NEXSKILL

Training • Freelancing • Placement

ADVANCE

MACHINE LEARNING & DEEP LEARNING

MASTER PROGRAM

LEARN. TRAIN. DEPLOY.



16 Weeks • 48 Classes • 7 Modules

Python • Pandas • Scikit-learn • XGBoost • PyTorch • NLP • Transformers • LLMs • RAG • Generative AI

DURATION

4 MONTHS

Practical • Real-Project Based • Portfolio Focused

3 Classes per Week • Hands-On Labs • Certificate on Completion

INTRODUCTION

ABOUT-THE-PROGRAM

About the Program

From Python basics to training ML models, deep learning and your own LLM apps.

- **What is ML & DL Engineering?:** Machine learning engineers build systems that learn from data to predict, classify and recommend. Deep learning extends this with neural networks, and Generative AI uses them to build LLMs, chatbots and image generators.
- **Why This Program?:** Every modern AI product, from fraud detection to ChatGPT-style models, is built on these foundations. Understanding them is what separates engineers who use AI from those who build it.
- **What You Will Use:** Python, NumPy, Pandas, Scikit-learn, XGBoost, PyTorch, Hugging Face, LangChain, LlamaIndex, Ollama, vLLM, Stable Diffusion, FastAPI, Google Colab, Claude Code and Cursor.
- **Who This Program Is For:** students, developers, data analysts and professionals who want a career in machine learning, data science or AI. The program starts from Python, so no prior coding is required.

MEET YOUR INSTRUCTORS

INSTRUCTOR · 01

Mian Ahmad Basit

Founder, CEO, CTO & Strategic Advisor



- **Leadership:** Founder, CEO, CTO & Strategic Advisor building AI, Cloud & Blockchain companies and products.
- **Program Architect:** Instructor & Program Architect for Nexskill's advanced AI programs; CTO @ PBI & Anz Tech.

50,000+	13+	5
Talent Developed	Years Executive Leadership	Continents Reached

Connect on LinkedIn ↗ linkedin.com/in/mianahmadbasit

MEET YOUR INSTRUCTORS

INSTRUCTOR · 02

Zeeshan Ali

Technical Project Manager at P2P Clouds

- **Expertise:** Software Engineer & Instructor specializing in AI, Blockchain, Cloud & DevOps.
- **Industry Delivery:** Leads real-world AI & SaaS projects at P2P Clouds for clients across Pakistan & the Middle East.



10,000+ Contributions	**500+** Delivered Projects	**5,000+** Students Trained
6+ Years Experience	**3** Continents Active	

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CURRICULUM MAP

Program Modules

16 WEEKS · 48 CLASSES · 3 CLASSES PER WEEK

- **Module 1 — Python for AI**
  Weeks 1–4 · Classes 1–12
- **Module 2 — Data Science Toolkit & Math for ML**
  Weeks 5–6 · Classes 13–18
- **Module 3 — Machine Learning & Model Deployment**
  Weeks 7–8 · Classes 19–24
- **Module 4 — Deep Learning & PyTorch**
  Weeks 9–10 · Classes 25–30
- **Module 5 — NLP & Transformers**
  Weeks 11–12 · Classes 31–36
- **Module 6 — Generative AI & Large Language Models**
  Weeks 13–14 · Classes 37–42
- **Module 7 — Computer Vision, Generative Vision & Capstone**
  Weeks 15–16 · Classes 43–48

MODULE 1 — PYTHON FOR AI · WEEKS 1–2

M1-CLS-1-6

Python Core Fundamentals

Building a solid programming foundation from the very first line of code.

- **Class 1 — Setup & Syntax:** installing Python & VS Code, running scripts, variables and data types, operators (arithmetic, comparison, logical, bitwise), input & output.
- **Class 2 — Control Flow:** if-elif-else conditions, for and while loops, break & continue, nested logic, logic-building exercises.
- **Class 3 — Functions:** defining functions, arguments & return values, *args & **kwargs, default parameters, lambda functions, variable scope.
- **Class 4 — Data Structures:** lists, tuples, sets & dictionaries in depth, list/dict/set comprehensions, choosing the right structure.
- **Class 5 — Strings, Files & Errors:** string manipulation, regex parsing, file handling with context managers, exception handling (try-except-finally).
- **Class 6 — Modules & Environments:** modules, packages & imports, virtual environments (venv, conda, poetry), pip & dependency locking.

MODULE 1 — PYTHON FOR AI · WEEKS 3–4

M1-CLS-7-12

OOP, Advanced Python & APIs

Writing clean, production-style Python and connecting it to the outside world.

