# Applied AI–ML Engineering Program (3 Months / 12 Weeks)

**Offered by:** Alpha IT Managed Services
Plot 15C, IT Park, Sector 67, Mohali (Punjab)

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**Module 1: Python & Data Processing for AI–ML (Weeks 1–2)**

**Week 1: Python Foundations for AI**

- Role of Python in AI–ML
- Setting up Anaconda & working environment
- Variables, data types, operators
- Conditional statements & loops
- Basic dataset reading (CSV files)

**Week 2: Data Processing with NumPy & Pandas**

- NumPy arrays & basic operations
- Vectorization fundamentals
- Pandas DataFrames & data cleaning
- Handling missing values
- Basic data transformations for ML

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**Module 2: SQL for Data Access (Week 3)**

**Week 3: SQL Essentials for AI Projects**

- Introduction to relational databases
- MySQL setup & basic queries
- SELECT, WHERE, ORDER BY
- Joins for combining datasets
- Connecting Python with SQL

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**Module 3: Exploratory Data Analysis (Weeks 4–5)**

**Week 4: Data Understanding & Preparation**

- Summary statistics
- Detecting outliers
- Handling missing data
- Feature relationships
- Preparing dataset for modeling

**Week 5: Visualization for ML Insights**

- Matplotlib basics
- Seaborn visualizations
- Distribution plots & boxplots
- Correlation heatmaps
- Simple EDA storytelling project

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**Module 4: Machine Learning Fundamentals (Weeks 6–8)**

**Week 6: ML Workflow & Regression**

- ML lifecycle overview
- Train–test split
- Linear regression
- Model evaluation metrics (MAE, RMSE, $R^2$)
- Regression prediction project

**Week 7: Classification Algorithms**

- Logistic regression
- K-Nearest Neighbors
- Decision Trees
- Model evaluation (Accuracy, Precision, Recall, F1)
- Classification mini project

**Week 8: Clustering & Dimensionality Reduction**

- K-Means clustering
- Hierarchical clustering
- PCA basics
- Cluster evaluation (silhouette score)
- Customer segmentation project

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**Module 5: Introduction to Deep Learning (Weeks 9–10)**

**Week 9: Artificial Neural Networks**

- Neural network intuition
- Activation functions
- Forward propagation concept
- Building ANN using Keras
- Classification example project

**Week 10: CNN for Image Classification**

- Convolution concept
- Pooling layers
- CNN architecture overview
- Image classification example
- Transfer learning introduction

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**Module 6: ML Deployment Basics (Week 11)**

**Week 11: Model Deployment**

- Saving ML models (pickle/joblib)
- Creating ML interface using Streamlit
- User input → prediction workflow
- Deployment of ML project locally
- End-to-end ML mini deployment

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**Module 7: Capstone Project & Career Preparation (Week 12)**

**Week 12: Final Applied AI–ML Project**

- Problem understanding
- Data preprocessing & EDA
- Model building & evaluation
- Project presentation
- Resume & GitHub project setup