COURSE OUTLINE

Computer Science/Information Systems 151
Python Programming

I. Catalog Statement

Computer Science/Information Systems 151 is a course in programming computers in the Python language for those who plan to be programmers or those interested in graphics and Graphical User Interface (GUI) programming. Python is used in both business and game applications. The course covers the basics of the Python language and reviews computer science concepts. Data types, decision structures, loops, functions, object-oriented programming, and some basic graphics and GUI concepts will be presented.

Units – 3.0
Lecture Hours – 3.0
Lab Hours – 3.0
(Faculty Laboratory Hours 0.0 + Student Laboratory Hours 3.0 = 3.0 Total Laboratory Hours)

Prerequisites: Computer Science/Information Systems 112 or equivalent.

II. Course Entry Expectations

Skills Level Ranges: Reading 5; Writing 5; Listening/Speaking 5; Math 3.

III. Course Exit Standards

Upon successful completion of the required coursework, the student will be able to:
1. use basic programming concepts;
2. code complete programs from program descriptions and provide complete documentation;
3. acquire a vocabulary of Python commands;
4. develop and code intermediate level object oriented programs using Python;
5. understand, describe, and implement basic graphics in Python programs.

IV. Course Content **Total Contact Hours = 48**

A. Introduction to the Python Language 3 hours
   1. Brief history
   2. Compiled vs. interpreted languages
   3. Object-oriented languages
   4. How Python runs programs/the Python interpreter

B. Writing Programs: Basic Python Syntax 6 hours
   1. Software development
   2. Elements of programs: names, expressions, output statements
   3. Computing with numbers: numeric concepts, data types, variable, assignment statements, simple Input/Output (I/O)

C. Computing with Strings 5 hours
   1. Python syntax
   2. String operations: indexing, slicing, string conversion and formatting tools
D. Basic Control Structures 9 hours
   1. Algorithms and selection structures
   2. If statements and multi-way branching (if/elif) and block delimiters
   3. Boolean operators
   4. Loops and repetition statements
E. Intermediate Control Structures for Loops and Tuples 3 hours
F. Python Collection Types: Lists and Dictionaries 2 hours
G. Functions: Definitions and Calls; Scopes and Arguments 3 hours
H. Files and Exceptions 2 hours
I. Software Objects/Object-Oriented Programming 15 hours
   1. Using software objects
   2. Object-oriented concepts
   3. Designing and implementing object-oriented programs
   4. Basic graphics and graphical user interfaces (GUI)
      a. Basic graphics and GUI programming concepts
      b. Basic program development using the *Tkinter* graphics module

V. Methods of Presentation

The following instructional methodologies may be used in the course:
1. lecture;
2. demonstration;
3. online.

VI. Assignments and Methods of Evaluation

1. Programming assignments (e.g. designing a playing card game).
2. Computer assignments (e.g. hands-on exploration of GUI programming fundamentals).
3. Midterm examination.
4. Final examination.

VII. Textbook

Dawson, M. Guide to Programming with Python.
Boston: Course Technology, 2008.
11th Grade Textbook Reading Level. ISBN: 1-4239-0112-6.

Zelle, J. Python Programming: An Introduction to Computer Science. Current ed.
Wilsonville, Oregon: Franklin, Beedle & Associates, 2006.
12th Grade Textbook Reading Level. ISBN: 1-887902-99-6.

VIII. Student Learning Objectives

Upon successful completion, the student will be able to:

1. explain, recognize and describe Python programming commands and code
2. develop and code intermediate level object oriented programs using Python
3. describe and implement basic graphical user interface programs in Python