

## ANNEXURE I

### Course Name: Certificate Course in Applied Machine learning

**Course Objective:** This course will present, comprehensive introduction and an exhaustive view of the Virtual and Augmented Reality domain, including a global view, a panorama of example, and a projection to the future with case study, project work.

**Pre – Requisite:** No prior programming skills are required. Access to certain combinations of hardware is required

**Course Outcome:** Students will learn to build, train, and deploy machine learning models to solve real-world problems, gaining expertise in algorithms, data analysis, and predictive modelling.

**Course Duration:** 80 Hrs (8 hours/ day for 2 Weeks)

### Teaching Schema:

| S. No. | Modules                                                 | Hours     |
|--------|---------------------------------------------------------|-----------|
| 1      | Data Science & EDA                                      | 8         |
| 2      | Data Visualization, Data Engineering And Pre-processing | 18        |
| 3      | Machine Learning                                        | 16        |
| 4      | Machine Learning Algorithms                             | 20        |
| 5      | Dimensionality Reduction                                | 8         |
| 6      | Project                                                 | 10        |
|        | <b>Total</b>                                            | <b>80</b> |

### Detailed Course Content:

#### Data Science

- Introduction To Data Science
- Use Of Data Science In Artificial Intelligence & Machine Learning

#### Exploratory Data Analysis (Eda) Using Numpy & Pandas

- Introduction To Pandas
- Overview Of Numpy
- Explanation Of Key Data Structures In Pandas: Series And Dataframe.
- Hands-On Exploration Of Data Using Pandas To Summarize, Filter, And Transform Data.
- Data Cleaning Techniques, Handling Missing Values, and Dealing with Outliers.
- Statistical Analysis of Data Using Numpy Functions.
- Slicing/Dicing Operations.

#### Introduction to Data Visualization Libraries

- Introduction Of Matplotlib & Seaborn

- Creating Graphs- Bar Chart, Pie, Line Chart, Histogram, Scatter Plot
- Advanced Plotting Techniques With Seaborn: Heatmaps, Pair Plots, And Categorical Plots.

### **Data Engineering and Preprocessing**

- Data Cleaning And Processing
- Feature Selection & Feature Engineering
- Handling Outliers
- Cross Validation
- Data Scaling and Normalization: Standardization, Min-Max Scaling, Etc.
- Dealing With Categorical Variables: One-Hot Encoding, Label Encoding, Etc

### **Machine Learning**

- Introduction To Machine Learning
- Understanding Supervised And Unsupervised Learning Techniques
- Machine Learning Algorithms, Problem Statement And Analysis

### **Supervised Learning – Regression**

- Introduction To Regression: Definition, Types, And Use Cases
- Linear Regression: Theory, Cost Function, Gradient Descent, And Assumptions
- Evaluation Metrics For Regression Models: Mean Squared Error (Mse), R-Squared, And Mean Absolute Error (Mae)

### **Supervised Learning – Classification**

- Introduction To Classification: Definition, Types, And Use Cases
- Logistic Regression: Theory, Logistic Function, Binary And Multiclass Classification
- Decision Trees: Construction, Splitting Criteria, Pruning, And Visualization
- Random Forests: Ensemble Learning, Bagging, And Feature Importance
- Evaluation Metrics For Classification Models: Accuracy, Precision, Recall, F1-Score, And Roc Curves
- Implementation Of Classification Models Using Scikit-Learn Library

### **Knn**

- Knn Theory, Classification With Knn, Selection Of K And Prediction ,Euclidean & Manhattan Distance
- Case Study

### **Decision Tree**

- Decision Tree Theory, Working Of Decision Tree, Classifier, Regressor  
Case Study

### **Support Vector Machine**

- Support Vector Machine Theory
- Case Study

### **Unsupervised Learning – Clustering**

- Introduction To Unsupervised Machine Learning And Clustering
- Clustering Techniques: K-Means, Hierarchical
- Case Study

### **Dimensionality Reduction**

- Introduction To Dimensionality Reduction
- Pca – Principal Component Analysis
- Case Study

### **Machine Learning Project**

1. Hands on Numpy, Pandas, Matplotlib & Seaborn
2. Salary Prediction – Linear Regression
3. Titanic Passenger Survival Prediction / Customer Purchase Prediction – Logistic Regression
4. Iris Flower Classification – Knn And Svm
5. Car Evaluation – Decision Tree & Random Forest
6. Mnist Hand Written Digit Classification
7. Customer Segmentation – Knn & Hierarchical Clustering