Introduction to Python Programming

Course Description:

Python is an easy to learn, powerful programming language. You can use Python when your data analysis tasks need to be integrated with web apps or if statistics code needs to be incorporated into a production database. Being a full-fledged programming language, it's a great tool to implement algorithms for production use.

Learning Outcomes:

After completing this course, you will be able to:

- Write your first python program
- Navigate your way through a python environment
- Perform basic operations related to data analysis
- Work with loops and functions

Pedagogy

The course is a mixture of classroom lectures, in-class lab exercises, quizzes, take-home exercises and mini-projects. Jupyter notebook will be the medium of coding in python.

Starter kits : Why Python? Python in data science. Advantages over R. Intro to Jupyter notebooks. Setting up the environment, setting up the working directory.

Course Content

DAY-1

- Program Launch **(~2 hours)**
- Break
    - *During break, setting up Jupyter notebook(TA will assist students who have problems installing Jupyter)*
- Intro to Python - **15 min**
- Basic Commands - **1 hr 15 min**
    - Hello World
    - Variables
    - Basic Arithmetic & logical operators (int, float)
    - Data Types - numbers, boolean & strings
    - Concat, Subset, Position, length etc.

- Appreciation of programming using **Pseudo Code (Introduction)** - If-else, loops (Deck) - **30 min**

Lab-1 - 2 Hrs

- Pseudo code
    - Logic
    - Flowcharts (Intuitive understanding of code flow)
    - Pseudo Code
    - Basic Programming syntax

Day 2

- List, Tuples, Sets & Dictionaries **2 hr**
    - Operators
    - Default functions
    - Default methods

- **Intro** to Conditional statements (if-else, elif), Nested Conditional in Python **60 min**
- **Intro** to Basic For, While Loops, Break in Python **60 min**

Lab Exercises (2 hrs)

DAY-3

- Convert pseudo codes from Day 1 into programs using Loops and if-else. **3 hr 30 mins**
- List Comprehension **30 min**
    - Use cases
    - vs Loops

Lab Exercises (2 hrs)

- Write Programs including both loops and If-else
- Practice list comprehensions

DAY-4

- Understanding the concept of functions **3 hrs**
    - Exploring commonly used built in functions (min, max, sort etc.)
    - Programming user defined functions
    - Working with functions with and without arguments
    - Functions with return items
    - Understanding lambda functions
    - Overview of map, reduce and filter functions

Lab Exercises (3 hrs)