Basic AI ML Course Outline (Duration – 50 Hours)

1. **Introduction to AI and ML (2 hour Theory + 2 hour Lab)**
    a. Definition and history of AI and ML
    b. Applications and impact of AI and NL in various industries
2. **Machine Learning Fundamentals (2 Hours Theory + 2 hours Lab)**
    a. Supervised, unsupervised, reinforcement learning, deep learning
    b. Data preprocessing and feature engineering
    c. Evaluation of ML models - training, validation, test sets, cross-validation
3. **Regression (2 hours Theory + 2 hours Lab)**
    a. Linear regression
    b. Polynomial regression
    c. Regularization techniques
4. **Classification (4 hours Theory + 2 hours Lab)**
    a. Logistic Regression
    b. Decision Tree
    c. Support Vector Machines
5. **Dimensionality Reduction (2 hours Theory + 2 hours Lab)**
    a. Principal Component Analysis (PCA)
    b. T-SNE
6. **Clustering (2.5 hours Theory + 2 hours Lab)**
    a. K- Means clustering
    b. Hierarchical clustering
    c. Density-based clustering
7. **Neural Networks (2.5 hours Theory)**
    a. Introduction to neural networks
    b. Backpropagation
8. **Reinforcement Learning (2 hours Theory)**
    a. Basics of RL
    b. Markov Decision Processes (MDPs)
9. **Natural Language Processing(NLP) (5 hours Theory + 4 hours Lab)**
    a. Text Preprocessing
    b. Word Embeddings (Word2Vec)
    c. Recurrent Neural Networks
    d. Pretraining Basics
10. **Model Deployment (2.5 hours Theory + 2.5 hours Lab)**
    a. Model deployment and serving
    b. ML-Systems
    c. FAST API
    d. Model Context Protocol
11. **Introduction to LLMs (2.5 hours Theory + 2.5 hours Lab)**