

A: Division

Instructional

Date

June 19, 2007

Textbook and Materials to be Purchased by Student:

on C++ Programming and Problem Solving with C++ Examples
D.C. Heath and Company

Portfolio for Programming Assignments

diskettes

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www.cems.vt.edu/teachin

Two 3 1/2" high density

On-Course Objectives

The student should be able to:

- analyze problem specifications

Object-oriented Design

- implement, in a widely acceptable style, algorithms in C++ using standard methodologies
 - document a project

The student should understand the concepts of:

- generality through abstractions
- maintainability, reusability and extensibility through

high modularity

P: Course Content

Introduction and Review (syntax of C++)	
1.1	Program Structure
1.2	Primitive data types and expressions
1.3	Control Structures
1.4	Functions and parameter passing
1.5	Arrays
1.6	Top-down design review and specs for assignment #1: procedural programming with emphasis on control structures, procedures, and arrays
2.1	Strings
2.2	Collections
2.2.1	Lists
2.2.2	Sets
2.2.3	Stacks
3.1	Implementing Abstractions
3.1.1	C++ Strings
3.1.2	Introduction to pointers (domain)
3.1.3	C++ records (struct)
emphasis on: cohesion and coupling and using more complicated static data structures	
3.5	Design of set primitives
3.6	Recursion
3.6.1	Numerical examples: factorial, Fibonacci, ...
3.6.2	Examples from symbolic (LISP-like) expressions (SExpressions)
3.7	Discussion and specs for assignment #3: functional programming using an existing module for SExpressions and C++ inheritance
4.1	Encapsulation, instantiation, and OO
4.1.1	Structure (syntax and semantics)
4.1.2	Examples
4.2.1	Sets implementation and use
4.2.2	Stacks implementation and use
Discussion and specs for assignment #4: OO	

Q: Method of Instruction

The course consists of lectures and exercises. There are three components to the course: lectures (one and a half hours per week), exercises (one hour per week) and assignments (one hour per week). The lectures are used to introduce new material, usually via a sequence of theoretical concepts, practical examples, case studies. The book is to be used as an additional source of problems and examples.

There are two types of assignments: written assignments and programming assignments. The written assignments consist of exercises from the book. They are marked mostly on results, i.e. correctness of the algorithm.

The programming assignments consist of programs that implement some algorithm. They are marked according to program design, correctness and efficiency of the algorithms, coding style and documentation.

R = Combination

Official distribution of the course material and the assignment will be given to the student on the first day of classes along with the course outline and necessary policies.

Distribution Policy