

Introduction to C++ Programming (ITSE 1407)



Credit: 4 semester credit hours (3 hours lecture, 2 hours lab)

Prerequisite/Co-requisite: None

Course Description

Introduction to computer programming using C++. Emphasis on the fundamentals of object-oriented design with development, testing, implementation, and documentation. Includes language syntax, data and file structures, input/output devices, and files.

Required Textbook and Materials

1. *C++ Programming: From Problem Analysis to Program Design, 6th Edition;*
D.S. Malik
 - a. ISBN: 9780538466529
2. USB Flash Memory drive
3. Visual Studio C++ Express Edition or another C++ compiler

Course Objectives

Upon completion of this course, the student will be able to:

1. Use object-oriented programming (OOP) techniques. (SCANS: C5, C6, C8, C9, C19, F1, F2, F3, F9)
2. Develop executable programs. (SCANS: C5, C6, C8, C9, F9)
3. Incorporate pointers and/or arrays to manipulate data; and create programs using classes and objects. (SCANS: C5, C6, C8, C9, F2, F3, F9)
4. Create appropriate documentation. (SCANS: C5, C6, C8, C9, F1, F2, F3, F9)

SCANS Skills and Competencies

Beginning in the late 1980's, the U.S. Department of Labor Secretary's Commission on Achieving Necessary Skills (SCANS) conducted extensive research and interviews with business owners, union leaders, supervisors, and laborers in a wide variety of work settings to determine what knowledge workers needed in order to perform well on a job. In 1991 the Commission announced its findings in *What Work Requires in Schools*. In its research, the Commission determined that "workplace know-how" consists of two elements: foundation skills and workplace competencies.

Course Outline

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| <p>A. Computers and Programming Languages</p> <ol style="list-style-type: none">1. Elements of a Computer System2. Language of a Computer | <ol style="list-style-type: none">3. Evolution of Programming Languages4. Processing a C++ Program <p>B. Basic Elements of C++</p> <ol style="list-style-type: none">1. Basics of a C++ Program |
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Approved 08/2012

ITSE 1407

Course Syllabus

2. Data Types
3. Variables
4. Arithmetic Operators
5. Casting
6. Assignment and Input Statements
- C. Input/Output
 1. I/O Streams
 2. Predefined Functions
 3. Output Formatting
- D. Control Structures I (Selection)
 1. Relational Operators
 2. Logical Expressions
 3. If/If...else
 4. Block Statements
- E. Control Structures I (Repetition)
 1. while Looping
 2. for Looping
 3. do...while Looping
- F. User-Defined Functions
 1. Value-Returning Functions
 2. return Statements
 3. Void Functions
 4. Parameters
 5. Overloading
- G. Namespaces and User-Defined Data
 1. Enumeration Types
 2. typedef Statemet
 3. Declaring Enumeration Types
- H. Arrays
 1. One-Dimensional Array
 2. Indexing
 3. Array Searching
 4. c-Strings
 5. Parallel Arrays
 6. Multidimensional Arrays
- I. Records (Structs)
 1. Accessing struct Members
 2. I/O structs
 3. Arrays vs Structs
- J. Classes and Data Abstraction
 1. UML Diagrams
 2. Object Declaration
 3. Class Scope
 4. Data Abstraction and Types
 5. Struct vs Class
- K. Inheritance and Composition
 1. Overriding Functions
 2. Composition Aggregatoin
 3. OOD and OOP Programming
- L. Pointers, Classes, Virtual Functions, and Abstract Classes
 1. Pointer data types
 2. Address of Operator (&)
 3. Pointer Variables
 4. Dynamic Arrays
 5. Shallow and Deep Pointers
 6. Inheritance and Virtual Functions
- M. Operator Overloading and Templates
 1. Operator Syntax
 2. Overloading an Operator
 3. this Pointer
 4. Binary Operator
 5. Unary Operator
- N. Exception Handling
 1. try/catch
 2. Blocks
 3. Creating Exception Classes
 4. Stack Unwinding
- O. Recursion
 1. Direct Recursion
 2. Indirect Recursion
 3. Recursion vs Iteration
- P. Searching and Sorting
 1. List Processing
 2. Bubble Sort
 3. Binary Sort
 4. vector Type (class)
- Q. Linked Lists
 1. Building a Linked List
 2. Deletion
 3. ADT Nodes
 4. List Retrieval
 5. Destructor
 6. Unordered Linked List
 7. Ordered Linked List
 8. Doubly Linked List (isEmptyList)
- R. Stacks and Queues
 1. Stack Operations
 2. Stacks as Arrays
 3. Linked Stack Implementation
 4. Removing Recursion
 5. Queue Operations
 6. Queue Simulation

