Artificial Intelligence and Machine Learning (AI & ML) Syllabus

Objective: This syllabus provides a comprehensive overview of both theoretical concepts and practical applications in Artificial Intelligence and Machine Learning over the course of 12 weeks. Each week focuses on specific topics, allowing students to gradually build their knowledge and skills in AI and ML.

Week 1-2: Introduction to AI and ML (6 hours)

- Overview of Artificial Intelligence (AI) and Machine Learning (ML)
- Importance and Applications of AI and ML
- Basics of AI and ML
- Machine Learning vs. Traditional Programming
- Types of Machine Learning: Supervised, Unsupervised, Reinforcement Learning

Week 3-4: Machine Learning Algorithms (12 hours)

- Introduction to Machine Learning Algorithms
- Supervised Machine Learning Algorithms: Linear Regression, Decision Trees, Support Vector Machines (SVM), K-Nearest Neighbors (KNN)
- Unsupervised Machine Learning Algorithms: K-Means Clustering
- Reinforcement Learning: Basics and Applications

Week 5-6: Machine Learning Models (10 hours)

- Understanding Machine Learning Models
- Linear Regression: Theory and Implementation
- Linear Regression Use Case
- Multiple Linear Regression
- Decision Trees: How Decision Trees Work
- Support Vector Machines (SVM): Theory and Application

Week 7-8: Deep Learning and Neural Networks (12 hours)

- Introduction to Deep Learning
- Basics of Neural Networks
- Deep Learning Frameworks: TensorFlow and Keras
- Keras: Theory and Practical Applications
- Use Case of Keras in AI and ML
- Understanding Generative Adversarial Networks (GANs)

Week 9-10: Advanced Topics in ML (10 hours)

- Long Short-Term Memory (LSTM) Networks
- Advanced Deep Learning Concepts
- Advanced Techniques in Neural Networks
- Applications of Deep Learning in Real-world scenarios
- Challenges and Future Trends in AI and ML

Week 11-12: Project Work and Practical Applications (10 hours)

- Final Project: Students work on a real-world AI and ML project
- Guidance and Assistance from the Instructor
- Presentation of Projects and Peer Evaluation
- Discussion on Use Cases of AI and ML in Various Industries
- Career Opportunities in AI and ML