SU DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE
SYLLABUS (Tentative)
COSC 220 Computer Science II

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, priority queues, lists, trees, etc.; searching and sorting algorithms and their runtime analysis. C++ is the teaching language. Three one-hour lectures and one two-hour lab per week.

Prerequisite: Computer Programming (COSC 120) or equivalent with a grade of C or better and Discrete Mathematics (MATH 210) or equivalent with a grade of C or better. MATH 210 may be taken concurrently.


Week

Pointers & Arrays 1.0
Review pointers, passing pointers as parameters, relation between pointers and arrays, dynamic memory allocation, arrays of pointer types

Advanced Recursion 1.0
Recursive algorithms and functions

Linked Lists 2.0
Introduce singly-linked and doubly-linked lists and their manipulation

Data Structures 2.0
Introduce vectors, stacks, queues (include priority queues) and their manipulation through their APIs

Data Structure Implementation 1.5
Discuss implementation of vector, stack, queue, list using pointer-based array and/or linked lists

Sorting Algorithms 1.5
Introduce algorithms for insertion sort, mergesort, quicksort, radix sort, etc. with arrays

Algorithm Efficiency Analysis 1.0
Introduce asymptotic notations (big-O, big-Ω, big-Θ) and basic related theorems, perform runtime analysis on searching and sorting algorithms

Advanced Concepts in Object-oriented Programming 2.0
Introduce inheritance, polymorphism, abstract classes, virtual functions, static and dynamic binding

Optional Topics 1.0
Introduce trees, hash tables, heaps and other data structures

Test 1.0

14.0

EVALUATION

Homework, labs, projects, class participation, presentation: 30-50%
Tests, final exam, and quizzes: 50-70 %

NOTE: ONCE A STUDENT HAS RECEIVED CREDIT, INCLUDING TRANSFER CREDIT, FOR A COURSE, CREDIT MAY NOT BE RECEIVED FOR ANY COURSE WITH MATERIAL THAT IS EQUIVALENT TO IT OR IS A PREREQUISITE FOR IT.