Artificial Intelligence & Machine Learning

Course Content

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1. Introduction to Artificial Intelligence & Machine Learning

- What is Artificial Intelligence?
- What is Machine Learning?
- AI vs ML vs Data Science
- Real-world applications of AI & ML
- Types of Machine Learning (Supervised, Unsupervised, Reinforcement)
- Career opportunities in AI & ML

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2. Python Basics for AI & ML

- Introduction to Python
- Python syntax & data types
- Control statements & functions
- Working with arrays & data structures
- Hands-on:
- Write basic Python programs for ML

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3. Mathematics & Statistics for Machine Learning

- Linear algebra basics
- Probability fundamentals
- Statistics concepts
- Mean, Variance & Standard Deviation
- Correlation & data distribution
- Importance of math in ML models

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4. Data Preprocessing & Feature Engineering

- Data collection & understanding
- Handling missing values
- Data cleaning & transformation
- Feature scaling & normalization
- Train-test split
- Hands-on:
- Prepare dataset for ML models

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5. Machine Learning Algorithms

- Linear Regression
- Logistic Regression
- Decision Trees
- K-Nearest Neighbors (KNN)
- Naive Bayes
- Clustering (K-Means)
- Hands-on:
- Build ML models using Scikit-learn

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6. Model Evaluation & Optimization

- Model training & testing
- Accuracy, Precision, Recall & F1-score
- Confusion matrix
- Overfitting & underfitting
- Hyperparameter tuning
- Hands-on:
- Evaluate and improve ML models

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7. Introduction to Deep Learning

- What is Deep Learning?
- Neural networks basics
- Activation functions
- Overview of TensorFlow & Keras
- Use cases of Deep Learning
- Demo:
- Simple neural network example

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8. AI & ML Mini Project

- End-to-end ML project workflow
- Problem definition → data → model → evaluation
- Example projects:
- House price prediction
- Student performance prediction
- Spam email detection
- Project explanation & results

9. Career Guidance & Wrap-Up

- AI & ML career roadmap
- Skills required for internships & jobs
- Industry expectations & tools
- Project discussion & Q&A

Workshop Outcomes

- Strong understanding of AI & ML fundamentals
- Hands-on experience with Python & ML libraries
- Ability to build and evaluate ML models
- Exposure to real-world AI applications
- Confidence to pursue AI & ML career paths