

# Machine Learning

**Synopsis :** The course is designed to teach on the advanced concepts of Machine Learning (ML). The course will cover a brief recapitulation of ML fundamentals followed up by advanced concepts in the domain of ML. Completion of the course will enable the participant to deal with high dimensional data and extract important features from it, grasp advanced modeling techniques in ML, build these models in Python, and identify cases where it can be applied. The course consists of Theory (40%) and Practical (60%), comprising of Industry-based Use Cases.

**Category:** Machine Learning

**Duration:** 42 hours

**Delivery Mode:** Virtual Instructor-led / Classroom-based

**Prerequisites:** Basic knowledge of programming, high-school mathematics | Laptop/Desktop with internet connection

**Tools:** Jupyter Notebook, Spyder IDE

**Python packages:** NumPy, SciPy, Pandas, Matplotlib, Seaborn, Scikit-Learn, TensorFlow, Keras

**Modules:**

1. Introduction to Python [8]
  - a. Data Types, Variables, Operators
  - b. Control Flow
  - c. Looping
  - d. Functions and Recursion
  - e. Exception and File Handling
  - f. OOPs
  - g. Data Science Libraries – NumPy, Pandas, Matplotlib, Seaborn
2. Recap of Machine Learning Fundamentals [2]
  - a. Connection between AI and ML
  - b. Types of learning
  - c. Applications of machine learning
  - d. Python Programming for Machine Learning
  - e. Regression vs Classification vs Clustering
3. Data Preprocessing [6]
  - a. Introduction to Statistics

- b. Missing Value Handling
  - c. Outlier Detection
  - d. Handling of Categorical data
  - e. Feature Scaling
  - f. Feature Engineering
- 4. Dimensionality Reduction and Feature Selection [4]
  - a. Recursive Feature Elimination (RFE)
  - b. Principal Component Analysis (PCA)
  - c. Linear Discriminant Analysis (LDA)
- 5. Supervised Learning [12]
  - a. K-Nearest Neighbors Classifier
  - b. Support Vector Machines
  - c. Decision Tree Classifier
  - d. Ensemble Methods
  - e. Random Forest Classifier
  - f. Boosting Algorithms
- 6. Unsupervised Learning [4]
  - a. K -Means
  - b. A-priori Association Rule Mining
- 7. CAPSTONE PROJECT [6]