Programming Logic: C++

CSB-2100

2022 07/01/2022 to 06/30/2023 Modified 04/22/2022

Course Description

This course will guide the student in learning the basics of programming in C++. The course focuses on learning and applying key programming concepts such as the use of variables, functions, loops, conditional statements, object-oriented programming, and exception handling, all in the C++ programming language. Throughout the course, learning will be aided and applied through the completion of many practical programming exercises. Upon completing this course, students will be prepared for further programming in C++ and will be able to apply their understanding of programming in C++ to learning to program in other programming languages as well.

Rationale

This course is designed to offer the student a well-rounded introduction to programming in C++, including a significant amount of practical application through the completion of programming exercises, such that after completing the course, the student will have a sound understanding of the basics of programming in C++.

Prerequisite

Junior Standing

Measurable Learning Outcomes

A. The student will describe what computer programming is at a basic level.
B. The student will create and use variables and data structures such as arrays and linked lists.
C. The student will create and use functions.
D. The student will implement decision-making logic using if and if…else statements.
E. The student will utilize loops, including the while loop and for loop.
F. The student will manipulate String data.
G. The student will create programs which use object-oriented concepts such as classes and inheritance.
H. The student will implement exception handling.
I. The student will read from and write to files.
J. The student will search and sort lists of elements.

Course Resources

See LUOA's Systems Requirements for computer specifications necessary to operate LUOA curriculum. Also view Digital Literacy Requirements for LUOA's expectation of users' digital literacy.

This course makes use of third-party digital resources to enhance the learning experience. LUOA staff and faculty have curated these resources. Students can safely access them to complete coursework. Please ensure that internet browser settings, pop-up blockers, and other filtering tools allow for these resources to be accessed. See Technologies and Resources Used in this Course below for a specific list.

- Note: Embedded YouTube videos may be utilized to supplement LUOA YouTube videos are the property of the respective content creator, licensed to YouTube for distribution and user access. As a non-profit educational institution, LUOA is able to use

YouTube video content under the YouTube Terms of Service. For additional information on copyright, please contact the Jerry Falwell Library.

Scripture Attribution

- Grades 7-12: All Scripture quotations, unless otherwise indicated, are from the ESV® Bible (The Holy Bible, English Standard Version®), copyright © 2001 by Crossway, a publishing ministry of Good News Publishers. Used by permission. All rights reserved. May not copy or download more than 500 consecutive verses of the ESV Bible or more than one half of any book of the ESV Bible.

Technologies and Resources Used in this Course

The following resource(s) are used throughout this course:

- Cengage MindTap
- Note: Students in this course must have a PC or Mac laptop or desktop with Microsoft Office desktop apps; Chromebooks and Microsoft Web apps are not compatible with the software used in this course.

Policies

Students are accountable for all information in the Student Handbook (https://www.liberty.edu/online-academy/wp-content/uploads/2021/11/LUOA-Student-Handbook.pdf). Below are a few policies that have been highlighted from the Student Handbook.

Course Grading Policies

The student's grades will be determined according to the following grading scale and assignment weights. The final letter grade for the course is determined by a 10-point scale. Assignments are weighted according to a tier system, which can be referenced on the Grades page in Canvas. Each tier is weighted according to the table below. Items that do not affect the student's grade are found in Tier 0.

Grading Scale	Assignment Weights
A 90-100%	Tier 0 0%
B 80-89%	Tier 1 25%
C 70-79%	Tier 2 35%
D 60-69%	Tier 3 40%
F 0-59%	

In order for students to receive credit for a course, the following conditions have to be met:

- All semester exams and module tests have to be completed.
- All Tier 3 projects or papers have to be completed.
- Fewer than 10 zeros exist in the gradebook for blank submissions in a full credit course and 5 zeros for blank submissions in a semester course.

Types of Assessments

To simplify and clearly identify which policies apply to which assessment, each assessment has been categorized into one of four categories: Lesson, Assignment, Quiz, or Test. Each applicable item on the course Modules page has been designated with an identifier chosen from among these categories. Thus, a Quiz on the American Revolution may be designated by the title, "1.2.W - Quiz: The American Revolution." These identifiers were placed on the Modules page to help students understand which Resubmission and Honor Code policies apply to that assessment (see the Resubmission Policy and Honor Code Policy below for further details).

- **Lesson:** *Any item on the Modules page designated as a "Lesson"*

  These include instructional content and sometimes an assessment of that content. Typically, a Lesson will be the day-to-day work that a student completes.

