

Annexure 1

Detailed Syllabus of Course

S. No	Module Title	Topics	Duration (Hours)		Learning Outcome
			Theory	Lab	
1.	Basic	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none"> • An Introduction to Python • Components of Python ML Ecosystem • Jupyter Notebook • Types of Cells in Jupyter Notebook 	1	1	<ul style="list-style-type: none"> • Understand the strength and weakness of Python • Why Python for Data Science • How to use the Jupyter Notebook
3	Methods for Machine Learning	<ul style="list-style-type: none"> • Different Types of Methods, • Tasks Suited for Machine Learning 	2	2	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Consideration While Loading CSV data, • Methods to Load CSV Data File, • Load CSV with NumPy • Load CSV with Pandas. 	2	3	<ul style="list-style-type: none"> • Understand the Data Loading concept through various files.
5	Understanding Data with Statistics	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Analyzing the Raw data • Reviewing the Class Distribution and correlation between Attributes

6	Understanding Data with Visualization	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Understand how to make various plots using the Data.

7	Preparing Data	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Importance of Data Feature Selection, • Feature Selection Techniques, • Recursive Feature Elimination, • Principal Component Analysis (PCA), • Feature Importance. 	4	6	<ul style="list-style-type: none"> • Understand the Data Feature Selection. • Understand how to implement Data Selection

9	MACHINE LEARNING ALGORITHMS	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Understand various Algorithm • And the Implementation of these Algorithm according to the situation demanded
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10	Machine Learning with Pipelines – Automatic Workflows	<ul style="list-style-type: none"> • Introduction, • Challenges Accompanying ML Pipelines, • Modelling ML Pipeline and Data Preparation, • Modelling ML Pipeline and Feature Extraction. 	3	4	<ul style="list-style-type: none"> • Understand what the Automatic Workflow is. • Understand how to model the Pipeline
11	Improving Performance of ML Models	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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)		