

AI & MACHINE LEARNING PROGRAM

A 12-week course that takes students from core machine learning concepts to building neural networks, using pretrained AI models, and deploying a working AI application.

Course Modules

Module 1: Machine Learning Foundations (Weeks 1–3)

➔ Week 1: Introduction to AI & Machine Learning

- Learn the basics of AI, ML, and deep learning, including supervised and unsupervised learning.
- Explore the ML workflow, Python tools like NumPy and Pandas, and basic data visualization.

Hands-on:

Analyse a real dataset and present key insights using charts.

➔ Week 2: Data Preparation & Feature Engineering

- Learn to clean data, handle missing values and outliers.
- Encode categories, scale features, create new features, and avoid data leakage using Scikit-Learn pipelines.

Hands-on:

Clean and prepare a messy dataset using a reusable pipeline.

➔ Week 3: Regression Models

- Learn linear regression, gradient descent, overfitting and underfitting.
- Regularization, and model evaluation using MAE, RMSE, R^2 , and cross-validation.

Hands-on:

Build and evaluate a house or car price prediction model.

Module 2: Classification, Ensembles & Unsupervised Learning (Weeks 4–6)

➔ Week 4: Classification Models

- Learn logistic regression, KNN, and decision trees for classification.
- Explore accuracy, precision, recall, F1-score, ROC-AUC, and handling imbalanced data.

Hands-on:

Build a customer churn or loan approval classification model.

➔ Week 5: Ensemble Methods & Model Tuning

- Learn Random Forests, XGBoost, and hyperparameter tuning to improve model performance.
- Explore feature importance and basic SHAP for explaining model predictions.

Hands-on:

Improve the Week 4 model and compare results across different models.

➔ Week 6: Unsupervised Learning

- Learn K-Means and hierarchical clustering for grouping similar data points.
- Explore PCA for dimensionality reduction and data visualization.

Hands-on:

Perform customer segmentation and describe each customer group.

Module 3: Deep Learning & AI Applications (Weeks 7–10)

➔ Week 7: Introduction to Neural Networks

- Learn neural network basics, activation and loss functions, and backpropagation.
- Explore optimizers and techniques to prevent overfitting using Keras.

Hands-on:

Build a handwritten digit classifier using MNIST.

➔ Week 8: Computer Vision with CNNs

- Learn how computers process images using CNNs, convolution, and pooling.
- Explore data augmentation and transfer learning for image classification.

Hands-on:

Build an image classifier using a pretrained model.

➔ Week 9: Natural Language Processing

- Learn text cleaning, tokenization, and text representation techniques like Bag-of-Words and TF-IDF.
- Explore word embeddings and the basics of RNNs and LSTMs.

Hands-on:

Build a sentiment analysis model for product or movie reviews and propose a capstone project.

➔ Week 10: Transformers & Generative AI

- Learn the basics of attention, transformers, and large language models.
- Explore pretrained models, prompt engineering, and responsible AI practices.

Hands-on:

Build a text summarizer or Q&A tool using a pretrained model.

Module 4: Deployment & Capstone (Weeks 11–12)

➤ Week 11: Deploying AI Models

- Learn how to save and load models, build interactive apps with Streamlit.
- Create prediction APIs with FastAPI, and share AI apps online.

Hands-on:

Turn the capstone model into a working web app and deploy it.

➤ Week 12: Capstone Project & Presentations

- Review the complete AI workflow from problem identification to model development.
- Cover data preparation, model evaluation, and deployment.

Final Deliverable:

A deployed AI application with a live demo, short project report, and presentation.

PROGRAM DETAILS

DURATION: 3-MONTHS

DAYS: SAT & SUN (1:00 PM TO 3:00PM)

PER MONTH FEE: PKR 20,000

CLASS MODE: VIRTUAL/ ONSITE