students in any case. Also, if team members were particularly responsible for particular aspects or parts of your solutions, giving credit and some general description of the team members contributions in the @description is good standard practice.

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You can have a single team member submit your full solution, and other team members only submit a file containing the file header from your project with the @authors and a note of which team member submitted the official full version of your solution. It is also acceptable for all team members to submit your team full solution, but in that case make sure that all versions are identical as I will not check and will not change the grade if I happen to grade a broken or otherwise less well done attempt.

### **Quizzes and Tests**

Quizzes and Tests will still be required to be individual efforts for this class. You may not work with others or see others answers to the tests before taking the test yourself. We will be more diligent in looking for students who are working on tests together since we have allowed some collaboration on the programming assignments, so please be advised. Because of accreditation requirements, in core courses like this one we need to have measurements that reflect individual students performance and comprehension of the materials. It can be tempting if you are struggling with the material to copy and cheat on these assessments, but if you are caught you will loose the grade for the assessment and may be referred to the college for disciplinary actions.

This course employs Proctorio, a proctoring service to ensure exam security. Proctorio relies upon an algorithm to flag suspicious behavior. Your instructor can review recorded testing sessions to determine if cheating has taken place. An exam should be a measure of a student's learning. Academic dishonesty diminishes a student's learning, and also devalues the learning of other students. It is unacceptable in an academic community.

## **TECHNOLOGY REQUIREMENTS**

### **LMS**

All course sections offered by Texas A&M University-Commerce have a corresponding course shell in the myLeo Online Learning Management System (LMS). Below are technical requirements

LMS Requirements:

<https://community.brightspace.com/s/article/Brightspace-Platform-Requirements>

LMS Browser Support:

[https://documentation.brightspace.com/EN/brightspace/requirements/all/browser\\_support.htm](https://documentation.brightspace.com/EN/brightspace/requirements/all/browser_support.htm)

YouSeeU Virtual Classroom Requirements:

<https://support.youseeu.com/hc/en-us/articles/115007031107-Basic-System-Requirements>

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## **ACCESS AND NAVIGATION**

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or [helpdesk@tamuc.edu](mailto:helpdesk@tamuc.edu).

**Note:** Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a TAMUC campus open computer lab, etc.

## **COMMUNICATION AND SUPPORT**

If you have any questions or are having difficulties with the course material, please contact your Instructor.

### **Technical Support**

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found here:

<https://community.brightspace.com/support/s/contactsupport>

### **Interaction with Instructor Statement**

Please use e-mail and through the MyLeoOnline course to ask questions and for help, and to set up additional appointments if needed. We may use some of the MyLeoOnline virtual classroom tools this semester for online class feedback sessions.

## **COURSE AND UNIVERSITY PROCEDURES/POLICIES**

### **Course Specific Procedures/Policies**

There will be no make up or extra credit for late assignments. You must turn in all assignments by the require due date, or notify the instructor with a valid reason for missing an assignment.

### **Syllabus Change Policy**

The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance.

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## **University Specific Procedures**

### **Student Conduct**

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The Code of Student Conduct is described in detail in the [Student Guidebook](#).

<http://www.tamuc.edu/Admissions/oneStopShop/undergraduateAdmissions/studentGuidebook.aspx>

Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum:

<https://www.britannica.com/topic/netiquette>

### **TAMUC Attendance**

For more information about the attendance policy please visit the [Attendance](#) webpage and [Procedure 13.99.99.R0.01](#).

<http://www.tamuc.edu/admissions/registrar/generalInformation/attendance.aspx>

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/academic/13.99.99.R0.01.pdf>

### **Academic Integrity**

Students at Texas A&M University-Commerce are expected to maintain high standards of integrity and honesty in all of their scholastic work. For more details and the definition of academic dishonesty see the following procedures:

[Undergraduate Academic Dishonesty 13.99.99.R0.03](#)

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/undergraduates/13.99.99.R0.03UndergraduateAcademicDishonesty.pdf>

[Graduate Student Academic Dishonesty 13.99.99.R0.10](#)

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/graduate/13.99.99.R0.10GraduateStudentAcademicDishonesty.pdf>

### **Students with Disabilities-- ADA Statement**

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 have a disability requiring an accommodation, please contact:

#### **Office of Student Disability Resources and Services**

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Texas A&M University-Commerce  
Gee Library- Room 162  
Phone (903) 886-5150 or (903) 886-5835  
Fax (903) 468-8148  
Email: [studentdisabilityservices@tamuc.edu](mailto:studentdisabilityservices@tamuc.edu)

Website: [Office of Student Disability Resources and Services](#)

<http://www.tamuc.edu/campusLife/campusServices/studentDisabilityResourcesAndServices/>

### **Nondiscrimination Notice**

Texas A&M University-Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

### **Campus Concealed Carry Statement**

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in Texas A&M University-Commerce buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and A&M-Commerce Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations.

For a list of locations, please refer to the [Carrying Concealed Handguns On Campus](#) document and/or consult your event organizer.

Web url:

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf>

Pursuant to PC 46.035, the open carrying of handguns is prohibited on all A&M-Commerce campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

### **COURSE OUTLINE / CALENDAR**

<b>Week</b>	<b>Topic</b>	<b>Textbook Reading</b>
01	Review functions, enumerated types, arrays	Ch. 6, 7, 8
02	Structures and Classes	Ch. 9, 10
03	Pointers, dynamics variables and memory management	Ch. 12

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04	Recursion	Ch. 15
05	Searching and Sorting	Ch. 16
06	Analysis of Algorithms	Supplemental material
07	Inheritance, Overloading and Templates	Ch. 11, 13
08	Midterm Exam	
09	Linked Lists	Ch. 17
10	Stacks	Ch. 18
11	Queues	Ch. 18
12	Trees	Supplemental material
13	Hashing and Dictionaries	Supplemental material
14	Standard Template Library	Appendix H
15		
16	Final Exam	

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