Course Name: Certificate Course in Data Science using Python

Course Objective: The objective of this course is to create expertise in Python Programming to develop data science applications.

Prerequisite: Candidates should be proficient in Computer Fundamentals, Basic Database and Programming Concepts with Logical Approach.

Course Duration: 80 Hrs (8 hours/ day for 2 Weeks)

Course Outline:

S. No.	Course Modules	Duration (Hrs)
1	Introduction to Python programming language	15
2	Understanding the concept of data structures in Python and their implementation	30
3	Pandas basics for data manipulation in Python	15
4	Data visualization on using matplotlib and seaborn libraries	10
5	Project	10
	Total	**80**

Module 1: Introduction to Python programming language:

- Installation and setup,
- Creating and saving a script file
- basics of Python,
- data types,
- variables.

- Syntax and comments in Python: Understanding the syntax and commenting the code
- Python string manipulation: String data type, string indexing, slicing, concatenation, and formatting
- Introduction to Python operators:
  - Arithmetic operators,
  - comparison operators,
  - logical operators,
  - assignment operators.

Module 2: Understanding the concept of data structures in Python and their implementation

- Python lists,
- tuples,
- sets,
- dictionaries

- Conditional statements and loops in Python:
  - if-else,
  - while loop,
  - for loop,

- nested loops.
- Introduction to Python functions:
  - Defining functions, arguments, return statement, and scope of variables.
- Introduction to Data Manipulation
  - Introduction to NumPy
  - NumPy Package in Python, Importing NumPy, creating different arrays using NumPy, Array Functions and Methods, Different Mathematical Functions, Different Matrix Operations, Random Numbers, Generate Numbers between a range.

Module 3: Pandas basics for data manipulation in Python:

- Understanding the Pandas library, series, and data frame operations.
- Concept of Series in Pandas, Creating Series using Pandas, Different Series Attributes, Series vs List, Series Operations, Series from CSV File.

- **Exploratory data analysis,**
  - Reading files
  - Data cleaning in Python: handling missing values and filling NA
  - Data preparation and pre-processing
  - Data feature engineering: handling categorical data
  - Data validation techniques in Python
  - Data feature engineering: removing columns and rows from raw data

Module 4: Data visualization on using matplotlib and seaborn libraries

- Scatter plot
- Line plot
- Bar plot
- Histogram
- Box plot
- Pie plot

Final Project: showcase all your skills in an end-to-end data analysis project. You'll pick the dataset, do the data munging, ask the research questions, visualize the data, draw conclusions, and present your results