Saint Leo University
School of Business

COM 302: Python Programming

Course Description:

This course will introduce students to Python, a high level imperative and object-oriented language. Python offers a shorter and cleaner coding integration process while providing better programmer's productivity. Students learn Python's basic and advanced programming concepts.

Prerequisite:

COM 209 or an equivalent programming language;
COM 301 or an equivalent course covering Data Structures and Algorithms

Textbook:
This course requires information from the following text:

- Lambert - Bundle: Fundamentals of Python: First Programs 2nd edition as well as the MindTap + Packt student resources.

Students will need to choose from one of the three Cengage Unlimited Subscriptions.

1. 4-month subscription
2. 1-year subscription
3. 2-year subscription

Learning Outcomes:

Students will be able to:

1. Demonstrate a fundamental knowledge of the object-oriented programming language including writing, testing, and debugging Python code.
2. Demonstrate Writing Python code for file processing, decision and repetition structures, functions, list and tuples, classes, inheritance, recursion, and GUI.
3. Demonstrate how to apply theory in practical ways to efficiently code a good Python program.

Core Value:

4. A good programming skill is critical to any software development process. This course will emphasize the Saint Leo core value of EXCELLENCE to highlight the importance of a clean and clear software development practice.

Evaluation:

Assignment(s)	**Number of Assignments**	**Total % Possible** *(weighted)*
Tests/Exams	8	40%
Homework • Case Studies: 12 • Quick – Programming Exercises: 94 • QAEs: 9	115	50%
Participation/Discussion	16	10%
Total		**100%**

Grading Scale:

Grade	**Score (%)**
A	94-100
A-	90-93
B+	87-89
B	84-86
B-	80-83
C+	77-79
C	74-76
C-	70-73
D+	67-69
D	60-66
F	0-59

Class Participation and Attendance:

A. Tests/Exams:
A minimum of eight tests and exams will be given in this course, with two exams scheduled as midterm and final. The tests will be from the book and it will include programming exercises, debugging exercises, and maybe written questions. For online sections we will use MindTab to include a test for each unit.

B. Homework Assignments:
Homework Assignments from MindTab, it is primarily consisting of programming assignments involving writing application programs in Python from the assigned chapters exercises in the textbook.

C. Weekly Discussions:
Students will engage in weekly discussions on topics related to topics on programming practices. Each student will be required to post a discussion question and respond to two others posted by other students in the class.

Assessment of the Learning Outcomes:

Learning Outcome	**Mandatory Assessment Method(s)**
1	Tests/ Exams Homework Assignments, Discussion
2	Tests/ Exam, Homework Assignments, Discussion
3	Tests/ Exam, Homework Assignments, Discussion
4	Homework Assignments, Discussion

Course Schedule:

Module 1 Python Fundamentals

Objectives When you complete this module, you should be able to:

1. Describe the basic features of an algorithm and use that to compose and run a simple Python program
2. Explain how hardware and software collaborate in a computer's architecture
3. Summarize a brief history of computing
4. Describe the basic phases of software development: analysis, design, coding, and testing
5. Use strings for the terminal input and output of text and use integers and floating-point numbers in arithmetic operations to construct arithmetic expressions
6. Initialize and use variables with appropriate names

Readings Chapters: 1 & 2

Assignments

Items to be Completed:	**Due No Later Than:**
Post an introduction to the class	Tuesday 11:59 PM EST/EDT
Post initial response to Discussion 1	Thursday 11:59 PM EST/EDT
Post responses to at least two classmates	Sunday 11:59 PM EST/EDT
Complete Homework • QAEs • Programming Exercises	Sunday 11:59 PM EST/EDT
Complete Quiz 1	Sunday 11:59 PM EST/EDT

Module 2 Inputs, Outputs, and Calculations

Objectives When you complete this module, you should be able to:

1. Construct a simple Python program that performs inputs, calculations, and outputs
2. Use docstrings to document Python programs
3. Write a loop to repeat a sequence of actions a fixed number of times
4. Write a loop to traverse the sequence of characters in a string
5. Write a loop that counts down and a loop that counts up

Readings Chapters: 2 & 3

Assignments

Items to be Completed:	**Due No Later Than:**
Post initial response to Discussion 2	Thursday 11:59 PM EST/EDT
Post responses to at least two classmates	Sunday 11:59 PM EST/EDT
Complete Homework • QAEs • Case Studies • Programming Exercises	Sunday 11:59 PM EST/EDT
Complete Quiz 2	Sunday 11:59 PM EST/EDT

Module 3 Control Statements, Strings, & .txt.

