CSCI 140 Outline

C++ Language and Object Development

*Programming in C++ with zyLab*

by F. Vahid and R. Lysecky, 2020, zyBooks

Approved: June 20 Effective: Fall 2020

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| **Topics** | **Sections** | **Time** |
| Introduction to Programming and C++: introduction to computers and programming, introduction to C++, variables, assignments, data types, memory concepts, arithmetic expressions | 1.1 - 1.12  2.1 - 2.22 | 3 hours |
| Control Structures: selection structure (if, if/else, and switch), repetition structure (while, for, and do/while), increment and decrement operators, relational operators, logical operators, enumerated types, C++ strings and operations | 3.1 - 3.20  4.1 - 4.14 | 5.5 hours |
| Functions and Recursion: standard library functions and user-defined functions, function prototypes, function definitions, function calls, scope rules, storage classes, passing parameters by value and by reference, default arguments, function overloading, stubs and drivers, preprocessor directives, recursive functions, recursion vs. iteration | 6.1 - 6.20  12.1 – 12.9 | 4 hours |
| Arrays/Vectors and Pointers: one-dimensional and multidimensional arrays, vectors, character and C-string processing, string libraries, array applications, sorting and searching, pointer variables, pointers vs. arrays, pointer arithmetic, arrays of pointers, passing arrays to functions, dynamic memory allocation/de-allocation (new and delete) | 5.1 - 5.17  8.1 - 8.12 9.1 - 9.7 | 7 hours |
| Classes and OOP: structures, introduction to classes and objects, encapsulation, controlling access to members (public, protected, and private), constructors, destructors, interface and implementation files, software reusability, constant objects and constant member functions, friends, the “this” pointer, static class members, data abstraction, information hiding, operator overloading, aggregation and composition | 7.1 - 7.21 | 7.5 hours |
| Inheritance: base-class pointers and derived-class pointers, overriding, composition vs. inheritance, multiple inheritance, virtual functions and pure virtual functions, abstract base classes and concrete classes, static binding vs. dynamic binding | 11.1 - 11.10 | 3.5 hours |
| Streams: stream I/O classes and objects, stream output, stream input, stream manipulators, files and streams, file input, file output | 10.1 - 10.9 | 4.5 hours |
| Exceptions and Templates: error-handling techniques, basics of C++ exception handling (try, throw, and catch), function templates, class templates | 13.1 - 13.4  14.1 – 14.3 | 3 hours |
| Data Structures and STL: introduction to STL, introduction to linked lists, stacks, queues, and containers | 15.1 – 15.9  16.1 | 2 hours |

Submitted by: Vo

Notes:

* 1 hour = 1 hour of face time
* 16-week Term: 1 week = 2.8333 hours + 2.8333 hours (face time)
* 6-week Term: 1 week = 7.5 hours + 7.5 hours (face time)
* The above outline allows 3 hours for review and exams, not counting holidays. Keep in mind that most holidays affect MW or MWF classes, so this timeline – NOT the topical outline – may need adjustment