

BQ 024



GENERATIVE AI

2nd EDITION



FROM THOUGHT TO CREATION.

Duration 3 Months

● on-campus classes

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Table of Contents

1. PROGRAM OVERVIEW	3
2. COURSE OBJECTIVES	3
3. LEARNING OUTCOMES.....	3
4. ASSESSMENT CRITERIA	4
5. COURSE OUTLINE BREAKUP.....	4
Week-1: Foundations of AI & Generative AI Overview:.....	Error! Bookmark not defined.
Week-2: Python Setup & Essential Programming Basics:	Error! Bookmark not defined.
Week-3: Python Programming -Logic, Loops and Functions:	5
Week-4: Python advanced – Data Structures & OOP:	Error! Bookmark not defined.
Week-5: Data Handling for AI – NumPy, Pandas & Visualization/ Soft Skills Session: 	Error! Bookmark not defined.
Week-6: Machine Learning Foundations – Regression & Classification/ Soft Skills Session:	Error! Bookmark not defined.
Week-7: Natural Language Processing (NLP) Basics/ Soft Skills Session:	Error! Bookmark not defined.
Week-8: Generative AI Fundamentals-Transformers & HuggingFace/ Soft Skills Session: 	Error! Bookmark not defined.
Week-9: Multi-Modal AI – Text + Image Models/ Soft Skills Session:	Error! Bookmark not defined.
Week-10: Chatbots,LangChain & RAG Systems / Soft Skills Session:	Error! Bookmark not defined.
Week-11: AI Agents & Model Fine-Tuning/ Soft Skills Session:	Error! Bookmark not defined.
Week-12: Capstone Project & Career/Freelancing Guidance / Soft Skills Session:.....	Error! Bookmark not defined.
6. Guest Session:Experienced AI Freelancer / Industry Expert.....	6

Course Title: Generative AI	
Course Code:	BQ-024
Duration:	12 Weeks
Class Structure	
Total Hours:	48 Hours
Total Sessions:	24 Sessions (Two sessions per week or as per convenience)
Session Duration:	2 Hours

1. Program Overview

The Generative AI Program is designed to equip learners with foundational knowledge and hands-on expertise in modern AI systems-specifically in Large Language Models (LLMs), text generation, multi-modal AI, chatbots, RAG systems, and AI automation. The curriculum emphasizes practical learning, enabling students to understand, build, and deploy real AI applications using industry -standard tools like Python, Hugging Face, Lang Chain, and various no code-/low-code platforms.

Throughout the program, learners explore the core building blocks of AI-Python programming, data handling, machine learning fundamentals, NLP, visual AI, and transformer-based architectures. The course gradually advances towards real -world Generative AI applications, including prompt engineering, fine-tuning small LLMs, creating chatbots, RAG pipelines, and developing agentic AI workflows.

Using local datasets and applied projects, students develop the ability to solve real business and community problems with Generative AI. Ethical AI usage, responsible deployment, and AI safety are integrated across all modules. By the end of the program, participants will not only build a complete portfolio but will also understand how to monetize AI skills through freelancing, remote jobs, and local industry opportunities.

2. Course Objectives

By the end of this generative AI course, participants will be able to:

- Understand core AI and Generative AI concepts, transformers models, and real-world use cases.
- Apply Python, AI libraries, and no-code /low-code tools to build functional Generative AI applications.
- Work with LLMs, perform text generation, apply prompt engineering, and build NLP-based workflows.
- Create chatbots, RAG-based systems, and multimodal AI applications using state-of-the-art tools.
- Fine-tune small LLMs and deploy practical AI solutions with real datasets.
- Utilize Generative AI for freelancing, business automation, and commercial AI use cases.
- Present AI projects professionally with proper documentation and portfolio development.

3. Learning Outcomes

After successfully completing the program, participants will be able to:

- Demonstrate understanding of AI foundations, NLP, ML workflows, transformers, and multimodal AI.
- Build real Generative AI applications using Hugging Face, Lang Chain, OpenAI, and other leading tools.
- Perform text generation, content creation, summarization, sentiment analysis, and embeddings-based tasks.
- Develop chatbots, RAG pipelines, and assistant-style models using vector databases and LLM frameworks.
- Fine-tune and evaluate small language models for specialized tasks.
- Implement ethical, safe, and responsible Generative AI practices.
- Showcase AI projects through a professional GitHub portfolio and deploy solutions for freelance or business use.