- **Assignment:** *Any item on the Modules page designated as an "Assignment"*

  Typical examples of Assignments include, but are not limited to, papers, book reports, projects, labs, and speeches. Assignments are usually something that the student should do his or her best work on the first time.

- **Quiz:** *Any item on the Modules page designated as a "Quiz"*

  This usually takes the form of a traditional assessment where the student will answer questions to demonstrate knowledge of the subject. Quizzes cover a smaller amount of material than Tests.

- **Test:** *Any item on the Modules page designated as a "Test"*

  This usually takes the form of a traditional assessment where the student will answer questions to demonstrate knowledge of the subject. Tests cover a larger amount of material than Quizzes.

Resubmission Policy

Students are expected to submit their best work on the first submission for every Lesson, Assignment, Quiz, and Test. However, resubmissions may be permitted in the following circumstances:

- **Lesson**: Students are automatically permitted two attempts on a Lesson. Students may freely resubmit for their first two attempts without the need for teacher approval.
- **Assignment**: Students should do their best work the first time on all Assignments. However, any resubmissions must be completed before the student moves more than one module ahead of that Assignment. For example, a student may resubmit an Assignment from Module 3 while in Module 4, but not an Assignment from Modules 1 or 2. High School students may not resubmit an Assignment without expressed written permission from the teacher in a comment.
- **Quiz**: Students may NOT resubmit for an increased grade.
- **Test**: Students may NOT resubmit for an increased grade.

If a student feels that he or she deserves a resubmission on a Lesson, Assignment, Quiz, or Test due to a technical issue such as a computer malfunction, the student should message his or her teacher to make the request.

Honor Code Policy

Every time a student violates the Honor Code, the teacher will submit an Honor Code Incident Report. The Student Support Coordinator will review the incident and allocate the appropriate consequences. Consequences, which are determined by the number of student offenses, are outlined below:

- **Warning:** This ONLY applies to high school Lessons and elementary/middle school Assignments and Lessons. Students should view these actions as learning opportunities.
  - **Lessons**: A zero will be assigned for the question only.
  - **Elementary/Middle School Assignment**: The student must redo his or her work; however, the student may retain his or her original grade.
- **1st Offense**:
  - **Lesson, Quiz, or Test**: The student will receive a 0% on the entire assessment.
  - **Assignment**: The student will either:
    - Receive a 0% on the original assignment
    - Complete the Plagiarism Workshop
    - Retry the assignment for a maximum grade of 80%
- **2nd Offense**: The student will receive a 0% and be placed on academic probation.
- **3rd Offense**: The student will receive a 0% and the Director of Faculty will determine the consequences that should follow, possibly including withdrawal from the course or expulsion from the academy.

Materials Selection Policy

LUOA curates educational materials that are consistent with the school's philosophy; however, the fallen human condition depicted in literature (as in Scripture itself) is not always pleasant. Valuable works sometimes have objectionable or profane elements. Good books provide four (4) recognized values.

- They build godly attitudes and character traits.
- They deepen our social and cultural awareness.
- They strengthen our use of written language.
- They provide a lifelong source of enjoyment and relaxation.

In order to instill these values in students and fulfill the stated objectives of the school, all LUOA students are expected to read and study good books on a regular basis. Recognizing that materials designed for one level may not be appropriate for another, three (3) levels of criteria are applied:

- Elementary materials must contain no objectionable material,
- Objectionable elements in sixth through eighth-grade materials must be limited and must serve a specific educational purpose, and
- Objectionable content may be included in high school materials but must be outweighed by positive literary, curricular, and/or Christian values.

The curriculum department has approved required educational materials for students.

Schedule

Module 1: An Overview of Computers and Programming

Module 2: Basic Elements of C++

Module 3: Input/Output

Module 4: Control Structures I (Selection)

Module 5: Control Structures II (Repetition)

Module 6: User-Defined Functions

Module 7: User-Defined Simple Data Types

Module 8: Arrays and Strings

Module 9: Classes and Data Abstraction

Module 10: Inheritance and Composition

Module 11: Pointers, Classes, Virtual Functions, and Abstract Classes

Module 12: Overloading and Templates

Module 13: Exception Handling

Module 14: Recursion

Module 15: Searching, Sorting, and the Vector Type

Module 16: Linked Lists

Module 17: Stacks and Queues