AI Training Course Outline

1. Introduction to AI

- What is AI?
  - Definition and history
  - AI vs. Machine Learning vs. Deep Learning
- Applications of AI
  - AI in everyday life (e.g., virtual assistants, recommendation systems)
  - Industry-specific applications (e.g., healthcare, finance, robotics)

2. Machine Learning Basics

- Supervised Learning
  - Definition and examples
  - Key algorithms: Linear Regression, Logistic Regression, Decision Trees, Random Forest
- Unsupervised Learning
  - Clustering and dimensionality reduction
  - Key algorithms: K-Means, PCA
- Reinforcement Learning
  - Basic concepts and real-world applications
  - Key algorithms: Q-Learning, Deep Q Networks

3. Data Handling and Preprocessing

- Data Collection
  - Sources of data
  - Data privacy and ethics
- Data Cleaning
  - Handling missing values, outliers, and duplicates

- Feature Engineering
  - Feature selection and extraction
- Data Splitting
  - Training, validation, and test sets

4. Deep Learning

- Neural Networks
  - Introduction to neurons and layers
  - Activation functions
- Deep Learning Architectures
  - Convolutional Neural Networks (CNNs) for image processing
  - Recurrent Neural Networks (RNNs) for sequential data
  - Generative Adversarial Networks (GANs)
- Training Deep Learning Models
  - Backpropagation and gradient descent
  - Overfitting and regularization

5. Natural Language Processing (NLP)

- Text Preprocessing
  - Tokenization, stemming, lemmatization
- Language Models
  - N-grams, Bag of Words, TF-IDF
  - Transformer models (e.g., BERT, GPT)
- Applications of NLP
  - Sentiment analysis, text classification, machine translation

6. AI Tools and Frameworks

- Programming Languages

  - Python, R, etc.
- Machine Learning Libraries
  - Scikit-Learn, TensorFlow, PyTorch, Keras
- Development Environments
  - Jupyter Notebook, Google Colab, Anaconda

7. AI Project Lifecycle

- Problem Definition
  - Understanding the problem and setting objectives
- Data Collection and Preparation
- Model Selection and Training
- Model Evaluation
  - Metrics: accuracy, precision, recall, F1 score
- Deployment and Monitoring
  - Model deployment strategies
  - Model maintenance and updates

8. Ethical and Social Implications of AI

- Bias in AI
  - Understanding and mitigating bias
- Privacy Concerns
  - Data privacy laws and regulations
- AI and Society
  - Impact on jobs, economy, and social structures

9. Hands-On Projects

- Project 1: Predictive Modeling
  - E.g., Building a model to predict house prices

- Project 2: Image Classification
  - E.g., Building a CNN to classify images
- Project 3: Text Analysis
  - E.g., Sentiment analysis on social media data

10. Advanced Topics (Optional)

- AI in IoT
- AI in Cloud Computing
- Quantum Computing and AI
- Explainable AI (XAI)

11. Resources and Further Learning

- Books, Courses, and Certifications
- Online Communities and Forums
- Research Papers and Journals

12. Q&A and Final Review

- Recap of key concepts
- Addressing any questions