

Prerequisite: Candidate must know the basic knowledge about object oriented language.

Duration: 180 Hrs

Data Science  
Beginner Track – Python for Beginner Programmers

<b>PYTHON SYLLABUS</b>
<b>Introduction to Python</b>
<ul style="list-style-type: none"><li>• <b>Installation and Working with Python</b></li><li>• <b>Understanding Python variables</b></li><li>• <b>Python basic Operators</b></li><li>• <b>Understanding python blocks</b></li></ul>
<b>Data Types</b>
<ul style="list-style-type: none"><li>• <b>Declaring and using Numeric data types: int, float, complex</b></li><li>• <b>Using string data type and string operations</b></li><li>• <b>Defining list and list slicing</b></li><li>• <b>Use of Tuple data type</b></li></ul>
<b>Program Flow Control</b>
<ul style="list-style-type: none"><li>• <b>Conditional blocks using if, else and elif</b></li><li>• <b>Simple for loops in python</b></li><li>• <b>For loop using ranges, string, list and dictionaries</b></li><li>• <b>Use of while loops in python</b></li><li>• <b>Loop manipulation using pass, continue, break and else</b></li><li>• <b>Programming using Python conditional and loops block</b></li></ul>
<b>Function ,Modules &amp; Packages</b>
<ul style="list-style-type: none"><li>• <b>Organizing python codes using functions</b></li><li>• <b>Organizing python projects into modules</b></li><li>• <b>Importing own module as well as external modules</b></li><li>• <b>Understanding Packages</b></li><li>• <b>Powerful Lamda function in python</b></li><li>• <b>Programming using functions, modules and external packages</b></li></ul>
<b>String, List and Dictionary Manipulation</b>
<ul style="list-style-type: none"><li>• <b>Building blocks of python programs</b></li><li>• <b>Understanding string in build methods</b></li></ul>

- List manipulation using in build methods
- Dictionary manipulation
- Programming using string, list and dictionary in build functions

### File Operations

- Reading config files in python
- Writing log files in python
- Understanding read functions, read(), readline() and readlines()
- Understanding write functions, write() and writelines()
- Manipulating file pointer using seek
- Programming using file operations

### Object Oriented Programming

- Concept of class, object and instances
- Constructor, class attributes and destructors
- Real time use of class in live projects
- Inheritance , overlapping and overloading operators
- Adding and retrieving dynamic attributes of classes
- Programming using OOps support

### Regular Expression

- Powerful pattern matching and searching
- Power of pattern searching using regex in python
- Real time parsing of networking or system data using regex
- Password, email, url validation using regular expression
- Pattern finding programs using regular expression

### Exception Handling

- Avoiding code break using exception handling
- Safe guarding file operation using exception handling
- Handling and helping developer with error code
- Programming using Exception handling

### Database Interaction

- SQL Database connection using python
- Creating and searching tables
- Reading and storing config information on database
- Programming using database connections

## Multithreading

- Understanding threads
- Forking threads
- Synchronizing the threads
- Programming using multithreading

Intermediate Level – Machine Learning for Beginner Programmers

Machine Learning
Introduction
<ul style="list-style-type: none"><li>• Getting Started with Machine Learning</li><li>• Artificial Intelligence   An Introduction</li><li>• What is Machine Learning?</li><li>• An introduction to Machine Learning</li><li>• Introduction to Data in Machine Learning</li><li>• Demystifying Machine Learning</li><li>• Applications</li><li>• Machine Learning and Artificial Intelligence</li><li>• Difference between Machine learning and Artificial Intelligence</li><li>• Agents in Artificial Intelligence</li></ul>
Supervised & Unsupervised Learning
<ul style="list-style-type: none"><li>• Types of Learning – Supervised Learning</li><li>• Types of Learning – Part 2</li><li>• Supervised and Unsupervised learning</li><li>• Reinforcement learning</li></ul>
Parametric Methods
<ul style="list-style-type: none"><li>• Regression and Classification</li><li>• Understanding Logistic Regression</li><li>• Multivariate Regression</li><li>• Confusion Matrix in Machine Learning</li><li>• Linear Regression(Python Implementation)</li><li>• Softmax Regression using TensorFlow</li><li>• Linear Regression using PyTorch</li><li>• Identifying handwritten digits using Logistic Regression in PyTorch</li></ul>
Dimensionality Reduction
<ul style="list-style-type: none"><li>• Parameters for Feature Selection</li><li>• Introduction to Dimensionality Reduction</li></ul>

<ul style="list-style-type: none"> <li>• <b>Underfitting and Overfitting in Machine Learning</b></li> <li>• <b>Handling Missing Values</b></li> </ul>
<b>Clustering</b>
<ul style="list-style-type: none"> <li>• <b>Clustering in Machine Learning</b></li> <li>• <b>Different Types of Clustering Algorithm</b></li> <li>• <b>K means Clustering – Introduction</b></li> <li>• <b>Analysis of test data using K-Means Clustering in Python</b></li> <li>• <b>Gaussian Mixture Model</b></li> </ul>
<b>Non-Parametric Methods</b>
<ul style="list-style-type: none"> <li>• <b>Decision Tree</b></li> <li>• <b>Decision Tree Introduction with example</b></li> <li>• <b>K-Nearest Neighbours</b></li> <li>• <b>Implementation of K Nearest</b></li> <li>• <b>Decision tree implementation using Python</b></li> </ul>
<b>Multilayer perceptron</b>
<ul style="list-style-type: none"> <li>• <b>Introduction to Artificial Neural Networks   Set 1</b></li> <li>• <b>Introduction to Artificial Neural Network   Set 2</b></li> <li>• <b>Introduction to ANN (Artificial Neural Networks)   Set 3 (Hybrid Systems)</b></li> <li>• <b>Image Classifier using CNN</b></li> </ul>
<b>Hidden Markov Model</b>
<ul style="list-style-type: none"> <li>• <b>Markov Decision Process</b></li> <li>• <b>Chinese Room Argument in Artificial Intelligence</b></li> </ul>
<b>Data Processing</b>
<ul style="list-style-type: none"> <li>• <b>Getting started with Classification</b></li> <li>• <b>Understanding Data Processing</b></li> <li>• <b>Data Cleansing   Introduction</b></li> <li>• <b>Data Preprocessing for Machine learning in Python</b></li> </ul>