MT. SAN ANTONIO COLLEGE, WALNUT

Math/Computer Science Department
Spring 2020
Syllabus for CSCI 230 -- 43486
Data Structures II
Prof. Tuan A Vo
MW 1:45 pm - 4:10 pm, Room 61-1418

Course Description

CSCI 230 -- Basic searching and sorting algorithms, hashing, graphs, memory/disk management, B-trees, advanced tree structures and analysis. *Prerequisite*: CSCI 220. Units: 3.5 (3 lecture units and 0.5 lab unit).

Student Learning Outcomes (SLO)

1. Students will be able to implement efficient searching techniques including hash tables and skip lists.
2. Students will be able to implement and analyze running time for various sorting algorithms.
3. Students will be able to represent graphs and implement well-known graph algorithms.
4. Students will be able to differentiate the costs between memory access and disk access.

Course Measurable Objectives (CMO)

1. Analyze algorithms and select the most efficient one to solve a problem.
2. Implement sorting algorithms.
3. Implement hashing algorithms.
4. Use self-organizing lists in problem solving.
5. Understand and implement graph algorithms.
6. Estimate running time for sort, search, and graph algorithms.
7. Identify main memory access and disk access costs.
8. Utilize object-oriented techniques in design of data structures and algorithms.

Office Hours and Addresses

Office Location:	61-1654
Office Hours:	MW 1:00 pm – 1:45 pm TuTh 7:15 am – 8:00 am, Tu 1:35 pm – 2:35 pm
Office Phone:	(909) 274-4519
Email:	tvo@mtsac.edu
Web Page:	http://zeus.mtsac.edu/~tvo
Course Link:	https://myportal.mtsac.edu (via Canvas)

Textbooks and Materials

- M. Goodrich, R. Tamassia, and D. Mount, *Data Structures and Algorithms in C++*, Second Edition, Wiley, 2011 (can also use the 6th edition of the Java book as well).
- Access to a computer with a C++/Java compiler (available in Math/CSCI computer lab).
- Some USB storages to store and submit your work.

Grading

Grading will be based on homework assignments, pop quizzes/in-class exercises, exams, and projects. The final grade is generally based on a straight scale:

A >= 90%, 80% <= B < 90%, 70% <= C < 80%, 60% <= D < 70%, F < 60%.

Percent	Items	Lecture Points	Lab Points
9%	Homework -- 3	90	
12%	Labs -- 12		120
20%	Projects -- 4		200
4%	Pop Quizzes/Class Exercises -- 8	40	
30%	Exams -- 2	300	
4%	Lab Final -- comprehensive		40
21%	Written Final -- comprehensive	210	

All assignments must be turned in at the beginning of the class session on the due date (only labs will be due at the end of the class). Unless you received my prior approval, late assignments will only be accepted up to the beginning of the next class session with a 10% deduction. All exams will cover the homework assignments, textbook reading assignments, labs, projects, and class activities. The exams will usually consist of true/false, multiple choice, code tracing, problem solving, and short essay questions. Tests can only be made up with instructor's prior approval or special circumstance that can be substantiated.

Some potential extra credit points can be earned from projects, class activities, and excellent work. A pop quiz or class exercise can be given any time (must be there when it is given out or up to the half way point at the latest and no make-up pop quizzes) so make sure to come to class on time and be there for the duration of the class.

Lab Activities

The goal of the lab is to enhance teaching/learning and to develop a deeper understanding of concepts taught in class. We will use lab time to lecture on topics, demonstrate new concepts via programming examples, and you would have time to try out new concepts under the supervision of your professor. Lab activities would include going over new concepts, solving problems, modifying existing programs, testing programs, debugging programs, and conducting experiments. Important concepts will be demonstrated so you can complete your labs and programming projects. Besides coding analysis, design, testing and debugging it will be important that you learn individually or in collaborative group work. You might be asked to present/share your solutions with other students so giving you a chance to learn from others.

Students need to prepare for lab by reading the material assigned and covered in lecture. Each lab will start with a preview of the concepts on which the lab is based in one of the following forms:

instructor lecture or demonstration, class questions or discussion, using class worksheets: T/F, fill-in blanks, or short answers. Class lab handouts will guide you to use the lab resources, lab textbook or interactive visualization software. Handouts on specific additional topics, code skeletons or demonstrations will be provided.

