Course Syllabus ~ Fall 2011

Course Number: CSC 110

Course Title: Computational Problem Solving

Credits: 3:3

Prerequisites/co-requisites: None

For whom planned: This course is for non-computer science majors who wish to strengthen their mathematical, computational and problem solving skills and knowledge. The purpose of this class is not to teach a programming language, but rather how to solve problems and think computationally, using programming as a tool to that end.

Instructor information: Lydia K Fritz, Lecturer, 152 Petty Building, 336.334.9723, lkfritz@uncg.edu.
Office Hours: 10 – 11am Monday & Friday. Additional office hours are available by appointment. Email lkfritz@uncg.edu to schedule.

Catalog Description: Using computing to apply mathematical concepts in developing algorithmic solutions to non-trivial mathematical real-world problems, stressing analysis and logical reasoning. An educational programming language will be covered and used for examples and assignments.

Student Learning Outcomes: As a GMT designated course, upon completion of the course, the student should be able to:

1. Employ problem solving strategies in fundamental mathematics that go beyond routine mathematical operations and data manipulation;
2. Reason in mathematical systems;
3. Formulate and use mathematical models and apply mathematical concepts effectively to solve real-world problems;
4. Evaluate decisions based on mathematically valid principles;
5. Communicate mathematical solutions clearly and effectively.

In addition, specifically for this course, the student should be able to:

6. Create simple algorithmic procedures for solving computational problems;
7. Implement algorithmic procedures using a modern programming language;

Evaluation Methods and Guidelines for Assignments

- Homework/in-class assignments (written and programming): 35%
- Three written tests: 15% each
- Final exam (cumulative): 20%

Late/missed work policy

- Homework assignments are due at the *beginning of class* on the announced due date. Late homework is not accepted. Late and/or missing homework will receive a grade of zero.
- In class assignments must be completed in class. If you are absent on the day of an in class assignment, you will receive a grade of zero for that assignment.
- You are allowed to drop 3 homework/in-class assignments. These drops are to cover emergencies that might cause you to miss class. Treat every homework/in-class assignment as if it will count toward your grade (because it does!).

Grading Scale

A+ = (97, 100]	A = (93, 97]	A- = (89, 93]
B+ = (87, 89]	B = (83, 87]	B- = (79, 83]
C+ = (77, 79]	C = (73, 77]	C- = (69, 73]
D+ = (67, 69]	D = (63, 67]	D- = (59, 63]
F = [0, 59]		

Teaching Strategies:

Problems with computational solutions, as studied in this course, are inherently mathematical, and the problems covered in this course will involve algebra, geometry, consumer and financial mathematics, and basic statistical analysis. For each problem domain, the relevant mathematics principles are covered first, followed by an exploration of computational techniques in this domain and an analysis of results.

a. This course will consist of two 75 minute lectures per week.
b. Class lectures will be interactive and include demonstrations and in-class programming assignments. Students will be expected to participate in class discussion.
c. Assignments will be given which will include a mix of written analysis, hand computation, and computer-based assignments.
d. Tests will include
    i. Short-answer questions requiring hand calculations to determine correct solutions.
    ii. Real-world problems requiring formulation of mathematically correct algorithms to produce solutions.
    iii. Code comprehension problems requiring an evaluation of given code to determine mathematical purpose and solutions.

Required Texts

Maria Litvin and Gary Litvin. Mathematics for the Digital Age and Programming in Python. Skylight Publishing, 2008.

BRING YOUR BOOK TO CLASS EVERYDAY!

Topical Outline

The topics to be covered include:

1. Sets & Functions
2. An Introduction to Programming, including
    a. Python code structure
    b. Variables & Scope, including variables in Python functions
    c. Function arguments
    d. Using functions to solve problems
3. Arithmetic & Geometric sequences
    a. Sigma notation
    b. Finite and infinite sums
    c. Partial sums
    d. Converging and Diverging series
4. Number Systems
    a. Binary, Octal and Hexadecimal systems
    b. Representing numbers in computers
    c. Irrational numbers
5. Boolean Algebra
    a. Propositions
    b. Logical operators
    c. Predicates and Sets
6. Counting
    a. Multiplication rule
    b. Permutations
    c. Combinations

Academic Integrity Code: Students are expected to adhere to the UNCG Academic Integrity Policy, discussed in the first class and linked from the syllabus. See http://studentconduct.uncg.edu. Each student is required to sign the Academic Integrity Policy on all major work submitted for the course. Refer to UNCG *Undergraduate Bulletin*.

Attendance Policy: Attendance is taken daily. The instructor reserves the right to ***drop any student who misses more than 3 hours of lecture***. The university allows for a limited number of excused absences for religious observances --- students who plan to take such an absence should notify the instructor at least two weeks in advance so that accommodations can be made. Students with planned absences, whether for university events, religious observance, or other reason, are expected to make arrangements with the instructor to turn in assignments or take exams **BEFORE** the scheduled date of the assignment or test.

Exercises: Text chapter exercises should be completed as the chapter is being read. These exercises are good practice for preparing for tests and labs. If time permits, I will answer questions about the exercises in class; if you need additional help, see me in my office. You MUST study and complete the assignments at the end of the chapters to be successful in this class.

Tests: Dates for the tests are fixed. The test dates for the Fall 2011 semester are:

- Tuesday, September 13 (midterm #1) – **Petty 223**
- Thursday, October 25 (midterm #2) – **Petty 223**
- Thursday, December 1 (midterm #3) – **Petty 223**
- Tuesday, December 13; 12 noon – 3:00pm (final exam) – **Petty 223**

If you miss taking a test at the scheduled time because of some circumstance beyond your control, see Mrs. Fritz to take the test before it is graded and returned to class members. Once a missed test has been graded and returned to the class, it cannot be made up and will receive a grade of 0.

Class Handouts: Any handouts used in class will be available through the Course Documents link on Blackboard.

Announcements: If the need should arise, any announcements to the class will be made through the Announcements page on Blackboard, so check it often.

Emergency Preparedness: Closure of university facilities and classrooms in response to flu outbreak or other emergency does not mean that this class is halted, and students should check blackboard for announcements about how the class will proceed in the event of such an emergency.

A few notes about PYTHON
Python version 3.1.2 is installed in all campus computer labs. All students have the ability/permission necessary to use Python in the labs.
If you choose to install Python on your personal computer, you may download it for free here:
http://wiki.python.org/moin/BeginnersGuide/Download

The instructor cannot assist with download/install issues. Any student choosing to install Python to their personal machine does so at his/her own risk. Personal computer issues are not valid excuses for late/missing work.