- **Class 7 — OOP Foundations:** classes & objects, constructors, inheritance (single, multiple, MRO), encapsulation & private attributes.
- **Class 8 — OOP Advanced:** polymorphism & duck typing, abstract base classes, dataclasses & immutability, type hints & static checking.
- **Class 9 — Advanced Mechanics:** iterators & the iterable protocol, generators & yield, decorators with state, custom context managers.
- **Class 10 — Async Python:** asyncio event loop, async/await patterns, tasks, gather & semaphores, non-blocking API calls.
- **Class 11 — APIs & Your First LLM Call:** HTTP/REST fundamentals, JSON serialization, environment variables (.env), calling the Claude API from Python.
- **Class 12 — Git & Project Setup:** Git/GitHub workflow, Python project structure & packaging, mini project: a command-line AI assistant.

MODULE 2 — WEEKS 5–6

M2-CLS-13-18

Data Science Toolkit & Math for ML

The tools and mathematics behind every machine learning model.

- **Class 13 — NumPy:** arrays & tensors, vectorized operations, broadcasting, indexing & slicing, random sampling.
- **Class 14 — Pandas:** DataFrames, loading CSV & Excel data, cleaning & filtering, groupby & merges, handling missing values.
- **Class 15 — Visualization & EDA:** Matplotlib & Seaborn, distributions, correlations & outliers, an exploratory data analysis workflow in Google Colab.
- **Class 16 — Linear Algebra:** scalars, vectors, matrices & tensors, dot product, matrix multiplication, vector norms, eigenvalues & eigenvectors.
- **Class 17 — Probability & Statistics:** conditional probability, Bayes theorem, distributions, mean, variance & correlation, hypothesis testing & p-values.
- **Class 18 — Calculus & AI-Assisted Data Science:** derivatives, gradients & the chain rule, convexity, using Claude Code & Cursor for data analysis notebooks.

MODULE 3 — WEEKS 7–8

M3-CLS-19-24

Machine Learning & Model Deployment

Classical algorithms that solve real business problems, taken all the way to production.

- **Class 19 — ML Foundations & Regression:** supervised vs unsupervised learning, the ML lifecycle, linear & polynomial regression, MAE, MSE, RMSE & R^2.
- **Class 20 — Classification:** logistic regression, KNN, Naive Bayes, SVM, confusion matrix, precision, recall, F1 & ROC-AUC.
- **Class 21 — Trees & Ensembles:** decision trees, random forest & bagging, gradient boosting with XGBoost, LightGBM & CatBoost.
- **Class 22 — Clustering & Dimensionality Reduction:** K-Means, hierarchical clustering, DBSCAN, PCA, a customer segmentation project.
- **Class 23 — Feature Engineering & Validation:** encoding & scaling, missing values & outliers, data leakage prevention, K-fold & stratified cross validation.
- **Class 24 — Tuning, Pipelines & Deployment:** hyperparameter tuning, L1/L2 regularization, Scikit-learn pipelines, serving models with FastAPI & Docker.

MODULE 4 — WEEKS 9–10

M4-CLS-25-30

Deep Learning & PyTorch

Neural networks, how they learn, and how to build them in PyTorch.

- **Class 25 — Neural Network Basics:** artificial neurons, perceptrons, forward propagation, loss functions (MSE, cross-entropy).
- **Class 26 — Backpropagation & Optimizers:** computation graphs, gradient descent & SGD, momentum, Adam & AdamW, learning rate scheduling.
- **Class 27 — Training Stability:** activation functions (ReLU, GELU, softmax), Xavier & He initialization, batch & layer normalization, dropout.
- **Class 28 — PyTorch Fundamentals:** tensors & autograd, building models with nn.Module, Dataset & DataLoader, training & validation loops.
- **Class 29 — PyTorch in Practice:** GPU acceleration (CUDA), mixed precision training, checkpointing, experiment tracking.
- **Class 30 — Sequence Models:** RNNs, LSTM & GRU, Seq2Seq encoder-decoder models, the road to attention.

MODULE 5 — WEEKS 11–12

M5-CLS-31-36

NLP & Transformers

Teaching machines to understand language, from text basics to Transformers.

- **Class 31 — Text Processing & Embeddings:** tokenization, stemming & lemmatization, TF-IDF, Word2Vec & GloVe, contextual embeddings.
- **Class 32 — NLP Tasks:** text classification, sentiment analysis, named entity recognition, intent recognition, topic modeling.
- **Class 33 — Attention & Transformers:** scaled dot-product & multi-head attention, positional encoding, encoder vs decoder models (BERT vs GPT).
- **Class 34 — Tokenization Deep Dive:** BPE, WordPiece & SentencePiece, byte-level tokenizers (tiktoken, LLaMA), special tokens & vocabularies.
- **Class 35 — Hugging Face Transformers:** Transformers & Datasets libraries, pipelines, pre-trained models, fine-tuning DistilBERT for classification.
- **Class 36 — Sentence Embeddings & Semantic Search:** sentence transformers, cosine similarity, vector databases (FAISS, Qdrant), building a semantic search engine.

MODULE 6 — WEEKS 13–14

M6-CLS-37-42

Generative AI & Large Language Models

How LLMs work, and how to prompt, fine-tune, ground and deploy them.

