

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
	Total	80

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