

AI/ML Course Outline (3 days)

This course ensures balanced learning with foundational knowledge, advanced concepts, and practical applications.

Lab Sessions and Hands-On Activities

- Integrated into each day with focus on:
 - Data Preprocessing and Visualization (Day 1)
 - Building and Evaluating ML Models (Day 2)
 - NLP and Real-time AI Solutions (Day 3)

Capstone Project

- Spanning across all 3 days:
 - Use case of AI/ML in the Power/Energy sector or IT operations.
 - Final presentation on Day 3.

Day 1: Foundation and Overview

Session 1: Introduction to AI and ML

- **Duration:** 2 Hours
 - What is AI, ML, and Data Science?
 - Differences between AI, ML, and Deep Learning
 - Real-world applications of AI/ML in the Power and Energy Sector
 - Ethical considerations and challenges in AI/ML

Session 2: Data Fundamentals for AI/ML

- **Duration:** 2 Hours
 - Importance of Data in AI/ML
 - Data Collection and Preprocessing
 - Handling missing data
 - Feature engineering and selection
 - Overview of Structured vs. Unstructured Data

Session 3: Machine Learning Basics

- **Duration:** 4 Hours
 - Types of Machine Learning
 - Supervised, Unsupervised, and Reinforcement Learning

- Key Algorithms
 - Linear Regression, Logistic Regression, K-Means Clustering, Decision Trees
- Evaluation Metrics
 - Accuracy, Precision, Recall, F1 Score

Day 2: Advanced Topics and Applications

Session 1: Deep Learning Essentials

- **Duration:** 3 Hours
- Introduction to Neural Networks
- Key Concepts: Activation Functions, Forward and Backpropagation, Gradient Descent
- Overview of Deep Learning Frameworks (e.g., TensorFlow, PyTorch)

Session 2: AI/ML in Business Excellence

- **Duration:** 3 Hours
- Process Optimization with AI
- Predictive Maintenance using ML
- Anomaly Detection in Operational Data
- Case Studies in Energy and Utilities

Session 3: IT-Specific Applications

- **Duration:** 2 Hours
- Automating IT Operations using AI
- AI-driven Cybersecurity
- Data Integration and AI in Cloud Systems

Day 3: Integration and Future Trends

Session 1: Natural Language Processing (NLP)

- **Duration:** 3 Hours
- Basics of NLP
 - Tokenization, Sentiment Analysis, Text Classification
- AI Chatbots and Automation in Business Processes

Session 2: AI in Decision-Making and Forecasting

- **Duration:** 3 Hours
- Demand and Load Forecasting using AI
- Risk Analysis through Machine Learning Models

- Real-time Decision-making Systems

Session 3: Future of AI in Power and IT

- **Duration:** 2 Hours
- Emerging trends in AI/ML (e.g., Generative AI, Edge AI)
- AI Governance and Ethical Frameworks
- Career opportunities and skill-building for AI in power and IT sectors