COURSE OUTLINE FOR AI AND MACHINE LEARNING COURSE

Day 1: Introduction to AI and ML

- Overview of AI: History and Definitions
- Key Concepts: What is AI? What is ML?
- Real-World Applications of AI and ML
- Introduction to AI Ethics: Bias and Fairness

Day 2: The Machine Learning Process

- The ML Workflow: Data Collection, Model Training, and Evaluation
- Types of Machine Learning: Supervised vs. Unsupervised Learning
- Introduction to Data: Cleaning, Preprocessing, and Feature Selection
- Hands-On: Basic Data Analysis with Python

Day 3: Supervised Learning - Classification

- Introduction to Supervised Learning
- Classification Algorithms: Logistic Regression, Decision Trees
- Hands-On: Building a Classification Model
- Model Evaluation: Accuracy, Precision, Recall, and F1 Score

Day 4: Supervised Learning - Regression

- Understanding Regression Analysis
- Algorithms: Linear Regression, Polynomial Regression
- Hands-On: Implementing a Regression Model
- Model Evaluation: Mean Squared Error, R-squared

Day 5: Unsupervised Learning

- Introduction to Unsupervised Learning: Clustering and Dimensionality Reduction
- Algorithms: K-Means Clustering, Principal Component Analysis (PCA)
- Hands-On: Applying Clustering Techniques to Real Data
- Use Cases: Market Segmentation, Anomaly Detection

Day 6: Neural Networks and Deep Learning

- Basics of Neural Networks: Architecture and Activation Functions
- Introduction to Deep Learning: Concepts and Popular Frameworks (TensorFlow, Keras)
- Hands-On: Building a Simple Neural Network
- Practical Applications of Deep Learning

Day 7: Advanced Topics and Tools

- Introduction to Reinforcement Learning (Brief Overview)
- AI/ML Tools and Frameworks: Scikit-learn, TensorFlow, Keras
- Hands-On: Implementing Advanced ML Models
- Preparing Data for Deep Learning Models

Day 8: Practical Applications and Case Studies

- AI/ML in Various Industries: Healthcare, Finance, Retail
- Case Studies: Successful Implementations of AI/ML
- Hands-On: Developing a Mini AI/ML Project
- Ethical Considerations: Privacy, Security, and Responsible AI

Day 9: Final Project and Review

- Final Project Presentation: Students Demonstrate Their AI/ML Models
- Course Review and Summary of Key Concepts
- Discussion: Future Trends in AI and ML
- Q&A and Closing Remarks