

## Python for Data Analytics and Machine Learning

**Course Duration: 05 Days**

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### Module 01: Python Basics

- Introduction to Google Colaboratory
- Introduction to Python
- Variables
- Data types: List, Tuples, Dictionary, Sets, Strings
- Operators, Keywords, Functions
- Loops and Conditional statements: if, elif, while loop, for loop

**Demo/Lab:**

**Creation of Colab, and working with variable, operators, using basic predefined -defined functions, creating functions, using loops and conditional statement.**

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### Module 02: Python for Data Analysis

- What is Data Analysis?
- NumPy Module Functions
- Pandas Module Functions
- **Demo/Lab:**

**Data Analysis with NumPy and Pandas functions**

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### Module 03: Python for Data Cleaning and Data Pre-processing

- Treating null values
- Handling Outlier
- Encoding Techniques: Label Encoder and One-Hot Encoder
- Data Normalization; Minmax and Standard Scalar

- **Demo/Lab:**

**Cleaning and preprocessing the data- Hands on**

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## Module 04: Exploratory Data Analysis

Visualizing the data with various Python Visualization tools.

- Matplotlib Library
- Seaborn
- Plotly
- Choropleth Maps
- Pandas
- **Demo/Lab:**  
**Data Visualization with various Library: Line plot, Bar plot, Histogram, Pie chart, Box plot, Scatter plot, Heatmap, 3D-Plot**

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## Module 05: Machine Learning

- Introduction to Machine Learning
- Machine Learning Lifecycle
- Types of Machine Learning: Supervized ML, Unsupervised ML
- Supervized Machine Learning: Regression & Classification
- Unsupervised Machine Learning: Clustering, Natural Language Processing, Recommendation System

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## Module 06: Regression Machine Learning

- Linear Regression
- Evaluation Metrics
- Linear Regression OLS Model
- Multicollinearity, Variance inflation factor
- P-value, T-test, F-test
- Lasso and Ridge Regression
- Recursive Feature Elimination
- KNN Regression
- Polynomial Regression
- Bias-variance Tradeoff
- **Demo/Lab:**  
**Demo Hands-on for Regression Machine Learning**

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## **Module 07: Supervised Machine Learning**

### **Classification:**

- Logistic Regression
- Evaluation Metrics
- Imbalance Handling
- KNN Classification
- Decision Tree
- Ensemble Model
- Support Vector Classifier
- Naive Bayes classifier
- Hyper parameter Tunning
  
- **Demo/Lab:**
- **Demo Hands-on for Classification Machine Learning**
- **Demo on Handling Imbalance Datasets**

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## **Module 08: Unsupervised Machine Learning**

- Clustering - KMeans Clustering, Hierarchical Clustering
- Principal component Analysis
- Recommendation Systems - Content based filtering & Collaborative filtering
- Natural Language Processing
- **Demo/Lab:**  
**Implementing Clustering, PCA, Creating a Recommender System, Implementing Natural Language Processing**