SU DEPARTMENT OF COMPUTER SCIENCE SYLLABUS

COSC220 Computer Science II

Prerequisite: COSC 120 Computer Science I or equivalent with a grade of C or better and MATH 210 Discrete Mathematics or equivalent with a grade of C or better. MATH 210 may be taken concurrently. Three hours lecture and two-hour lab.

Description: A study of the design and implementation of abstract data types and algorithms using an object-oriented approach and standard class library. Attention will be paid to the introduction of data structures such as linked lists, vectors, stacks, queues, heap, priority queues, lists, trees, binary search tree etc.; searching and sorting algorithms and their runtime analysis. C++ is the teaching language.

References:

- Starting out with C++ from control structure through objects 9th Edition, by Tony Gaddis, Pearson 2017

Main Topics:

- ***Pointers & Arrays:*** Review of pointers, passing pointers as parameters, relations of pointers and array, dynamic memory allocation, array of pointer types
- ***Implementing class****:* Creating classes: constructors, destructor, overloading function and operators, templates, inheritance, polymorphism, copy constructor, and so on.
- ***Algorithms:*** Searching and sorting (insertion, merge sort, quick sort, radix sort algorithms with arrays and so on.
- ***Data Structures Implementation:*** Discuss implementation of linked list, stack, queue using pointer-based array and/or linked lists
- ***Advanced Recursion:*** Review concepts in recursive functions and examples of recursive functions
- ***Algorithm Efficiency Analysis:*** Introduce asymptotic notations (big-O, big-Ω, big-Θ) and basic related theorems, perform runtime analysis on searching and sorting algorithms
- ***Standard Template Library:*** Introduce vector, stack, queue, list, map, set manipulation (using recursive/non-recursive approach) through their STLs
- ***Advanced Data Structures and Algorithms:*** Introduce heap, priority queue, binary search trees, dynamic algorithms and so on

Homework/Project: Student can discuss project or homework however, I expect that you hand in your original work. Co-operative work will be regarded as academic dishonesty. If two students have identical or similar work, both will be given a failing grade in the course irrespective of whose work was copied. Each homework/project should be submitted at the beginning of class on the due date. Late homework/project will not be accepted.

Grade: Test 1- 20 %, Test 2 – 20 %, Final – 30 % Lab&Project/Mini-test – 15%/15%. Your final grade will be based on the standard formula

- **A:** $90 \leq$ Total_Average_score
- **B:** $80 \leq$ Total_Average_score < 90
- **C:** $70 \leq$ Total_Average_score < 80
- **D:** $60 \leq$ Total_Average_score < 70
- **F:** Total_Average_score < 60

Lab policy:

- Lab material will be provided at the beginning of a lab class.
- Each student is required to attend a lab session each week and start working on new lab. Each lab must be done by the beginning of the next lab class. Instructor will check and collect each student's works during the lab hour. Each student must be ready to show his/her works at the beginning of each lab class.
- Students are expected to work independently on each lab. I have no problem with students discussing assignments to help understand a problem, learn how to use language features, or debug a program. However, copying code is strictly prohibited. Copying code from another student or any other source (e.g., a web site) is considered plagiarism and will be prosecuted under the Code of Student Conduct at Salisbury University. If two students have identical or similar work, both will be given a failing grade.
- Late lab work will not be accepted without special permission.

Exam Policy: There will be an announcement one week before each exam. There will be no make-ups or rescheduling of exams for individual cases (except emergency cases with evidence).

Attendance: Each student is expected to be present each lecture and lab. Attendance will be checked for each class. If a student misses lectures more than 6 times (2 weeks) without any reason with evidence, he/she will lose 3% from the total average score. If a class must be missed, however, students are responsible for all material, assignments, and announcements made during class.