Specialised Programme on Machine Learning – 2 Weeks

Pre-requisites
- Proficient in Python programming.
- Basic understanding of statistics, linear algebra and calculus.

Aim

To equip participants with a solid foundation in machine learning, enabling them to solve real-world problems using modern techniques in supervised, unsupervised and deep learning and to manage the lifecycle of machine learning models effectively.

Objectives
- Understand the fundamentals and types of machine learning.
- Gain hands-on experience with key machine learning libraries.
- Master supervised and unsupervised learning techniques.
- Develop familiarity with neural networks and deep learning basics.
- Learn the essentials of model deployment and lifecycle management.

Course Contents

Introduction to Machine Learning
- Machine Learning and Applications
- Types of Machine Learning: Supervised, Unsupervised and Reinforcement Learning
- Machine Learning Workflow and Key Terminologies
- Python Libraries for Machine Learning

Supervised Learning
- Linear Models: Regression and Regularization Techniques
- Logistic Regression and Classification Metrics
- Decision Trees and Random Forest
- Support Vector Machines (SVM)
- Gradient Boosting Techniques
- Model Evaluation, Cross-Validation, and Hyperparameter Tuning

Unsupervised Learning
- Clustering Techniques: K-Means, DBSCAN
- Dimensionality Reduction Techniques: PCA and t-SNE
- Anomaly Detection Methods

Introduction to Deep Learning
- Basics of Neural Networks: Architectures and Activation Functions
- Building and Training Deep Learning Models
- Introduction to CNNs and Transfer Learning

Model Deployment
- Managing the Machine Learning Lifecycle
- Deploying Models Locally or in On-Premises Environments
- Monitoring and Updating Deployed Models