Data Science with Machine Learning & Deep Learning

Duration: 5 Days
Mode: Instructor-led (with labs & hands-on sessions)

Course Objectives

- Provide a comprehensive understanding of data science and machine learning concepts, techniques, and workflows.
- Enable participants to perform data analysis, visualization, and data preprocessing tasks using Python.
- Develop the ability to build, evaluate, and tune supervised and unsupervised machine learning models.
- Equip participants with practical skills to design and implement deep learning models, including CNNs, RNNs, NLP applications, and advanced architectures such as transformers.
- Prepare participants to work on real-world end-to-end projects involving data preparation, model building, evaluation, and deployment.

Course Outcomes

- Ability to handle and preprocess diverse datasets, perform exploratory data analysis, and derive insights through visualization.
- Proficiency in implementing various machine learning algorithms and evaluating their performance using appropriate metrics.
- Hands-on skills in developing deep learning models for image, sequence, and text data, and applying techniques like transfer learning and fine-tuning.
- Capability to design and deliver a complete data science or deep learning project independently.
- Readiness to apply acquired skills to solve business problems and pursue advanced roles in data science and machine learning.

Course Agenda

Module 1: Introduction to Data Science & ML

- Need & Types of Analytics
- Project Lifecycle
- Python Libraries
- EDA and Data Cleaning
- Visualizations
- Data Transformation & Normalization
- Train/Test Split
- Hands on: Data cleaning, EDA, Data preprocessing tasks

Module 2: Supervised and UnSupervised ML

- Linear & Logistic Regression
- Decision Trees
- Random Forests

- Evaluation Metrics
- Feature Selection
- PCA
- Cross-Validation
- Hyperparameter Tuning
- Clustering (K-Means)
- Hands on: Model building & evaluation exercises

Module 3: Deep Learning

- Intro to DL & ANNs
- TensorFlow & Keras basics
- Model building
- Activation & Loss functions
- Optimization techniques
- Hands on: Build basic neural networks

Module 4: Deep Learning

- CNNs for images
- RNNs for sequences
- NLP with Deep learning
- Transfer learning
- Object detection
- Hands on: Implement CNNs RNNs and NLP models

Module 5: Deep Learning

- Fine-tuning & Regularization
- Hyperparameter tuning in DL
- Attention mechanisms
- Transformers
- Project work: End-to-end DL project implementation