Syllabus: Machine Learning

1. Introduction to Machine Learning

- Definition and Scope

- Applications of Machine Learning

2. Supervised Learning

- Regression: Linear Regression, Polynomial Regression

- Classification: Logistic Regression, Decision Trees, Random Forests

- Support Vector Machines (SVMs)

3. Unsupervised Learning

- Clustering: K-Means, Hierarchical Clustering

- Dimensionality Reduction: PCA, t-SNE

4. Neural Networks and Deep Learning

- Introduction to Neural Networks

- Feedforward Neural Networks

- Convolutional Neural Networks (CNNs)

- Recurrent Neural Networks (RNNs)

- Transfer Learning

5. Model Evaluation and Optimization

- Overfitting and Underfitting

- Cross-Validation

- Hyperparameter Tuning

6. Reinforcement Learning

- Markov Decision Processes

- Q-Learning

- Policy Gradient Methods

7. Advanced Topics

- Generative Adversarial Networks (GANs)

- Natural Language Processing (NLP)

- Recommendation Systems

8. Tools and Frameworks

- Python Libraries: NumPy, Pandas, Scikit-learn

- Deep Learning Frameworks: TensorFlow, PyTorch