Artificial Intelligence Course Syllabus

Total Duration: 180hrs

Module 1

Chapter 1: Introduction to Artificial Intelligence

1. What is Artificial Intelligence?
2. Types of Artificial Intelligence
3. Applications of AI
4. Challenges in AI Development
5. The Future of Artificial Intelligence

Chapter 2: History and Evolution of Artificial Intelligence

1. Early Foundations of AI
2. The Birth of Artificial Intelligence
3. The Era of Optimism (1950s–1970s)
4. The AI Winters
5. The Resurgence of AI (1990s–2000s)
6. Modern AI Era (2010s–Present)
7. Key Factors Driving AI Evolution
8. Challenges During AI Evolution
9. Lessons Learned from AI's History
10. The Road Ahead for AI

Chapter 3: Understanding Machine Learning

1. What is Machine Learning?
2. Types of Machine Learning
3. Key Concepts in Machine Learning
4. Steps in the Machine Learning Workflow
5. Applications of Machine Learning
6. Challenges in Machine Learning
7. Future Trends in Machine Learning

Chapter 4: Supervised vs. Unsupervised Learning

1. Introduction to Supervised Learning
2. Introduction to Unsupervised Learning
3. Key Differences Between Supervised and Unsupervised Learning
4. Real-World Applications
5. Challenges in Both Approaches
6. Combining Supervised and Unsupervised Learning

Chapter 5: Introduction to Deep Learning

1. Understanding Deep Learning
2. Neural Network Structure
3. Training Neural Networks
4. Types of Neural Networks
5. Applications of Deep Learning
6. Challenges in Deep Learning
7. Tools and Frameworks for Deep Learning

Chapter 6: Neural Networks - Concepts and Applications

1. What Are Neural Networks?
2. Mathematics of Neural Networks
3. Types of Neural Networks
4. Applications of Neural Networks
5. Challenges in Neural Networks
6. Future Directions

Chapter 7: Working with AI Libraries - TensorFlow and PyTorch

1. Introduction to AI Frameworks
2. TensorFlow
3. PyTorch

4. Comparison: TensorFlow vs. PyTorch
5. Applications of TensorFlow and PyTorch
6. Challenges in Using AI Frameworks
7. Future Directions

Chapter 8: Natural Language Processing (NLP) Basics

1. What is Natural Language Processing (NLP)?
2. Components of NLP
3. Techniques in NLP
4. Tools and Libraries in NLP
5. Applications of NLP
6. Challenges in NLP
7. Future Directions

Chapter 9: Computer Vision and Image Recognition

1. What is Computer Vision?
2. Key Concepts in Computer Vision
3. Techniques in Computer Vision
4. Tools and Libraries for Computer Vision
5. Applications of Computer Vision
6. Challenges in Computer Vision
7. Future Directions

Chapter 10: Reinforcement Learning Concepts

1. What is Reinforcement Learning?
2. Mathematical Framework of Reinforcement Learning
3. Key Algorithms in Reinforcement Learning
4. Applications of Reinforcement Learning
5. Challenges in Reinforcement Learning
6. Future Directions

7. Use Case: Influencer Marketing Strategy for an Online Fashion Store

Chapter 11: AI in Robotics

1. What is AI in Robotics?
2. Components of AI in Robotics
3. AI Algorithms in Robotics
4. Applications of AI in Robotics
5. Challenges in AI Robotics
6. Future Directions

Chapter 12: Ethics and Bias in AI

1. Understanding Ethics in AI
2. Understanding Bias in AI
3. Strategies to Mitigate Bias in AI
4. Ethical Concerns in AI Applications
5. Societal Impact of AI Ethics
6. Future Directions in Ethical AI

Chapter 13: Building Chatbots and Virtual Assistants

1. What Are Chatbots and Virtual Assistants?
2. Key Components of Chatbots and Virtual Assistants
3. Building Chatbots: Step-by-Step Guide
4. Advanced Features of Virtual Assistants
5. Applications of Chatbots and Virtual Assistants
6. Challenges in Building Chatbots and Virtual Assistants
7. Future Directions in Chatbots and Virtual Assistants

