Machine Learning Using Python

**Introduction:**

Python is a popular platform used for research and development of production systems. It is a vast language with a number of modules, packages, and libraries that provide multiple ways of achieving a task. Python and its libraries like NumPy, SciPy, Scikit-Learn, Matplotlib are used in data science and data analysis. They are also extensively used for creating scalable machine learning algorithms. Python implements popular machine learning techniques such as Classification, Regression, Recommendation, and Clustering. Python offers a ready-made framework for performing data mining tasks on large volumes of data effectively in lesser time. It includes several implementations achieved through algorithms such as linear regression, logistic regression, Naïve Bayes, k-means, K nearest neighbor, and Random Forest.

Machine learning is a discipline that deals with programming the systems so as to make them automatically learn and improve with experience. Here, learning implies recognizing and understanding the input data and making informed decisions based on the supplied data. It is very difficult to consider all the decisions based on all possible inputs. To solve this problem, algorithms are developed that build knowledge from specific data and past experience by applying the principles of statistical science, probability, logic, mathematical optimization, reinforcement learning, and control theory.

**Duration:**

* 22.5 Hours.(9 days\*2 hrs=18 hrs)

**Content:**

**Course Objectives:**

* To introduce students/Faculty to the basic concepts and techniques of Machine Learning.
* To develop skills of using recent machine learning software for solving practical problems.
* To gain experience in doing independent study and research.

**Entry Requirements (Pre-requisites):**

* Students must have Knowledge of Python Programming.

### Statistics and Algebra, Math’s.

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| [S.No](http://s.no/) | **Lessons** | **Topics** | **Time (22.5 Hours)** |
| 1 | Introduction to Machine Learning and Overview of pandas | What is Machine Learning  Machine Learning Classification  Types of Algorithms  Reading and manipulating CSV files | 2.5hr |
| 2 | Sklearn Package, and Linear Regression using Machine Learning | Linear Regression with One variable  Evaluation Metrics in Regression Models  Train/Test splitting of data & Cross-Validation  Linear Regression with Multiple Variables | 2.5hr |
| 3 | Polynomial Regression | Under fitting, Overfitting, Best fit  Polynomial Features  Non-Linear Regression with One variable  Non-Linear Regression with Multiple Variable | 2.5hr |
| 4 | Classification models - 1 | Introduction to categorical types of data  Types of classification  K-Nearest Neighbors Classifier  Evaluation Metrics for Classification Models | 2.5hr |
| 5 | Logistic regression  Support Vector Machines | 2.5hr |
| 6 | Classification models - 2 | Introduction to Decision Tree  Terminology related to Decision Trees  Types of Decision Trees  Decision Trees Classifier | 2.5hr |
| 7 | Decision Tree Regressor  Random Forest Algorithm | 2.5hr |
| 8 | Unsupervised Learning and Clustering | Introduction to Unsupervised Learning  Types of Unsupervised Learning  Introduction to clustering  Types of Clustering methods  KMeans Clustering  Applications | 2.5 hr |
| 9 | Dimensionality Reduction | Dimensionality reduction  Principal Component Analysis (PCA) | 2.5hr |

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Hardware Requirements:

* i3 or above Processor is required
* 4 GB or above RAM is recommended
* Good Internet Connectivity
* OS-Windows 10 is Preferable