4. Assessment Criteria

Component	Weight
Attendance & Participation	15%
Quizzes	20%
Assignments & Mini-Projects	25%
Final Portfolio + Capstone Presentation	40%

5. Course outline breakup:

Session Focus:

- **Introduction to the Generative AI Program**
Overview of course roadmap, learning flow, hands-on activities, and final outcomes.
- **Understanding the Role of AI in Today's World**
How Generative AI is transforming global industries, jobs, businesses, and Pakistan's digital ecosystem.
- **Course Structure & Learning Methodology**
Explanation of weekly modules, lab activities, assignments, mini-projects, and capstone requirements.
- **Rules & Regulations of the Training Center**
Class discipline, attendance policy, project submission rules, and use of AI responsibly.
- **Success Stories & Industry Impact**
Real-world examples of AI freelancers, developers, and innovators using Generative AI tools.
- **Expectations from Students**
Attendance, participation, teamwork, timely project completion, ethical AI usage, and portfolio building.

Week-1: Foundations of AI & Generative AI Overview

A. Session-1: Introduction to Generative AI

- I. Definition of Generative AI
- II. History and evolution of AI & GenAI
- III. GenAI's role in everyday life and business
- IV. Global vs. Pakistani AI developments

B. Session-2: GenAI Types, Key Terms & Local Case Studies

- I. Types of GenAI: Text, Image, Video, Audio
- II. Core AI concepts: data, algorithm, model, training

C. Case Studies: ChatGPT, Careem AI, Easypaisa AI, Bykea, Sehat Kahani

D. Group Discussion: "The role of Generative AI in Pakistan's future"

E. Assignment: Write a 1-page report on a Pakistani startup using Generative AI

F. Quiz: GenAI Basics & Relevance in Pakistan

G. Trainer Reference Links: Google AI Intro, AI in Pakistan Case Studies

Week-2: Python Setup & Essential Programming Basics

A. Session-3: Python Setup & IDEs

- I. Installing Python, Jupyter Notebook, VS Code
- II. Git basics & version control
- III. Running first Python programs

B. Session-4: Python Basics

- I. Variables, Data Types, Operators
- II. Input/Output functions
- III. Control Flow (if/else, loops)

C. Assignment: Write a Python program to calculate simple statistics from a dataset

D. Quiz: Python Basics

E. Trainer Reference Links: Python Official Docs, Jupyter Tutorials

Week-3: Python Programming - Logic, Loops & Functions

A. Session-5: Advanced Python Logic

- I. Conditional statements, loops
- II. List comprehensions & basic data structures

B. Session-6: Functions & Modules

- I. Writing reusable functions
- II. Importing and using Python modules

C. Assignment: Create a program using functions and loops to process a small dataset

D. Quiz: Python Logic & Functions

E. Trainer Reference Links: W3Schools Python, Real Python Tutorials

Week-4: Python Advanced – Data Structures & OOP

A. Session-7: Python Data Structures

- I. Lists, Tuples, Dictionaries, Sets
- II. File Handling

B. Session-8: Object-Oriented Programming (OOP)

- I. Classes & Objects
- II. Basic inheritance and methods

C. Assignment: Build a simple class to store and manipulate data

D. Quiz: Python Advanced & OOP

E. Trainer Reference Links: Python Docs – OOP, Geeks for Geeks, Python Data Structures

Week-5: Data Handling for AI - NumPy, Pandas & Visualization / Soft Skills Session

A. Session-9: NumPy Basics

- I. Arrays & operations
- II. Mathematical functions

B. Session-10: Pandas & Data Visualization

- I. DataFrames, data cleaning
- II. Matplotlib & Seaborn for charts

C. Quiz: Data Handling Basics

D. Assignment: Load a dataset, clean it, and create 2 visualizations

E. Trainer Resource Links: Pandas Docs, Matplotlib/Seaborn Tutorials

Week-6: Machine Learning Foundations - Regression & Classification/ Soft Skills Session

