AI (Artificial Intelligence) and ML (Machine Learning)

Course Modules & Topics

□ Module 1: Introduction to AI & ML

- Difference Between AI, ML, DL, and Data Science
- Applications of AI & ML
- Machine Learning Workflow
- Tools: Jupyter, scikit-learn, TensorFlow, Google Colab

📈 Module 2: Data Preparation & Preprocessing

- Handling Missing Values
- Encoding Categorical Variables
- Feature Scaling (Standardization, Normalization)
- Feature Selection Techniques

🔢 Module 3: Supervised Learning

- Linear Regression
- Logistic Regression
- k-Nearest Neighbors (KNN)
- Decision Trees & Random Forest
- Support Vector Machines (SVM)

🔍 Module 4: Unsupervised Learning

- K-Means Clustering
- Hierarchical Clustering
- Principal Component Analysis (PCA)
- Anomaly Detection

📊 Module 5: Model Evaluation & Validation

- Train-Test Split, Cross Validation
- Evaluation Metrics: Accuracy, Precision, Recall, F1-Score
- ROC Curve and AUC
- Confusion Matrix

🔁 Module 6: Ensemble Techniques

- Bagging vs Boosting
- Random Forest
- Gradient Boosting, AdaBoost, XGBoost
- Voting Classifiers

□ Module 7: Deep Learning Essentials

- Artificial Neural Networks (ANNs)
- Activation Functions, Backpropagation
- Using TensorFlow/Keras for ANN
- Introduction to CNNs and RNNs

🤖 Module 8: AI Concepts and Applications

- Natural Language Processing (NLP) Basics
- Image Classification with CNNs
- Chatbot Development (Intro Level)
- Real-world AI Applications

💡 Module 9: Capstone Project

- Build a complete AI/ML Project
- Options:
    - Stock Price Predictor
    - Image Classifier
    - Sentiment Analyzer
- Final Presentation with Evaluation