- **Class 37 — Generative AI & LLM Foundations:** how LLMs work, pre-training vs post-training, GPT, LLaMA & Claude model families, KV cache & context windows.
- **Class 38 — Prompt Engineering & LLM APIs:** zero & few-shot, chain-of-thought, structured outputs with Pydantic & Instructor, Claude, OpenAI & Gemini APIs.
- **Class 39 — Fine-Tuning LLMs:** instruction datasets & chat templates, LoRA & QLoRA, supervised fine-tuning with Hugging Face TRL & Unsloth.
- **Class 40 — Alignment, Quantization & Serving:** RLHF & DPO, GPTQ, AWQ & GGUF quantization, running models locally with Ollama & serving with vLLM.
- **Class 41 — RAG Systems:** chunking & embeddings, LangChain & LlamaIndex, hybrid search & reranking, RAG evaluation with RAGAS.
- **Class 42 — AI Agents & Speech AI:** tool calling, ReAct agents with LangGraph, MCP basics, speech-to-text with Whisper.

MODULE 7 — WEEKS 15–16

M7-CLS-43-48

Computer Vision, Generative Vision & Capstone

Image models, image generation, and proving your skills on a real project.

- **Class 43 — CNNs & Transfer Learning:** convolutions, pooling, ResNet & EfficientNet, data augmentation, image classification pipelines.
- **Class 44 — Vision Transformers & CLIP:** ViT patch embeddings, CNN vs ViT, CLIP image-text models, vision APIs with Claude & Gemini.
- **Class 45 — Generative Vision:** diffusion models & Stable Diffusion, vision-language models (LLaVA, Qwen-VL), multimodal applications.
- **Class 46 — Deploying ML, DL & LLM Apps:** FastAPI & Docker, Gradio & Streamlit demos, Hugging Face Spaces, monitoring cost & latency.
- **Class 47 — Capstone Build:** build & deploy a complete ML, deep learning or LLM solution for a real problem, with mentor reviews along the way.
- **Class 48 — Capstone Demo & Certification:** live demo, case study report & GitHub portfolio, practical assessment, Advance Machine Learning & Deep Learning Certificate award.

PROGRAM OUTCOMES

- Write clean Python and work confidently with NumPy, Pandas and data visualization.
- Understand the math behind ML: linear algebra, probability, statistics and calculus.
- Build, evaluate, tune and deploy classical ML models with Scikit-learn and XGBoost.
- Build and train neural networks and sequence models in PyTorch.
- Build NLP systems with Transformers, Hugging Face and semantic search.
- Prompt, fine-tune, quantize and serve LLMs, and build RAG systems and AI agents.
- Build computer vision and generative vision apps, deploy them, and earn the Advance Machine Learning & Deep Learning Certificate.

FINAL CAPSTONE

- Solve a real-world problem end to end: collect and clean the data, build and compare machine learning, deep learning or LLM-based solutions, deploy the best one as a live API with a demo app, and present a full case study to earn the Advance Machine Learning & Deep Learning Certificate.

NEXSKILL
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BUILD YOUR FUTURE WITH NEXSKILL
MORE THAN A DEGREE

TECH STACK

TOOLS-&-TECHNOLOGIES

Technologies You'll Master

Industry-standard tools used by AI teams worldwide, all covered hands-on.

- Python
- NumPy
- Pandas
- Matplotlib
- Jupyter
- Google Colab
- Scikit-learn
- Keras
- PyTorch
- TensorFlow
- Hugging Face
- OpenCV
- LangChain
- LlamaIndex
- Ollama
- vLLM
- Claude
- Gemini
- OpenAI
- FastAPI
- Streamlit
- Gradio
- Docker
- GitHub

ALUMNI SUCCESS STORIES

NEXSKILL-ALUMNI

Success Stories

Real Nexskill students, now building careers in tech.



Muhammad Hashim

Full Stack AI Developer

Age 13 · One of Pakistan's youngest

Full Stack AI · n8n · AI Integration

View LinkedIn Profile



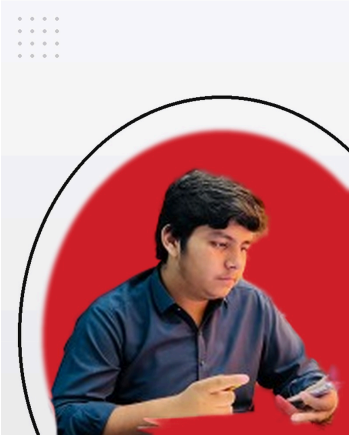
Kashan Iqbal

Senior Software Developer

Flacron Enterprises

Program: Blockchain · Batch B2

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Faizan Ahmad

Web & AI Developer

P2PClouds

Nexskill Alumni

& Many More...

Nexskill alumni are working as software engineers, AI developers and blockchain developers at companies like Flacron Enterprises and P2PClouds, building their own products, and earning as freelancers on Upwork and Fiverr. The next success story could be yours.

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