Chapter 14: AI in Business - Use Cases and Applications

1. Role of AI in Business
2. Applications of AI in Business

3. Implementation Strategies for AI in Business
4. Challenges of AI Adoption in Business
5. Future Directions for AI in Business

Chapter 15: Introduction to AI Model Deployment

1. What is AI Model Deployment?
2. Key Concepts in AI Model Deployment
3. Steps in AI Model Deployment
4. Tools and Frameworks for Model Deployment
5. Challenges in AI Model Deployment
6. Best Practices for AI Model Deployment
7. Future Directions in AI Model Deployment

Chapter 16: AI for Data Analytics

1. What is AI for Data Analytics?
2. Core Components of AI-Driven Data Analytics
3. Techniques in AI-Driven Data Analytics
4. Tools and Platforms for AI-Driven Data Analytics
5. Applications of AI in Data Analytics
6. Challenges in AI for Data Analytics
7. Future Trends in AI-Driven Data Analytics

Chapter 17: Advanced Topics: GANs and RNNs

1. Generative Adversarial Networks (GANs)
2. Recurrent Neural Networks (RNNs)
3. GANs vs. RNNs
4. Future Trends in GANs and RNNs

Chapter 18: AI in Healthcare and Autonomous Vehicles

1. AI in Healthcare
2. AI in Autonomous Vehicles

Chapter 19: AI Tools and Platforms Overview

1. Importance of AI Tools and Platforms
2. Categories of AI Tools and Platforms
3. Key Challenges in Using AI Tools and Platforms
4. Future Trends in AI Tools and Platforms

Module 2

Chapter 1: Introduction to Artificial Intelligence

1. What is Artificial Intelligence?
2. History and Evolution of AI
3. Applications of AI in Real Life
4. AI vs. Machine Learning vs. Deep Learning
5. Challenges and Ethical Considerations in AI
6.

- **Chapter 2: Python for AI**

1. Introduction to Python for AI
2. Setting Up Python and Development Environment
3. Understanding Variables and Data Types
4. User Input and Output Handling
5. Operators in Python (Arithmetic, Comparison, Logical)
6. Conditional Statements (if-else, elif)
7. Loops in Python (for and while loops)
8. Functions and Their Importance in AI
9. Lists, Tuples, and Dictionaries
10. File Handling in Python

Chapter 3: Machine Learning Basics

1. What is Machine Learning?
2. Types of Machine Learning (Supervised, Unsupervised, Reinforcement Learning)
3. Supervised Learning (Regression and Classification)
4. Unsupervised Learning (Clustering and Dimensionality Reduction)
5. Model Evaluation Metrics (Accuracy, Precision, Recall, MSE)

Chapter 4: Data Processing and Feature Engineering

1. Introduction to Data Processing
2. Handling Missing Data (Imputation Techniques)
3. Detecting and Handling Outliers
4. Converting Categorical Data (Label Encoding, One-Hot Encoding)
5. Feature Scaling and Normalization
6. Feature Engineering and Its Role in AI

Chapter 5: Supervised Learning Algorithms

1. Introduction to Supervised Learning Algorithms
2. Types of Supervised Learning Algorithms
3. Regression Algorithms (Linear and Logistic Regression)
4. Classification Algorithms (Decision Trees, Support Vector Machines

Chapter 6: Unsupervised Learning Algorithms

1 Introduction to Unsupervised Learning

2 Types of Unsupervised Learning Algorithms

3 Clustering Algorithms

4 Dimensionality Reduction

5 Anomaly Detection

Chapter 7: Neural Networks Basics

1 Introduction to Neural Networks
2 Structure of a Neural Network (Input, Hidden, Output Layers)
3 How do Neural Network Works
4 Activation Function in Neural Network
5 Forward Propagation
6 Backpropagation and Gradient Descent
7 Implementing a Simple Neural Network Using TensorFlow

Chapter 8: AI Tools and Frameworks

1 Introduction to AI Tools and Frameworks
2 Overview of Popular AI Frameworks (TensorFlow, PyTorch, Scikit-Learn)
3 Using TensorFlow for Deep Learning Applications
4 Introduction to PyTorch
5 Introduction to Scikit-Learn
6 OpenCV for Image Processing in AI
7 Natural Language Processing (NLP) with spaCy