

**UNIVERSITY OF GHANA**

(All rights reserved)

**DEPARTMENT OF COMPUTER SCIENCE**

**COLLEGE OF BASIC AND APPLIED SCIENCES**

**SEMESTER 1, 2018/2019 ACADEMIC YEAR**

**COURSE SYLLABUS**

**Course Code and Title:** CSCD 205: Programming 1 (C++)

**Credits:** 3

**Lecture Period(s) and Venue:** To be determined

**Course Instructor**

Name: Michael Agbo Tettey Soli

Office No: 010, Statistics Building

Office Hours: Wednesdays, 11:00 am - 1:00 pm

Email: [agbotettey@gmail.com](mailto:agbotettey@gmail.com) / [msoli@ug.edu.gh](mailto:msoli@ug.edu.gh)

**Course Overview**: C++ is a statically-typed, free-form, compiled, multi-paradigm, general-purpose middle-level programming language developed by Bjarne Stroustrup in 1979. Many of today’s operating systems, system drivers, browsers and games use C++ as their core language. This makes C++ one of the most popular and powerful languages today.

Since C++ is a middle level language, you will write code that interacts directly with the internal hardware of the computer. You’ll learn how the computer memory really works, how information is stored in them, how you can retrieve them and so on which will expand your knowledge on the architecture of the computer.

**Course Objectives and Goals**:

Perform object oriented programming to develop solutions to problems demonstrating usage of control structures, modularity, I/O, and other standard language constructs.

Demonstrate adeptness of object oriented programming in developing solutions to problems demonstrating usage of data abstraction, encapsulation, and inheritance.

Demonstrate ability to implement one or more patterns involving realization of an abstract interface and utilization of polymorphism in the solution of problems which can take advantage of dynamic dispatching.

Learn syntax, features of, and how to utilize the Standard Template Library. Learn other features of the C++ language including templates, exceptions, forms of casting, conversions, covering all features of the language. Learn features of the language which can be problematic with execution time or space and some techniques to resolve them.

**Topics include:** Structure of C++ programs, variables and types, constants, operators, basic input and output, control structures, functions, overloads, templates, structs, arrays, character sequences, pointers, dynamic memory, data structures, features of OOP, standard template library, exception handling, file management.

**Learning outcomes:**

At the end of this course, students will be able to:

* To understand how C++ improves C with object-oriented features.
* To learn how to write inline functions for efficiency and performance.
* To learn the syntax and semantics of the C++ programming language.
* To learn how to design C++ classes for code reuse.
* To learn how to implement copy constructors and class member functions.
* To understand the concept of data abstraction and encapsulation.
* To learn how to overload functions and operators in C++.
* To learn how containment and inheritance promote code reuse in C++.
* To learn how inheritance and virtual functions implement dynamic binding with polymorphism.
* To learn how to design and implement generic classes with C++ templates.
* To learn how to use exception handling in C++ programs.

**Assessment and Grading:**

Assignments and Quizzes : (2% each week) **20%**

Interim Assessment : **10%**

Semester Project : **20%**

Final Examination : **50%**.

**Plagiarism Policy:** Plagiarism in any form is unacceptable in the University of Ghana and shall be treated as a serious offence. Appropriate sanctions as stipulated in the Plagiarism Policy, will be apply when students are found to have violated the plagiarism policy.

**Course Delivery Schedule**

|  |  |  |  |
| --- | --- | --- | --- |
| **Week** | **Topic** | **Assignment** | **Remarks** |
| 1 | Brief overview, history and architecture of computers |  |  |
| 2 | Introduction to C++ (Data Types, Variables) |  | Submit Assignment 1 |
| 3 | Input / Output Processing |  |  |
| 4 | Control Structures(Operators, Conditionals, Loops) |  |  |
| 5 | Functions, Recursion and Scope |  |  |
| 6 | Data Structures(Arrays) |  |  |
| 7 | Classes and Data Abstraction |  |  |
| 8 | Inheritance and Composition |  |  |
| 9 | Pointers, Virtual Functions and Abstract Classes |  |  |
| 10 | Overloading and Templates |  |  |
| 11 | Exception Handling |  |  |
| 12 | Advanced Data Structures 1 |  |  |
| 13 | Advanced Data Structures 2 |  |  |

**Reading List / Required Text**

# Vine, M. (2007). *C Programming for the Absolute Beginner* (2nd ed.). Boston: Course Technology PTR. ISBN-10: 1598634801, ISBN-13: 978-1598634808. 336 pages.

Kanetkar, Y. P. (2008). *Let Us C.* Sudbury, Mass: Jones & Bartlett Publishers. ISBN-10: 1934015253, ISBN-13: 978-1934015254. 593 pages.

Kochan, S. G. (2004). *Programming in C* (3rd ed.). Indianapolis, Ind.: Developer's Library/Sams Pub. ISBN-10: 0672326663, ISBN-13: 978-0672326660. 576 pages.

Lee, M. (2009). *C++ Programming for the Absolute Beginner*. Boston: Course Technology PTR. ISBN-10: 1598638750, ISBN-13: 978-1598638752. 400 pages.

Holub, A. I. (1991).  *C++: Programming With Objects in C and C++.* New York: Mcgraw-Hill. ISBN-10: 0070296626, ISBN-13: 978-0070296626. 427 pages.

Dale, N., & Weems, C.(2009). *Programming and Problem Solving with C++: Comprehensive Edition*. Sudbury, Mass: Jones & Bartlett Publishers. ISBN-10: 0763771562, ISBN-13: 978-0763771560. 1152 pages