

# Generative AI Fundamentals

**Duration: 16 Hours (2 Days)**

## Overview

### Introduction to Generative AI Course OverviewUnlock the potential of Generative AI with Koenig Solutions' immersive Introduction to Generative AI course. Over two days (16 hours), dive deep into Python programming, and explore text-based and image-based Large Language Models (LLMs). Learn to apply Role-based prompting, optimize models through Quantization, and build practical applications like Chatbots using LangChain. The course features extensive hands-on labs utilizing open-source platforms and the Koenig Data Center. Elevate your AI skills with practical experiences in Object detection, Image captioning, Translation, and more. Join us to transform the way you perceive and implement AI technologies in real-world scenarios.

## Audience Profile

- Data Scientists
- Machine Learning Engineers
- AI Researchers
- Software Developers
- IT Consultants
- AI Enthusiasts
- Data Analysts
- Research Scientists
- Tech Entrepreneurs
- Graduate Students in AI and Machine Learning
- IT Managers overseeing AI projects
- Innovation Officers
- Solution Architects
- Backend Developers interested in AI
- Python Developers
- CTOs and CIOs (Chief Technology/Information Officers)
- University Educators in AI fields

## Course Syllabus

**Labs:** Open-Source platform and Koenig DC will be provided

**Pre-requisite:** Fundamental knowledge of Python/similar programming is a must.

### Course Objectives:

#### Module 01: Introduction of GenAI

- Understand Generative AI concepts, architectures, and Generative Adversarial
- Networks (GANs). Gain practical skills in creating basic GenAI applications using the
- Hugging Face Transformer Library

#### Module 02: Working with Text-Based Large Language Models

- Learn the architecture and types of text-based LLMs. Gain hands-on experience in
- using Ollama and role-based prompting for tasks like translation, summarization, and
- sentence similarity.

## **Module 03: Working with Image-Based Large Language Models**

- Explore various image-based AI models and services. Perform hands-on tasks such as
- object detection, image segmentation, and zero-shot classification using image-based LLMs.

## **Module 04: Prompt Engineering for Large Language Models**

- Master prompt engineering techniques for LLMs. Apply text prompting using Meta's
- Llama and practice iterative, summarization, inference, and transformation prompting
- techniques.

## **Module 05: Fine-tuning LLMs (Quantization) using Open Source Models**

- Understand quantization techniques for optimizing model weights and performance.
- Gain hands-on experience in fine-tuning LLMs like Llama using different quantization modes.

## **Module 06: Basic LLM Systems (RAG) using Large Language Models**

- Learn the basics of Retrieval-Augmented Generation (RAG) and LangChain. Build LLM
- applications, including a chatbot, utilizing concepts of embedding, retrieval, chains, and agents.

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## **Module 01: Introduction of GenAI**

- Introduction to Generative AI & its Architecture
- Introduction to Generative Adversarial Networks (GANs)
- Applications of Generative AI using Transformer Library
- Hands-on: Basic GenAI application creation using transformer library (Hugging face)

## **Module 02: Working with Text Based Large Language Model**

- Architecture of Large Language Models
- Types of Large Language Models (LLMs)
- Hands-on: Task based Text AI LLMs – Translation, Summarization, Sentence
- Similarity, etc.
- Introduction to Ollama
- Hands-on: Consuming Major Text AI LLMs using Ollama (Qwen, Llama)
- Role based prompting of LLMs using Ollama
- Hands-on: Applying role-based prompting & Consuming LLMs using Ollama (Llama)

## **Module 03: Working with Image Based Large Language Models**

- Image AI Models & Services
- Hands-On: Performing multiple tasks using LLMs (Object Detection, Image
- Segmentation, Image Retrieval, Image Captioning, Visual QnA, Zero-shot Image Classification)

## **Module 04: Prompt Engineering for Large Language Models**

- Introduction to Prompt Engineering
- Prompt Engineering Techniques

- Text Prompting using Llama (Meta)
- Hands-on: Iterative, Summarization, Inference & Transformation Prompting using LLMs

## **Module 05: Fine-tuning LLMs (Quantization) using Open Source Models**

- Introduction to Quantization
- Optimization of model weights (data types)
- Modes of Quantization
- Hands-on: Fine tuning Llama model

## **Module 06: Basic LLM Systems (RAG) using Large Language Models**

- Introduction to Retrieval Augmented Generation (RAG)
- Introduction to LangChain
- Concept of Embedding, Retrieval, Chain and Agents using LangChain
- Lab: Build a Simple LLM Application using LangChain
- Lab: Build a Chatbot LangChain