

CSCI 120 – Fall 2008

Computer Science I

Ben Coleman
coleman@cs.moravian.edu
214 PPHAC
Office Phone: 610-625-7781

Office Hours: MWF 9:00 - 10:00
or by appointment
AIM: bjcoleman15

Course Description

The goal of this course is to introduce students to the techniques computer scientists use to answer questions and solve real-world problems. The course emphasizes the design and creation of computer programs to solve problems and the analysis of program capabilities. In general, what is the best way to solve a given problem? Computer programming will be used as a vehicle for learning computer science concepts. In particular, this course includes data types, control structures, functional abstraction, parameter passing, and structured data, including simple objects.

During the in-class portion of the course, students will learn programming skills and discuss applications of these ideas. Weekly laboratories give students the opportunity for hands-on exploration of the material and the chance to solve real-world problems.

Course Goals

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

- Describe how the concepts of computer science are applied to solve real-world problems.
- Write programs in Python using assignments, conditions, loops, functions, and objects.
- Represent information using appropriate encodings such as binary, two's complement, and floating point
- Measure the performance of computer programs using appropriate mathematical notation.
- Break down problems using top-down design and functional decomposition.

Required Texts

In addition to the following texts, supplementary readings will be given periodically during the semester.

- *Object-Oriented Programming in Python* by Michael H. Goldwasser and David Letscher
- *Understanding Digital Communications* by Thomas P. Murtagh (distributed in class)

You should expect to spend about an hour before each class session working through the readings. This means reading the text for detail, studying the syntax for new language features, and working to learn vocabulary – not just skimming through the material before class.

Graded Material

- **Homework** – The goal of homework problems is for you to practice using the current course content and to explore the topics in more detail. Problems will be assigned nearly every class session and will be due the next class.
- **Laboratory Exercises** – Each Thursday session will be held in the Computer Science Computer lab, PPHAC 114. During the lab, you will be given a series of activities to complete, individually or with a partner, depending on the lab. Labs are designed to utilize concepts of the past week’s classroom session to answer real-world problems. In addition to writing programs to solve the problems, you will collect data from the program and write-up answers to questions.
- **Culture Points** – One of the goals of this course is for you to gain an appreciation of how computer scientists contribute to the world-at-large. The examples used in class will contribute toward this goal, but you are also expected to explore other applications on your own. There are no specific due dates for culture point submissions, but you are encouraged to submit write-ups regularly throughout the semester. See the handout on culture points for additional information.
- **Tests** – Three tests will be given during the semester on Friday, September 26, Wednesday October 29, and Monday November 17. You may only re-schedule a test for college-approved absences or documented illness. In either case, you must contact me *before* the beginning of the test.
- **Final** – The final will be cumulative and will be given in-class on the date assigned by the registrar. Any change to the final exam schedule must be approved by both me and the dean of students.
- **Participation** – Half of your participation grade is determined solely on your attendance in class (excused absences do not count against you). The other half is based on active participation. I believe that we learn better when we are *actively* engaged in the material. Therefore, I expect you to participate in the activities in class and contribute on a regular basis.

Grade Determination

- (30%) Homework
- (20%) Laboratory exercises
- (5%) Culture Points
- (20%) Tests
- (15%) Final
- (10%) Attendance and Participation

All grades will be calculated on the standard scale using pluses and minuses.

Responsibilities

Your attendance is expected at each class meeting. You are also responsible for the contents of reading assignments, handouts, class activities, and class email.

If you have a disability that may affect your participation in this course, please contact me immediately to discuss academic accommodations.

Academic Honesty

Except on tests, you are *encouraged* to discuss the material and work with other students in the course. Specifically, on homework and labs you may discuss any portion of the assignment with your fellow students. This policy does not allow you to copy another student's work verbatim – you must produce your own code or write-up of the material. Work together to learn the concepts, but keep in mind that you are ultimately responsible for the material on the tests.

Course Outline

Date	Reading	Topic
M Aug 25		• Day 1 Activities
W Aug 27	• Murtagh Chapter 1	• Being Digital
F Aug 29	• G&L Chapter 2	• Lists and Numbers
M Sept 1		• Labor Day
W Sept 3	• G&L Chapter 2	• Lists and Numbers
F Sept 5	• Murtagh Chapter 2	• Representing Characters
M Sept 8	• Murtagh Chapter 2	• Integer Representation
W Sept 10	• Murtagh Chapter 2	• Floating-Point Representation
F Sept 12	• Murtagh Chapter 2	• Floating-Point Round-Off
M Sept 15	• G&L Chapter 4	• Conditional Statements
W Sept 17	• G&L Chapter 4	• Designing Conditionals
F Sept 19	• G&L Chapter 4	• Loop Structures
M Sept 22	• G&L Chapter 4	• Designing Loops
W Sept 24	• G&L Chapter 4	• Designing Loops
F Sept 26		• Test #1
M Sept 29	• Murtagh Chapter 3	• Variable-Length Codes
W Oct 1	• Murtagh Chapter 3	• Huffman Codes
F Oct 3	• Murtagh Chapter 3	• Huffman Codes
M Oct 6		• Fall Break

Date	Reading	Topic
W Oct 8	• G&L Chapter 5	• Writing Functions
F Oct 12		• No class - CCSC conference
M Oct 13	• G&L Chapter 5	• Writing Functions
W Oct 15	• G&L Chapter 5	• Designing Functions
F Oct 17	• G&L Chapter 5	• Designing Functions
M Oct 20	• G&L Chapter 5	• Designing Functions
W Oct 22	• Handout	• Algorithm Analysis
F Oct 24	• Handout	• Big-Oh Notation
M Oct 27	• Handout	• Big-Oh Notation
W Oct 29		• Test #2
F Oct 31	• G&L Chapter 14	• Sorting
M Nov 3	• G&L Chapter 14	• Sorting
W Nov 5	• G&L Chapter 14	• Sorting
F Nov 7	• G&L Chapter 6	• Writing Objects
M Nov 10	• G&L Chapter 6	• Writing Objects
W Nov 12	• G&L Chapter 6	• Writing Objects
F Nov 14	• G&L Chapter 7	• Software Design
M Nov 17	• G&L Chapter 7	• Software Design
W Nov 19	• G&L Chapter 7	• Software Testing
F Nov 21	• G&L Chapter 7	• Software Testing
M Nov 17		• Test #3
W Nov 26 - F Nov 28		• Thanksgiving Break
M Dec 1	• Handout	• Traveling Salesman
W Dec 3	• Handout	• Traveling Salesman
F Dec 5	• Handout	• Traveling Salesman Approximation Algorithms
M Dec 8	• Handout	• Traveling Salesman Approximation Algorithms
W Dec 10	• Handout	• Traveling Salesman Approximation Algorithms
F Dec 12		• Review

The details of this syllabus and schedule are subject to change based on our progress through the material.