Computer Mathematics

MAT-1400

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

🖥 Course Description

Computer Mathematics is a project-based course that helps students understand the programming and logic behind computers and software. All assignments are related to the Excel spreadsheet which uses VBA (Visual Basics for Applications), the programming language of Excel and other Office programs. God created man in His own image, and with his creative power and intelligence, man created computers. This course will explore different aspects of computer programming utilizing built-in options of Excel and the manipulation of mathematics operations and principles. Incorporated into the course will be biblical principles and philosophy that points to God as Creator and the order and logic that He continues to exhibit in His creation.

◎ Rationale

In order to intelligently participate in the modern world, it is helpful to not only use technology, but to also understand how it works. Computer Mathematics gives the student a basic foundation in computer programming and logic with real-world applications in math and business environments. The course gives practical application for today's problems. The course also shows how God's creation was made to work in a logical and orderly way.

Prerequisite

Algebra I or Geometry

📊 Measurable Learning Outcomes

A. The student will explore the various uses and applications of the Microsoft Excel program in personal and educational situations.

B. The student will apply strategies and principles of basic computer programming and logic to solve problems and create original algorithms, flowcharts, pseudocode, and display flow data charts in conjunction with daily assignments, quizzes, and tests.

C. The student will research information about the history and development of computer programming and its uses down through the ages.

D. The student will design, write, test, debut, and document the specifics of a computer program.

E. The student will document to emphasize preconditions and post conditions of program segments, input/output specifications, planning, data, and correlated comments.

F. The student will analyze data in charts, graphs, and tables and use prior knowledge of equations, formulas, and functions to solve problems.

G. The student will select and implement built-in library functions of Excel, pre-existing algorithms including sort, search, and simple animation routines and subroutines.

Biblical Integration Outcomes

A. The student will develop an understanding of how being responsible for wise choices in a computer-driven society affects every aspect of displaying a Christian worldview.

B. The student will explore how God is personally involved with creation and mankind's reflection of being made in God's image as a creative being capable of original thought and design.

C. The student will be presented practical strategies and information to help him/her practice making decisions that make logical and ethical sense in problem solving.

D. The student will strengthen his/her personal witness and Christian growth by applying the content learned in the lessons.

📘 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 curriculum. 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.

Materials Required for Purchase

The following materials are required in this course:

- Notebook or journal

Scripture Attribution

- 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

Technologies and Resources Used in this Course

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

- RightNow Media

🏛 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 Introduction to Computer Mathematics

Week 1: An Introduction to Computer Mathematics

Week 2: Programmers – Translators of Computer Language

Week 3: Algorithms

Week 4: Users, Programming, and Functions in Excel

Week 5: Bits, Bytes, and Making Decisions

Module 2: Statistics

Week 6: Data, Percentages, and Calculations

Week 7: More on Percentages and Data

Week 8: More on Data, and Correlations

Module 3: Macros

Week 9: Macros Part 1

Week 10: More on Macros

Module 4: Business as Usual

Week 11: Big Business

Week 12: Binomial Function Project

Week 13: Business and Marketing

Week 14: Marketing and Module Test

Module 5: Personal Finances

Week 15: Managing Personal Finances

Week 16: More on Personal Finances and Credit

Week 17: Credit and Module Test

Week 18: Module Test and Semester Exam

SECOND SEMESTER

Module 6: Patterns and Randomness

Week 19: Patterns and Randomness

Week 20: Coding and Cryptography

Week 21: Intelligent Design

Module 7: Modern Programming

Week 22: Modern Programming

Week 23: Flowcharts

Week 24: Sorting

Week 25: Searching

Module 8: Advanced Data Issues, Processing, and Integration

Week 26: Data Types and Investigations

Week 27: Data Processing

Week 28: Data Integration

Week 29: Pseudocode and Programming

Module 9: Animation, More on Data, and the Internet

Week 30: Animation

Week 31: Inputting Data

Week 32: The internet Classroom

Week 33: Library Functions, Boolean Logic, Loops, and Module Test

Module 10: Case Studies, Semester Project, and Project Exam

Week 34: Case Study One

Week 35: Case Study Two

Week 36: Semester Project and semester Exam