As you work on code, it is recommended that you talk to each other (unless otherwise instructed) or ask your instructor for individual help. If a topic will be of interest for the whole class, we will take it up for class discussion and your instructor will lecture or demonstrate to clarify that topic. When you create your code, your work will be supervised, and your instructor will take questions to make sure you understand the concepts. Programming will be done on mostly MS Windows OS, but we might explore some other OS as well. Your answers to questions on the lab handouts will provide feedback and help access your work. You will be asked to formulate your own conclusions in projects and lab worksheets, and we shall use discussions, presentations or lectures to present/debate these conclusions. The lab assignments, projects, worksheets, and lab final represent 36% of your total grade.

Lab grading:

Programming projects -- 200 points
Graded lab worksheets -- 120 points
Mandatory lab final -- 40 points

Total lab -- 360 points

Cheating/Plagiarism

Cheating and plagiarism will not be tolerated in any shape or form in this class. Unless you are prepared to do your own work, DO NOT take this class. Zero will be given to an assignment for the first offense and a second offense would result in a grade of "F" for the course. In addition, you may be subject to Mt. San Antonio College's student discipline process. This policy is applied to both the copier and/or the provider so protect your work. You cannot work together on any assignments unless directed by your instructor. Academic dishonesty includes but is not limited to cheating on a test, sharing a solution, sharing code, and using unauthorized code. It is not okay to let someone look at your code! When in doubt, ask your instructor. In addition, refer to the school catalog for additional information.

Useful Information

Last day to withdraw without a "W" is 03/08/2020 and last day to withdraw without getting A-F grade from this class is 05/01/2020. It is your responsibility to drop/withdraw from the class or you will receive a grade. Since programming is part of the course, be prepared to be very patient and willing to spend a great deal of time with and without a computer! Any C++ or Java compiler can be used to complete your assignments.

I usually check email once a day during the week so it would be best to see me during my office hours for help. For help with a program, bring a hardcopy as well as an electronic copy of your program.

We will have seating assignment so do come early in the second meeting to select your seat. Do not eat or drink in the classroom. Please advise your instructor of any special requirements within the first week. The instructor reserves the right to revise this syllabus.

Tentative Schedule

This is just a tentative schedule and is subject to change. With an exception of a few sections, we will pretty much cover chapters 9, 11 through 14. Lectures and reading assignments will cover the materials from the required text and it is your responsibility to read the assigned materials before coming to class. Many students tell me they have a better understanding of the materials when they read those topics before the lecture.

WEEK	DATE (M)	LECTURE ACTIVITIES	LAB ACTIVITES (lecture and demonstrate code)	TEXTBOOK
1	02/24	Introduction, Hashing	C++ STL map or Java HashMap	Chapter 9
2	03/02	Hashing	Hash Codes: Polynomial and Cyclic Shift	Chapter 9, Column 13
3	03/09	Ordered Maps	Skip Lists	Chapter 9
4	03/16	Sorting	Project 1, Merge Sort	Chapter 11
5	03/23	Sorting, Homework 1, Review	Quick Sort	Chapter 11, Column 11
6	03/30	Holiday (Tu), Sorting, Exam 1	Linear-Time Sorting Algorithms	Chapter 11
7	04/06	Sets and Selection	Union/Find Structures, Quick-Select	Chapter 11
8	04/13	Dynamic Programming	Project 2, DP Algorithms	Chapter 12
9	04/20	Pattern Matching	Pattern Matching Algorithms	Chapter 12
10	04/27	Text Compression, Homework 2	Huffman Coding Algorithms	Chapters 12 & 13
11	05/04	Graphs, Review, Exam 2	Graph ADT and Representations	Chapter 13
12	05/11	Graphs	Project 3, Graph Traversals	Chapter 13
13	05/18	Graphs	Shortest Paths	Chapter 13
14	05/25	Holiday (M), Memory Management, Homework 3	Memory Allocation/Deallocation	Chapter 14
15	06/01	External Searching and Sorting, Review	Project 4, External Searching with B-Trees and External Sorting Algorithms	Chapter 14
16	06/08	Written Final – Monday @ 1:30 pm	Lab Final -- Wednesday @ 1:30 pm	

Last updated on 01/22/2020 05:15:35