ITSE 1407
Course Syllabus

Grade Scale

90 – 100	A
80 – 89	B
70 – 79	C
60 – 69	D
0 – 59	F

Course Evaluation

Final grades will be calculated according to the following criteria:

1. Daily Assignments	35%
2. Homework	35%
3. Quizzes & Test	30%

Course Requirements

1. Demonstrate proper System Life Cycle documentation
2. Create Flow Charts when required
3. Demonstrate proper design layout & code structure

Course Policies

1. No food, drinks, or use of tobacco products in class.
2. Cellphones, MP3 players, tablets, notebook/netbook(s) and any other electronic devices must be turned off while in class.
3. Do not bring children to class.
4. No late assignments will be accepted. Any assignment submitted after the Blackboard cut-off time will result in a '0'.
5. **Tests.** Students that miss a test are not allowed to make up the test. Students that miss a test will receive a grade of '0'.
6. If you wish to drop a course, the student is responsible for initiating and completing the drop process. If you stop coming to class and fail to drop the course, you will earn an 'F' in the course.
7. A grade of 'C' or better must be earned in this course for credit toward degree requirement
8. All assignments will be completed using Blackboard. Assignment may not be submitted via email.
9. **Attendance:** Students should be present and punctual for all classes. Any assignment missed due to absence will result in a zero.
10. **Tardiness:** If tardy, enter quietly and do not disturb the class. Students that are tardy or miss a class are responsible for all work and/or discussion missed. The student is responsible to obtain missed material from a classmate. **Do not expect your instructor to repeat a lecture & do not interrupt your instructor.**
11. Do not talk, type, or print while the instructor is talking to the class or when a student is asking a question that pertains to the class.
12. Refrain from "surfing" the Web during class, unless directed by your instructor.

ITSE 1407
Course Syllabus

Disabilities Statement

The Americans with Disabilities Act of 1992 and Section 504 of the Rehabilitation Act of 1973 are federal anti-discrimination statutes that provide comprehensive civil rights for persons with disabilities. Among other things, these statutes require that all students with documented disabilities be guaranteed a learning environment that provides for reasonable accommodations for their disabilities. If you believe you have a disability requiring an accommodation, please contact the Special Populations Coordinator at (409) 880-1737 or visit the office in Student Services, Cecil Beeson Building.

Course Schedule

Refer to Blackboard for actual assignments and due date

Week of	Topic	Reference
Week 1	Computers and Programming Languages Basic Elements of C++	Chapter 1 Chapter 2
Week 2	Input/Output	Chapter 3
Week 3	Control Structures I (Selection)	Chapter 4
Week 4	Control Structures I (Repetition)	Chapter 5
Week 5	User-Defined Functions	Chapter 6
Week 6	Namespaces and User-Defined Data Types	Chapter 7
Week 7	Arrays	Chapter 8
Week 8	Records (Structs)	Chapter 9
Week 9	Classes and Data Abstraction	Chapter 10
Week 10	Inheritance and Composition	Chapter 11
Week 11	Pointers, Classes, Virtual Functions, and Abstract Classes	Chapter 12
Week 12	Operator Overloading and Templates	Chapter 13
Week 13	Exception Handling	Chapter 14
Week 14	Recursion	Chapter 15
Week 15	Searching and Sorting	Chapter 16
Week 16	Linked List Stacks and Queues	Chapter 17 Chapter 18