CSCI 120 – Fall 2010
Computer Science I

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

Office Hours: MWF 9:00 - 10:00
R 3:00 - 4:00
or by appointment

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 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.

- *Python Programing: An Introduction to Computer Science* by John Zelle
- *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 Monday, September 27, Wednesday, October 29, and Friday, December 3. 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 Tuesday, December 14 at 8:30 a.m. 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 (irregardless of whether an absence is excused). 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.

Course Policies

- **Late Policy** – I understand that life sometimes gets in the way of getting work done. Consequently, late assignments will be accepted without penalty in the class after the assignment is due. However, this policy should not be used as a crutch, and if you frequently use it I will deduct from your grade. After the next class session, late work will not be accepted unless there are exceptional circumstances.
- **Extensions** – In a similar vein, I am generous with extensions on work if you approach me *before* the day the assignment is due.
- **Absences** – Your attendance is expected at each class meeting, but I understand that students occasionally get sick, have obligations outside Moravian, and even over sleep. If you do miss class, please send me an email explaining your absence – preferably before the class session. Regardless of your reason for missing class, you are responsible for the contents of reading assignments, handouts, class activities, and class email.
- **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.
- **Disabilities** – If you have a disability that may affect your performance in this course, please contact me immediately to discuss academic accommodations.

Course Outline

Date	Reading	Topic
M Aug 30		• Day 1 Activities
W Sept 1	• Zelle Chapter 1	• Computer Hardware and Software • Compiling
F Sept 3	• Murtagh Chapter 1	• Being Digital
M Sept 6		• Labor Day
W Sept 8	• Zelle Chapter 2	• Input / Output • Assignment Statements • Definite Loops
F Sept 10	• Zelle Sections 3.1 - 3.3	• Numeric Programming • Using Libraries
M Sept 13	• Zelle Sections 3.4 - 3.7	• Numeric Representation and Type • Type Conversions
W Sept 15	• Murtagh Chapter 2	• Binary • Two's Complement

Date	Reading	Topic
F Sept 17	• Zelle Sections 4.1 - 4.3	• IEEE Floating Point • Strings and String Processing • Simple Lists
M Sept 20		• More String Processing • Computing Standard Deviations • Summation Notation
W Sept 22		• One-Pass Standard Deviation
F Sept 24		• Review
M Sept 27		• Test #1
W Sept 29	• Zelle Sections 7.1 - 7.3 • Zelle Sections 7.5 - 7.6	• Decision Statements
F Oct 1	• Zelle Sections 8.1 - 8.3	• Looping Statements • Common Loop Patterns
M Oct 4	• Zelle Section 8.4	• Loop Design
W Oct 6	• Zelle Section 8.5	• Program Design
F Oct 8	• Murtagh Chapter 3 pp. 25 - 41	• Variable-Length Codes
M Oct 11		• Fall Break
W Oct 13	• Murtagh Chapter 3 pp. 41 - 48	• Huffman Encodings
F Oct 15		• CCSC Conference - No Class
M Oct 18	• Zelle Sections 6.1 - 6.3	• Functions
W Oct 20	• Zelle Section 6.4	• Function Parameters • Function Return Values
F Oct 22	• Zelle Section 6.5	• Scope
M Oct 25	• Zelle Section 6.6 • Zelle Sections 9.1 - 9.3	• Top-Down Design
W Oct 27	• Zelle Sections 9.4 - 9.6	• Bottom-Up Design
F Oct 29		• Test #2
M Nov 1	• Zelle Sections 11.1 - 11.2	• List Processing
W Nov 3		• More List Processing
F Nov 5	• Malik pp. 548 - 555	• Big-Oh Notation • Algorithm Analysis
M Nov 8	• Malik pp. 568 - 575	• Sorting Analysis
W Nov 10		• More Analysis
F Nov 12		• More Analysis
M Nov 15	• Zelle Sections 10.1 - 10.3	• Defining Classes

Date	Reading	Topic
W Nov 17	• Zelle Sections 10.4 - 10.5	• Encapsulation
F Nov 19	• Zelle Sections 12.1 - 12.2	• Object-Oriented Design
M Nov 22		• Object-Oriented Example
W Nov 24 & F Nov 26		• Thanksgiving Break
M Nov 29	• Weisfeld Chapter 6	• Designing With Objects
W Dec 1		• Object-Oriented Example
F Dec 3		• Test #3
M Dec 6	• TBD	• The Traveling Salesman Problem
W Dec 8		• Review

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