Artificial Intelligence From Basic To Advance

Go from zero to building and deploying real AI and machine learning systems in three focused months.

Duration: 3 months | Certificate: NUEXUS AI completion certificate | Format: Online or onsite, 1-on-1 or batch | NUEXUS certificate on completion

OVERVIEW

Artificial Intelligence From Basic To Advance is a three-month, hands-on program that takes you from Python fundamentals all the way through machine learning, deep learning, and modern generative AI. You build real projects at every stage, from your first data analysis notebook to a deployed model with an API, so you leave with a portfolio rather than just theory. Mentor-led by certified trainers and delivered online from anywhere or onsite in Islamabad, in batches or 1-on-1, it is built for people who want practical, job-focused AI skills. On finishing, you receive the NUEXUS AI completion certificate.

SKILLS YOU WILL GAIN

Python for AI | Data Handling | Machine Learning | Deep Learning | Neural Networks | Natural Language Processing | LLMs & Prompting | Model Evaluation | APIs & Deployment | Project Building

WHAT YOU WILL BE ABLE TO DO

- Write clean Python and use NumPy, Pandas, and Matplotlib to load, clean, analyze, and visualize real datasets
- Build, train, and evaluate core machine learning models for regression, classification, and clustering with scikit-learn
- Design and train neural networks and deep learning models using TensorFlow or PyTorch, including CNNs for images
- Apply natural language processing and work with large language models, embeddings, and prompt-based and RAG workflows
- Handle a full ML workflow end to end: data preparation, feature engineering, model tuning, and honest evaluation
- Deploy a trained model as a working API or app and present a complete portfolio project you built during the course

WHO IT IS FOR

- Complete beginners and students who want a structured, practical path into AI and machine learning
- Working professionals (analysts, developers, IT staff) looking to move into data science or ML roles
- Domain experts in fields like finance, healthcare, or marketing who want to apply AI to their own data
- Entrepreneurs and product people who want to understand and build AI features hands-on
- Anyone preparing a project portfolio to pursue AI, data science, or machine learning positions

PREREQUISITES

- No prior programming or AI experience required, it is beginner friendly and starts from fundamentals
- Comfort using a computer and a willingness to work through hands-on coding exercises
- Basic high-school mathematics is helpful; the deeper math (linear algebra, probability) is taught as needed
- A laptop with a stable internet connection for labs, notebooks, and cloud tools

WHAT'S INCLUDED

- Mentor-led live sessions, online or onsite, in batch or 1-on-1
- Hands-on labs and real-world projects, not slides alone
- Recordings of your own sessions to revisit anytime
- Exam-aligned study material and practice questions
- Doubt-clearing and revision support through the program
- A verifiable NUEXUS completion certificate
- Career and next-step guidance after you finish

COURSE CURRICULUM

1 Foundations and Python for AI

Setting up the environment: Python, Jupyter or Colab, and virtual environments
Python essentials: variables, data types, control flow, functions
Data structures: lists, dictionaries, sets, and comprehensions
Working with files, libraries, and packages
First hands-on scripts and mini-exercises

2 Data Analysis and Visualization

NumPy for numerical computing and array operations
Pandas for loading, cleaning, and transforming datasets
Handling missing data, duplicates, and data types
Exploratory data analysis and summary statistics
Visualization with Matplotlib and Seaborn

3 Math and Statistics for Machine Learning

Descriptive statistics, distributions, and probability basics
Linear algebra essentials: vectors, matrices, and operations
Derivatives and gradients intuition for optimization
Correlation, sampling, and the idea of bias and variance
Applying concepts directly in Python, no heavy theory dumps

4 Core Machine Learning with scikit-learn

The ML workflow and supervised vs unsupervised learning
Linear and logistic regression
Decision trees, random forests, and gradient boosting
Train/test split, cross-validation, and overfitting
Evaluation metrics: accuracy, precision, recall, F1, ROC-AUC

5 Feature Engineering and Model Improvement

Feature scaling, encoding categorical variables, and pipelines
Feature selection and dimensionality reduction (PCA)
Handling imbalanced datasets
Hyperparameter tuning with grid and random search
Building reproducible, leak-free ML pipelines

6 Unsupervised Learning and Clustering

K-means and hierarchical clustering
DBSCAN and choosing the number of clusters
Dimensionality reduction for visualization (PCA, t-SNE)
Anomaly and outlier detection basics
Practical use cases: segmentation and pattern discovery

7 Deep Learning and Neural Networks

- Neurons, layers, activation functions, and forward/backward propagation
- Building models with TensorFlow/Keras or PyTorch
- Training, loss functions, optimizers, and regularization
- Convolutional neural networks (CNNs) for image classification
- Transfer learning with pretrained models

8 Natural Language Processing and Sequence Models

- Text preprocessing, tokenization, and word embeddings
- Sentiment analysis and text classification
- Recurrent networks and the transformer architecture at a high level
- Using pretrained language models for common NLP tasks
- Building a practical text-based application

9 Generative AI and Large Language Models

- How large language models work and where they fit
- Prompt engineering and structured prompting
- Embeddings and retrieval-augmented generation (RAG)
- Working with LLM APIs to build a simple AI assistant
- Responsible AI: bias, hallucination, privacy, and limitations

10 Model Deployment and Capstone Project

- Saving, loading, and versioning trained models
- Serving a model via an API (Flask or FastAPI) or a simple app (Streamlit)
- Introduction to MLOps concepts and cloud deployment options
- End-to-end capstone: from a real dataset to a deployed working solution
- Presenting your project and building your AI portfolio

CAREER OUTCOMES

- AI Engineer
- Machine Learning Engineer
- Data Scientist
- AI Application Developer
- Automation Specialist

CERTIFICATION

Completing the program earns you the NUEXUS AI completion certificate, awarded on the basis of your attendance, hands-on lab work, and a capstone project you build and present. It is a practical, portfolio-backed credential from NUEXUS Technologies; it is not a vendor exam, and while the course is job-focused and maximizes your readiness, no certificate can guarantee a job or a specific outcome.