



# APSSDC

**Andhra Pradesh State Skill Development Corporation**  
(Department of Skills Development & Training, Govt of Andhra Pradesh)



# Machine Learning Using Python





## **Introduction:**

Machine Learning involves computers discovering how they can perform tasks without being explicitly programmed to do so. It involves computers learning from data provided so that they carry out certain tasks. For simple tasks assigned to computers, it is possible to program algorithms telling the machine how to execute all steps required to solve the problem at hand; on the computer's part, no learning is needed. For more advanced tasks, it can be challenging for a human to manually create the needed algorithms. In practice, it can turn out to be more effective to help the machine develop its own algorithm, rather than having human programmers specify every needed step.

The discipline of machine learning employs various approaches to teach computers to accomplish tasks where no fully satisfactory algorithm is available. In cases where vast numbers of potential answers exist, one approach is to label some of the correct answers as valid. This can then be used as training data for the computer to improve the algorithm(s) it uses to determine correct answers. For example, to train a system for the task of digital character recognition, the [MNIST](#) dataset of handwritten digits has often been used.

## **Hardware Requirements:**

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

## **Duration :**

- 36 Hours (6 hours each day X 6 days)

## **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.



## **Course Content:**

### **1. Introduction to Machine Learning:**

- a. What is Machine Learning
- b. Machine Learning Classification
- c. Types of Algorithms
- d. Overview of Exploratory Data Analysis with NumPy, Pandas, Matplotlib

### **2. Regression Models:**

- a. Linear Regression with One variable
- b. Evaluation Metrics in Regression Models
- c. Train/Test splitting of data & Cross Validation
- d. Linear Regression with Multiple Variables
- e. Polynomial Features
- f. Non-Linear Regression with One variable
- g. Non-Linear Regression with Multiple variable

### **3. Regularization Models:**

- a. Under fitting
- b. Overfitting
- c. Best fit
- d. Applying Ridge Regression
- e. Lasso Regression Algorithms

### **4. Classification Models - 1:**

- a. Introduction to categorical types of data
- b. Types of classification
- c. K-Nearest Neighbors Classifier
- d. Evaluation Metrics for classification Models
- e. Logistic regression
- f. Support Vector Machines

### **5. Classification Models - 2:**

- a. Introduction to Decision Tree
- b. Terminology related to Decision Trees
- c. Types of Decision Trees
- d. Decision Trees Classifier
- e. Decision Tree Regressor
- f. Random Forest Algorithm

### **6. Unsupervised Machine Learning**

- a. Introduction to Unsupervised Learning
- b. Types of Unsupervised Learning



**7. Clustering:**

- a. Introduction to clustering
- b. Types of Clustering Methods
- c. KMeans Clustering Applications

**8. Dimensionality Reduction:**

- a. Dimensionality reduction
- b. Principal Component Analysis (PCA)

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

- Students must have Knowledge of Python Programming.
- Statistics and Algebra, Maths.

**Mode of Training:**

- Offline (Completely Hands on Training)