TRAINING TITLE: Machine Learning using Python

No.	*Content / Activities*	*Objectives*	*Outcomes*	*Day*
1.	**Introduction to Machine Learning & AI**	This module tells you what Machine Learning is and how ML can play an important role in AI applications in Business Context.	• Understand what is Machine Learning • How ML models are categorized • Scope of building AI and ML models in the Business Context • Understand the difference between Parametric and Non-Parametric Models	Day 1
2.	**Introduction to Python Programming**	This module starts from the very basics of Python programming like data types and functions. We present a scenario and let you think about the options to resolve it. For ex, which data type would you use to store the variable or which python function or method can help you in this scenario	• Understanding the IDE of Python • Spyder and Jupyter Notebook • Understand the basic syntax of Python code • Understand the different data types present in Python • Learn to perform operations on data types	Day 1

3.	**Data types in Python**	In this module, we start exploring Numeric, Character, List, Tuple and Dictionary Data types in Python. Also other data types from Numpy and Pandas Library.	• Understand the usage of List/Numpy array data structure • Understand how to choose a suitable data structure for a particular problem • Learn to use methods associated with List data type, such as append(), pop (), insert () etc	Day 1
4.	**Control structures and conditional statements**	This module tells you about the usage of for-loop, if-else and while loop modules	• Understanding for-loop, mapping by value and mapping by index • Usage of if-else block inside for-loop • Usage of while loop and creating user defined function in Python	Day 1
5.	**Loading External data/ Data Imports**	In this module, you will learn to import different files such as excel, tab separated, csv files and text files into python	• Understand data imports • Learn to choose different functions and arguments according to file types • Treating external data as a DataFrame • Learn to index and slice DataFrame	Day 1
6.	**Machine Learning Models** - **Prediction**	In this module, you will understand the math and statistics behind prediction model	• Learn to fit a Linear Regression Model • Understanding Univariate, Bivariate and Multivariate Models • Variable/Feature Selection to Model based on Correlation Analysis	Day 2
7.	**Non-Linear Prediction Models**	In this module, you will learn to build a non-linear prediction models.	• Understanding Quadratic Regression Model • Learn to fit a higher order (flexible) Polynomial Regression Model	Day 2

8.	**Logistic Regression Model**	This module lets you know about usage of Logistic Regression for Classification problem (Parametric Model)	• Understand the Parametric Classification Model for categorical response variable • Implement Logistic Regression Model for different data set	Day 2
9.	**Artificial Neural Network (ANN) Classifier**	This module covers the concept of different neural network model and its architecture. Also, this module explains different learning methods such as Perceptron and Delta Learning rule.	• Understand the neural network model as a non-parametric classifier • Understand splitting data into training and testing dataset for ANN model • Fine tuning parameters of ANN model	Day 3
10.	**Decision Trees and Random Forest**	This module covers the concepts of Decision Trees and Random Forest. The Algorithm for creation of trees and forests is discussed in a step wise approach and explained	• Learn about decision trees • Implement decision tree and random forest on a dataset and then visualize the data	Day 3

		with examples. At the end of the class, these are the concepts implemented on a real-life data set.		
11.	**K Nearest Neighbor Classifier**	This module tells you the role of KNN as a Classifier, as well as regression.	• Understand the distance metric and optimal selection of K value • Modeling KNN as a classifier and Regression	Day 3
12	**Naive Bayes Classifier**	This module covers the concept of conditional probability and Baye's theorem and Naïve Baye's classifier make decision	• Understand conditional/marginal probability • Modeling Naïve Based Classification Model	Day 4
13	**Support Vector Machine**	Understand linear and nonlinear kernels and its significance in SVM	• Understand the need of kernel based classification model • Role of different kernel and its implementation	Day 4
14	**Performance Metrics**	Understand various performance metrics for Classification and Regression models.	• Understand the accuracy and rmse scores • Confusion Matrix and Classification Report • Precision and Recall	Day 5

15	**Ensemble Techniques & Model Evaluation**	Understand the need of Ensemble Technique for Model optimization. Also the concept of Bias – Variance tradeoff	• Understand the usage of Bootstrap Aggregation (Bagging) • Understand the usage of Boosting • Comparison of various model • KFold cross validation	Day 5