

Python Certification Training for Data Science

Introduction to Python

Topics:

- Overview of Python
- The Companies using Python
- Different Applications where Python is used
- Discuss Python Scripts on UNIX/Windows
- Values, Types, Variables
- Operands and Expressions
- Conditional Statements
- Loops
- Command Line Arguments
- Writing to the screen

Hands On/Demo:

- Creating “Hello World” code
- Variables
- Demonstrating Conditional Statements
- Demonstrating Loops

Sequences and File Operations

Topics:

- Python files I/O Functions
- Numbers
- Strings and related operations
- Tuples and related operations
- Lists and related operations
- Dictionaries and related operations
- Sets and related operations

Deep Dive – Functions, OOPs, Modules, Errors and Exceptions

Topics:

- Functions
- Function Parameters
- Global Variables
- Variable Scope and Returning Values
- Lambda Functions
- Object-Oriented Concepts
- Standard Libraries
- Modules Used in Python
- The Import Statements
- Module Search Path
- Package Installation Ways
- Errors and Exception Handling
- Handling Multiple Exceptions

Skills:

- Error and Exception management in Python
- Working with functions in Python

Introduction to NumPy, Pandas and Matplotlib

Topics:

- NumPy - arrays
- Operations on arrays
- Indexing slicing and iterating
- Reading and writing arrays on files
- Pandas - data structures & index operations
- Reading and Writing data from Excel/CSV formats into Pandas
- matplotlib library
- Grids, axes, plots
- Markers, colours, fonts and styling
- Types of plots - bar graphs, pie charts, histograms
- Contour plots

Skills:

- Probability Distributions in Python
- Python for Data Visualization

Data Manipulation

Topics:

- Basic Functionalities of a data object
- Merging of Data objects
- Concatenation of data objects
- Types of Joins on data objects
- Exploring a Dataset
- Analysing a dataset

Skills:

- Python in Data Manipulation

Introduction to Machine Learning with Python

Topics:

- Python Revision (numpy, Pandas, scikit learn, matplotlib)
- What is Machine Learning?
- Machine Learning Use-Cases
- Machine Learning Process Flow
- Machine Learning Categories
- Linear regression

- Gradient descent

Skills:

- Machine Learning concepts
- Machine Learning types
- Linear Regression Implementation

Supervised Learning - I

Topics:

- What are Classification and its use cases?
- What is Decision Tree?
- Algorithm for Decision Tree Induction
- Creating a Perfect Decision Tree
- Confusion Matrix
- What is Random Forest?

Skills:

- Supervised Learning concepts
- Implementing different types of Supervised Learning algorithms
- Evaluating model output

Dimensionality Reduction

Topics:

- Introduction to Dimensionality
- Why Dimensionality Reduction
- PCA
- Factor Analysis
- Scaling dimensional model
- LDA

Skills:

- Implementing Dimensionality Reduction Technique

Supervised Learning - II

Learning Objectives: In this module, you will learn Supervised Learning Techniques and their implementation, for example, Decision Trees, Random Forest Classifier etc.

Topics:

- What is Naïve Bayes?
- How Naïve Bayes works?
- Implementing Naïve Bayes Classifier
- What is Support Vector Machine?
- Illustrate how Support Vector Machine works?
- Hyperparameter Optimization

- Grid Search vs Random Search
- Implementation of Support Vector Machine for Classification

Skills:

- Supervised Learning concepts
- Implementing different types of Supervised Learning algorithms
- Evaluating model output

Unsupervised Learning

Topics:

- What is Clustering & its Use Cases?
- What is K-means Clustering?
- How does K-means algorithm work?
- How to do optimal clustering
- What is C-means Clustering?
- What is Hierarchical Clustering?
- How Hierarchical Clustering works?

Skills:

- Unsupervised Learning
- Implementation of Clustering – various type

Association Rules Mining and Recommendation Systems

Learning Objectives: In this module, you will learn Association rules and their extension towards recommendation engines with Apriori algorithm.

Topics:

- What are Association Rules?
- Association Rule Parameters
- Calculating Association Rule Parameters
- Recommendation Engines
- How does Recommendation Engines work?
- Collaborative Filtering
- Content-Based Filtering

Hands-On/Demo:

- Apriori Algorithm
- Market Basket Analysis

Skills:

- Data Mining using python
- Recommender Systems using python

Association Rules Mining and Recommendation Systems

Topics:

- What are Association Rules?
- Association Rule Parameters
- Calculating Association Rule Parameters
- Recommendation Engines
- How does Recommendation Engines work?
- Collaborative Filtering
- Content-Based Filtering

Skills:

- Data Mining using python
- Recommender Systems using python

Reinforcement Learning

Learning Objectives: In this module, you will learn about developing a smart learning algorithm such that the learning becomes more and more accurate as time passes by. You will be able to define an optimal solution for an agent based on agent-environment interaction.

Topics:

- What is Reinforcement Learning
- Why Reinforcement Learning
- Elements of Reinforcement Learning
- Exploration vs Exploitation dilemma
- Epsilon Greedy Algorithm
- Markov Decision Process (MDP)
- Q values and V values
- Q – Learning
- α values

Skills:

- Implement Reinforcement Learning using python
- Developing Q Learning model in python

Time Series Analysis

Topics:

- What is Time Series Analysis?
- Importance of TSA

- Components of TSA
- White Noise
- AR model
- MA model
- ARMA model
- ARIMA model
- Stationarity
- ACF & PACF

Skills:

- TSA in Python