Objectives When you complete this module, you should be able to:

1. Write an entry-controlled loop that halts when a condition becomes false
2. Use selection statements to make choices in a program
3. Construct appropriate conditions for condition-controlled loops and selection statements
4. Use logical operators to construct compound Boolean expressions
5. Use a selection statement and a break statement to exit a loop that is not entry-controlled
6. Access individual characters in a string, then retrieve a substring from a string and, search for a substring in a string
7. Convert a string representation of a number from one base to another base
8. Use string methods to manipulate strings
9. Open a text file for output and write strings or numbers to the file and open a text file for input and read strings or numbers from the file
10. Use library functions to access and navigate a file system

Readings Chapters: 3 & 4

Assignments

Items to be Completed:	**Due No Later Than:**
Post initial response to Discussion 3	Thursday 11:59 PM EST/EDT
Post responses to at least two classmates	Sunday 11:59 PM EST/EDT
Complete Homework • QAEs • Case Studies • Programming Exercises	Sunday 11:59 PM EST/EDT
Complete Quiz 3	Sunday 11:59 PM EST/EDT

Module 4 Data Organization

Objectives When you complete this module, you should be able to:

1. Construct lists and access items in those lists
2. Use methods to manipulate lists and perform traversals of lists to process items in the lists
3. Define simple functions that expect parameters and return values
4. Construct dictionaries and access entries in those dictionaries and use methods to manipulate dictionaries
5. Determine whether a list or a dictionary is an appropriate data structure for a given application

Readings Chapters: 5

Assignments

Items to be Completed:	**Due No Later Than:**
Post initial response to Discussion 4	Thursday 11:59 PM EST/EDT
Post responses to at least two classmates	Sunday 11:59 PM EST/EDT
Complete Homework • QAEs • Case Studies • Programming Exercises	Sunday 11:59 PM EST/EDT
Complete Quiz 4	Sunday 11:59 PM EST/EDT

Module 5 Designing with Functions

Objectives When you complete this module, you should be able to:

1. Explain why functions are useful in structuring code in a program
2. Employ top-down design to assign tasks to functions
3. Define a recursive function
4. Explain the use of the namespace in a program and exploit it effectively
5. Define a function with required and optional parameters
6. Use higher-order functions for mapping, filtering, and reducing

Readings Chapters: 6

Assignments

Items to be Completed:	**Due No Later Than:**
Post initial response to Discussion 5	Thursday 11:59 PM EST/EDT
Post responses to at least two classmates	Sunday 11:59 PM EST/EDT
Complete Homework • QAEs • Case Studies • Programming Exercises	Sunday 11:59 PM EST/EDT
Complete Quiz 5	Sunday 11:59 PM EST/EDT

Module 6 Simple Graphs & Images Processing

Objectives When you complete this module, you should be able to:

1. Use the concepts of object-based programming—classes, objects, and methods—to solve a problem
2. Develop algorithms that use simple graphics operations to draw two-dimensional shapes
3. Use the RGB system to create colors in graphics applications and modify pixels in images
4. Develop recursive algorithms to draw recursive shapes
5. Write a nested loop to process a two-dimensional grid
6. Develop algorithms to perform simple transformations of images, such as conversion of color to grayscale

Readings Chapters: 7

Assignments

Items to be Completed:	**Due No Later Than:**
Post initial response to Discussion 6	Thursday 11:59 PM EST/EDT
Post responses to at least two classmates	Sunday 11:59 PM EST/EDT
Complete Homework • QAEs • Case Studies • Programming Exercises	Sunday 11:59 PM EST/EDT
Complete Quiz 6	Sunday 11:59 PM EST/EDT

Module 7 Graphical User Interface (GUI)

Objectives When you complete this module, you should be able to:

1. Design and code a GUI-based program
2. Define a new class using sub-classing and inheritance
3. Instantiate and lay out different types of window components, such as labels, entry fields, and command buttons, in a window's frame
4. Define methods that handle events associated with window components
5. Organize sets of window components in nested frames

Readings Chapters: 8

Assignments

Items to be Completed:	**Due No Later Than:**
Post initial response to Discussion 7	Thursday 11:59 PM EST/EDT
Post responses to at least two classmates	Sunday 11:59 PM EST/EDT
Complete Homework • QAEs • Case Studies • Programming Exercises	Sunday 11:59 PM EST/EDT
Complete Quiz 7	Sunday 11:59 PM EST/EDT

Module 8 Design with Classes

Objectives When you complete this module, you should be able to:

1. Determine the attributes and behavior of a class of objects required by a program
2. List the methods, including their parameters and return types, that realize the behavior of a class of objects
3. Choose the appropriate data structures to represent the attributes of a class of objects
4. Define a constructor, instance variables, and methods for a class of objects
5. Recognize the need for a class variable and define it
6. Define a method that returns the string representation of an object
7. Define methods for object equality and comparisons
8. Exploit inheritance and polymorphism when developing classes
9. Transfer objects to and from files

Readings Chapters: 9

Assignments

Items to be Completed:	**Due No Later Than:**
Post initial response to Discussion 8	Thursday 11:59 PM EST/EDT
Post responses to at least two classmates	Sunday 11:59 PM EST/EDT
Complete Homework • QAEs • Case Studies • Programming Exercises	Sunday 11:59 PM EST/EDT
Complete Quiz 8	Sunday 11:59 PM EST/EDT