A. Session-11: Introduction to ML

- I. Supervised vs Unsupervised Learning
- II. Regression & Classification concepts

B. Session-12: ML Hands-on with Scikit-learn

- I. Building simple ML models
- II. Evaluation metrics: Accuracy, Precision, Recall

C. Assignment: Build a regression/classification model on sample data

D. Quiz: ML Basics

E. Trainer Reference Links: Scikit-learn Tutorials, ML for Beginners

Week-7: Natural Language Processing (NLP) Basics/ Soft Skills Session

A. Session-13: NLP Fundamentals

- I. Text preprocessing: tokenization, stop words, stemming, lemmatization.
- II. Feature extraction: Bag of Words, TF-IDF

B. Session-14: NLP Mini Project

- I. Sentiment analysis on local tweets or reviews

C. Assignment: Build a sentiment classifier using Python

D. Quiz: NLP Basics

E. Trainer Reference Links: HuggingFace, Google AI Studio

Week-8: Generative AI Fundamentals - Transformers & Hugging Face/ Soft Skills Session

A. Session-15: Transformers Overview

- I. Understanding transformer architecture
- II. Introduction to GPT models & Hugging Face

B. Session-16: Prompt Engineering Basics

- I. Writing effective prompts for text generation
- II. Hands-on demo: Generate text with GPT

C. Assignment: Create short text outputs using prompts for a business idea

D. Quiz: Generative AI Basics

E. Trainer Reference Links: Hugging Face Tutorials, OpenAI Docs

Note: 01-hour Soft Skills Session will be conducted weekly from **Week 05 to Week 12.**

**Week-9: Multi-Modal AI – Text + Image Models/
Soft Skills Session**

A. Session-17: Image Generation Basics

- I. DALL·E, Stable Diffusion overview
- II. Image captioning & text-to-image applications

B. Session-18: Mini Project

- I. Create a simple text-to-image generator

C. Assignment: Generate 2–3 images for a chosen concept/business idea

D. Quiz: Multi-Modal AI Basics

E. Trainer Reference Links: DALL·E Docs, Stable Diffusion Guides

**Week-10: Chatbots, LangChain & RAG Systems/
Soft Skills Session**

A. Session-19: Chatbots & LangChain

- I. Build simple Q&A chatbots
- II. Add memory and context

B. Session-20: Retrieval-Augmented Generation (RAG)

- I. Introduction to vector databases (Chroma, Pinecone)
- II. RAG workflow implementation

C. Assignment: Build a simple chatbot with RAG capability

D. Quiz: Chatbots & RAG

E. Trainer Reference Links: LangChain Docs, Vector DB Tutorials

Week-11: AI Agents & Model Fine-Tuning/ Soft Skills Session

A. Session-21: Agentic AI Concepts

- I. LangChain Agents, CrewAI overview
- II. Automating tasks with AI agents

B. Session-22: Fine-Tuning Models

- I. Small LLMs (GPT-2, LLaMA)
- II. Dataset preparation & evaluation

C. Assignment: Fine-tune a small model for a specific use case

D. Trainer Reference Links: HuggingFace Fine-Tuning Guides

Week-12: Capstone Project & Career/Freelancing Guidance/ Soft Skills Session

A. Session-23: Capstone Project Development

- I. Choose: chatbot, summarizer, image generation app, AI assistant, RAG system, agentic workflow
- II. Build working prototype

B. Session-24: Career Prep & Portfolio

- I. GitHub portfolio setup
- II. Freelancing platforms (Upwork, Fiverr, LinkedIn)
- III. Personal branding & mock interviews

C. Assignment: Submit final project and showcase portfolio

D. Trainer Reference Links: Freelancing Guides, AI Career Resources

6. Guest Session: Experienced Generative AI Freelancer / Digital Professional

- **Speaker:** An industry expert or freelancer actively working with Generative AI, LLMs, or AI automation workflows.