Foundation Course in Machine Learning using Python

Detailed Syllabus of Course

S. No	Module Title	Topics	Duration (Hours)		Learning Outcome
			Theory	**Lab**	
1.	**Basic**	• What is Machine Learning? • Need for Machine Learning • Why & When to Make Machines Learn? • Machine Learning Model Challenges in Machines Learning Applications of Machines Learning	1	1	• Why we learn the Machine Learning and • What is the need and current demand of this technology • And what challenges he/she has to face in this field.

2	**Python Ecosystem**	• An Introduction to Python • Components of Python ML Ecosystem • Jupyter Notebook • Types of Cells in Jupyter Notebook	1	1	• Understand the strength and weakness of Python • Why Python for Data Science • How to use the Jupyter Notebook
3	**Methods for Machine Learning**	• Different Types of Methods, • Tasks Suited for Machine Learning	2	2	• What are the basics Methods Various Tech giants are using in the Market • And he will be able to identify to apply which of these methods in his model while developing the models.

4	**Data Loading for ML Projects**	• Consideration While Loading CSV data, • Methods to Load CSV Data File, • Load CSV with NumPy • Load CSV with Pandas.	2	3	• Understand the Data Loading concept through various files.
5	**Understanding Data with Statistics**	• Introduction, • looking at Raw Data, • Checking Dimensions of Data, • Getting Each Attribute's Data Type, • Statistical Summary of Data, • Reviewing Class Distribution, • Reviewing Correlation between Attributes, • Reviewing Skew of Attribute Distribution.	3	5	• Analyzing the Raw data • Reviewing the Class Distribution and correlation between Attributes

6	**Understanding Data with Visualization**	- Introduction, - Univariate Plots: Understanding Attributes Independently, - Density Plots, Box and Whisker Plots - Multivariate Plots: Interaction Among Multiple Variables, - Correlation Matrix Plot, - Scatter Matrix Plot.	3	7	Understand how to make various plots using the Data.

7	**Preparing Data**	• Data Pre-processing and techniques • Normalization and Its Types • Binarization • Standardization • Label Encoding	3	5	Understand how to prepare the data and its various techniques
8	**Data Feature Selection**	• Importance of Data Feature Selection, • Feature Selection Techniques, • Recursive Feature Elimination, • Principal Component Analysis (PCA), • Feature Importance.	4	6	• Understand the Data Feature Selection. • Understand how to implement Data Selection

| 9 | **MACHINE LEARNING ALGORITHMS** | • Classification Algorithms – Logistic Regression, Support Vector Machine (SVM), Decision Tree, Naïve Bayes, Random Forest,
• Regression Algorithms – Overview, Linear Regression.
• Clustering Algorithms – Overview, K-means Algorithm, Mean Shift Algorithm, Hierarchical Clustering
• KNN Algorithm – Finding Nearest Neighbours, Performance Metrics. | 5 | 13 | • Understand various Algorithm
• And the Implementation of these Algorithm according to the situation demanded |

10	**Machine Learning with Pipelines – Automatic Workflows**	• Introduction, • Challenges Accompanying ML Pipelines, • Modelling ML Pipeline and Data Preparation, • Modelling ML Pipeline and Feature Extraction.	3	4	• Understand what the Automatic Workflow is. • Understand how to model the Pipeline
11	**Improving Performance of ML Models**	• Performance Improvement with Ensembles, • Ensemble Learning Methods, • Bagging Ensemble, • Boosting Ensemble Algorithms, • Voting Ensemble Algorithms. • Performance Improvement with Algorithm Tuning, • Performance Improvement with Algorithm Tuning	3	5	• Understand how to improve the performance of the ML Model using various techniques • Understand how improve the performance using Ensembles and Algorithm Tuning

12	**Mini Project**	Project on Machine Learning Application	-	8	
Total			**90 Hours(Theory-30, Lab-60)**		