PCAC2010 APPLICATION DEVELOPMENT - TOOLS & TECHNOLOGIES (3-0-0)

OVERALL COURSE OBJECTIVES: To develop comprehensive knowledge and skills in Python, AI application development, and interacting with databases, which enables the learner to apply Python to data science tasks, develop AI-driven applications, manage SQL databases, and implement full-stack Django-based solutions.

LEARNING OUTCOMES: On successful completion of the course the students shall be able to:

1. Understand and implement basic and advanced Python concepts, including the use of libraries like Pandas, Numpy & Beautiful Soup.

2. Develop the ability for data collection, manipulation, and web scraping using Python.

3. Apply foundational Python skills to develop Artificial Intelligence (AI) enabled applications with Python and Flask.

4. Employ different Python techniques to develop web applications, write unit tests, and package applications for distribution.

5. Gain a thorough understanding of SQL and how Python interacts with databases using Object-Relational Mapping (ORM) with Django.

6. Implement a Django web application to manage data and gain experience deploying it to the cloud.

COURSE CONTENT:

Module 1: Python for Data Science, AI & Development [27 Hours]

This beginner-friendly, self-paced Python course starts from basics and progresses to programming in Python within a few hours. None prior programming experience needed! The course covers Python basics, different data types, and core components such as List, Tuples, conditions, and branching. It also illustrates how to utilize Python libraries like Pandas, Numpy, and Beautiful Soup, and perform data collection and web scraping tasks using APIs. The learning experience is enriched with hands-on labs using Jupyter Notebooks. On course completion, learners should be able to create basic programs, work with data, and automate real-world tasks using Python. It is an ideal choice for aspiring data scientists, software developers, data engineers, and individuals interested in AI and DevOps roles.

Sub-Topic
APIs, and Data Collection
Python Basics
Python Data Structures
Python Programming Fundamentals
Working with Data in Python

Formative Assessments:
6 graded quizzes.

Module 2: Developing AI Applications with Python and Flask [19 Hours]

This mini course provides hands-on experience in applying basic Python skills to develop Artificial Intelligence (AI) enabled applications. As a developer, learners will undertake various tasks such as developing functions and application logic, exchanging data through Watson AI libraries, writing unit tests, and packaging applications for distribution. The course allows learners to demonstrate their foundational Python skills through the development of web applications and AI-powered solutions. On completion, not only will learners gain confidence in creating AI-enabled applications with Python, Flask, Watson AI libraries, and handling unit tests, but will also add a valuable project to their portfolio.

Sub-Topics
Creating AI Application and Deploy using Flask
Python Coding Practices and Packaging Concepts
Web App Deployment using Flask

Formative Assessments:
1 peer-review assignment and 2 staff graded assignments.

Module 3: [Django Application Development with SQL and Databases](#) [14 Hours]

This course, crucial for developers, particularly in Back-End, Full Stack, and DevOps roles, focuses on the fundamentals of relational databases and how to access them from applications. Recognizing that key tasks in application development involve accessing, processing, and presenting data, the course provides insights into foundational database concepts and the basics of SQL. Besides SQL, learners will explore Object-Relational Mapping (ORM), which facilitates the use of Object-Oriented Programming languages, like Python, with databases. The course also assists in acquiring full-stack Django skills through the creation of a Django web app and offers hands-on experience in cloud deployment. Hands-on labs and a final project ensure learners can apply their knowledge and add a valuable asset to their portfolio.

Sub-Topics
Getting Started with SQL & Relational Databases
Consolidate and Deploy Your Django App
Full-stack Django Development
ORM: Bridging the Gap Between the Real World and Relational Model

Formative Assessments:
3 graded quizzes, 1 peer-review assignment and 2 staff graded assignments.

ASSESSMENT:

For summative assessments, Coursera will provide question banks for which exams can be conducted on the Coursera platform or the faculty will create their own assessments.

Note: If a Course or Specialization becomes unavailable prior to the end of the Term, Coursera may replace such Course or Specialization with a reasonable alternative Course or Specialization.