Knight Foundation School of Computing and Information Sciences

Course Title: Python Programming I **Date:** 10/16/2023

Course Number: COP 2XXX

Number of Credits: 3

Subject Area: Programming	**Subject Area Coordinator:** Janki Bhimani **email:** jbhimani@fiu.edu
Catalog Description: Introduction to computer programming using Python including fundamental concepts and systematic design techniques. Students will write programs that computationally solve and reduce problems.	
Textbooks: Python Crash Course: A Hands-On, Project-Based Introduction to Programming, 3rd Edition, by Eric Matthes. Release: January 10, 2023. Publisher: No Starch Press. ISBN: 978-1718502703	
References (for further reading): Fluent Python, 2nd Edition, by Luciano Ramalho. Released April 2022. Publisher: O'Reilly Media, Inc. ISBN: 978-1492056355	
Prerequisites Courses: MAC 1140 or MAC 1147 or MAC 2233 or MAC 2311 or Advisor's permission	
Corequisite Courses:	

Type: Core Course for BS in Data Science; Elective for CS and IT Majors.

Prerequisites Topics:

1. Mathematical functions
2. Arithmetic and geometric sequences

Course Outcomes:

1. **Describe** the structure and characteristics of various data structures such as lists, tuples, dictionaries, and sets.
2. **Apply** the fundamentals of Python to create simple to moderately complex programs.
3. **Implement** data structures effectively to solve real-world problems.
4. **Recall** the core concepts and syntax of the Python programming language.
5. **Analyze** a given problem to identify appropriate data structures and algorithms for solutions.
6. **Develop** algorithmic solutions for common computational problems.
7. **Practice** writing, debugging, and refining Python code in a collaborative environment.
8. **Execute** programming projects from inception to completion, focusing on best practices and testing methodologies.
9. **Utilize** object-oriented programming principles, like encapsulation and inheritance, in Python to design software.
10. **Break down** complex problems into manageable tasks or modules that can be addressed with Python functions or classes.

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Association between Student Outcomes and Course Outcomes

BS in Computing: Student Outcomes	Course Outcomes
1) Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.	1,2,3,4,5,6,7,8,9,10
2) Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.	1,2,3,4,5,6,7,8,9,10
3) Communicate effectively in a variety of professional contexts.	
4) Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.	
5) Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.	

Program Specific Student Outcomes	
6) Apply theory, techniques, and tools throughout the data science lifecycle and employ the resulting knowledge to satisfy stakeholders' needs. [DS]	5,6,7,8,9,10

Assessment Plan for the Course and how Data in the Course are used to assess Student Outcomes

Student and Instructor Course Outcome Surveys are administered at the conclusion of each offering, and are evaluated as described in the School's Assessment Plan: https://abet.cis.fiu.edu/

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Outline

Topic	**Number of Lecture Hours** (Total: 37.5 hours = 15 weeks * 2 lectures/week * 1.25 hrs/lecture)	Outcome
1. Introduction to programming and Python 1.1. Introduction to programming, Python, and course overview 1.2. Python basics - variables, data types, and operators	3.75	2,4,7
2. Control structures 2.1. Conditionals (if, elif, else) 2.2. Loops (for, while)	3.75	2,4,7
3. Functions and modular programming 3.1. Functions - definition, arguments, return values 3.2. Scope and lifetime of variables	5	2,4,7
4. Data structures I - Lists and Tuples 4.1. Lists - operations, indexing, and slicing 4.2. Tuples and list comprehensions	5	1,3,4,5
5. String manipulation 5.1. String basics - operations, methods, and formatting 5.2. Reading and writing files (JSON)	5	2,4,7,8
6. Data structures II - Dictionaries and Sets 6.1. Dictionaries - operations, keys, and values 6.2. Sets and set operations	5	1,3,4,5,8
7. File I/O and exception handling 7.1. Error handling with try, except, and finally	3.75	2,4,6,7
8. Object-oriented programming I 8.1. Introduction to OOP, classes, and objects 8.2. Attributes, methods, and constructors	6.25	6,9,10

Performance Measures for Evaluation

All assignments are assigned through the Canvas course site. The deadlines are strictly enforced. For example, if the deadline is 11:59 PM, any assignment submitted after this time is considered late. It is also each student's responsibility to submit correct files and ensure the submission is successful before the deadline. If students are unable to submit their assignment through Canvas, they will need to send a copy of their assignment to the instructor before the stated deadline. There will be three exams and each exam will be cumulative with an emphasis on the most

recently covered material. Exam details will be posted on the Canvas course site (https://canvas.fiu.edu).

Assignment	Total Points	Percentage of Final Grade
Quizzes (11-Drop-1)	100 each	10%
Homework Assignments (3)	100 each	30%
Exam 1	100	20%
Exam 2	100	20%
Exam 3	100	20%
	TOTAL	100%

Letter Grade Distribution Table

Letter	Range%	Letter	Range%	Letter	Range%
A	93 or above	B	82 - 85.9	C	70 - 73.9
A-	90 - 92.9	B-	78 - 81.9	D	60 - 69.9
B+	86 - 89.9	C+	74 - 77.9	F	less than 60

Description of Possible Homework Activities

Homework 1: Python Basics and Control Structures
Description: Students will develop an interactive quiz application that poses multiple-choice questions to the user, records their answers, provides immediate feedback, and summarizes their performance at the end.

Rubric:

Code Structure (20 points)	Clear organization and modular structure	10 points
	Informative comments and docstrings	10 points
Functionality (40 points)	Effective question prompt and multiple-choice display	10 points
	Correctly identifies and provides feedback on user's answer	20 points
	Summarizes quiz performance at the end	10 points
Control Structures (20 points)	Efficient use of conditionals	20 points
	Demonstrates understanding of loops (for iterating through questions)	20 points

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Homework 2: Data Structures in Action
Description: Students are to create a contact book program with search functionality. Besides adding, viewing, and deleting contacts, users should be able to search for contacts based on any field (name, phone, or email) and receive a list of matching results.

Rubric:

Code Structure (20 points)	Modular and maintainable structure	10 points
	Effective use of comments and docstrings	10 points
Functionality (40 points)	Successful addition and deletion of contacts	10 points
	View contacts with a neat display format	10 points
	Search contacts based on any field with relevant results	20 points
Control Structures (20 points)	Demonstrates proficiency in handling lists/tuples for storage	20 points
	Effective use of dictionaries for contact details and search	20 points

Homework 3: Object-Oriented Programming
Description: Students are required to model a library system using Python classes. This should include classes for Books, Users, and a Library. Users should be able to check out and return books.

Rubric:

Code Structure (20 points)	Clean, organized, and properly indented code	10 points
	Appropriate use of comments	10 points
Functionality (30 points)	Users can check out books	15 points
	Users can return books	15 points
Object-Oriented Concepts (50 points)	Appropriate use of classes and objects	20 points
	Effective use of methods within classes	20 points
	Demonstrates understanding of attributes and inheritance (if applied)	10 points