AIR FORCE INSTITUTE OF TECHNOLOGY

SCHOOL OF SYSTEMS AND LOGISTICS

Foundations of Python Programming

WKDSS 105

SYLLABUS

Foundations of Python Programming

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Course Description

This course provides Airmen with an introduction to Python Programming through basic exercises and assessments. Students are shown the capabilities of utilizing Jupyter Notebook and develop necessary coding and basic mathematical skills to work with data and conduct basic analysis to better inform data-driven decision making. Additionally, students are introduced to basic concepts of Generative AI capabilities and practical use cases they can apply to any project. This course serves as a springboard for more advanced courses on data science and other advanced analytical techniques.

Course Learning Objectives

At the end of this course students will be able to:

1. Install/utilize a Python-enabled integrated development environment (IDE).
2. Understand the various data types, classes, objects, and structures in Python.
3. Utilize fundamental mathematical techniques needed to conduct data analysis.
4. Conduct basic data cleaning and graphical storyboarding to inform decision makers.

Student Evaluation and Standards

Students are evaluated by means of knowledge assessments and various coding exercises.

Instructional Methods

Instruction is provided by means of recorded virtual lessons and/or online presentations made by faculty members of the School of Systems and Logistics.

Academic Freedom, Non-Attribution, Academic Integrity, and Student Rights

All students must be familiar with and adhere to the standards of academic freedom, non-attribution and academic integrity. Refer to the Student Handbook for these standards.

Student Preparation

Students should have a computer able to run a Python-enabled (IDE). Instructions for various methods are included as part of the course instruction.

Student Evaluation of the Course

There are two principal means of providing student evaluation of the course content and conduct:

1. Providing direct feedback to the course instructor via e-mail or telephone.
2. Completing an end-of-course evaluation online.

Course Schedule

Learning Activity	Estimated Time
Administration	30 Minutes
Module 1: Data Science Basics	
1. Data Profession Basics and Data Science	60 Minutes
2. Descriptive Statistics	60 Minutes
Module 2: Getting Started with Python	120 Minutes
Module 3: Data Structures, Classes, and Logic	
1. Numbers and Data Structures	120 Minutes
2. Functions and Classes	60 Minutes
Module 4: NumPy and Case Study Intro	
1. Case Study Introduction	30 Minutes
2. Arrays and NumPy Basics	90 Minutes
Module 5: Pandas and Data Exploration	
1. Pandas and Data Files	120 Minutes
2. Exploratory Data Analysis	90 Minutes
3. Pivot Tables	90 Minutes
4. Data Visualization	120 Minutes
Module 6: Basic Predictive Modeling	
1. Predictive Modeling	60 Minutes
2. Regression Modeling in Python	120 Minutes
Module 7: Web Scraping and Cleaning	90 Minutes
Module 8: Generative AI	
1. Introduction to Generative AIs	60 Minutes
2. Prompt Engineering	90 Minutes
Total Course Duration	**24 Hours**