

Machine Learning Course Content

Module 1: Introduction to Machine Learning

- What is Machine Learning?
- Applications of Machine Learning
- The Machine Learning Process

Module 2: Python for Machine Learning

- Setting up Python Environment
- Basic Python for ML
- Exploratory Data Analysis (EDA)

Module 3: Supervised Learning

- Overview of Supervised Learning
 - Regression Algorithms
 - Linear Regression
 - Polynomial Regression
 - Ridge and Lasso Regression
- Classification Algorithms:
 - Logistic Regression
 - k-Nearest Neighbors (k-NN)
 - Support Vector Machines (SVM)
 - Decision Trees
 - Random Forest
 - Naive Bayes
- Model Evaluation
 - Hands-on Projects

Module 4: Unsupervised Learning

- Introduction to Unsupervised Learning
 - Clustering Algorithms
 - k-Means Clustering
 - Hierarchical Clustering
 - DBSCAN
- Dimensionality Reduction
 - Principal Component Analysis (PCA)

- t-SNE:
- Association Rule Learning
 - Apriori Algorithm
 - Eclat
 - Hands-on Projects

Module 5: Advanced Topics in Supervised Learning

- Ensemble Methods
 - Bagging and Boosting
 - Random Forest
 - Gradient Boosting Machines (GBM)
 - XGBoost
- Regularization
 - L1 and L2 Regularization
- Support Vector Machines (Advanced)
- Hyperparameter Tuning
 - Grid Search and Random Search
- Hands-on Projects

Module 6: Introduction to Neural Networks and Deep Learning

- Introduction to Neural Networks
- Deep Learning Basics
 - Intro to TensorFlow and Keras
- Hands-on Projects
 - Image classification using neural networks

Module 7: Model Deployment and Practical Considerations

- Saving and Loading Models
- Model Deployment
- Real-World Challenges in ML