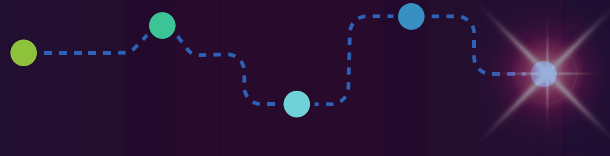# Transf🌐tech
A C A D E M Y

AI ENGINEERING:

AGENTIC & GENERATIVE AI

EMPOWERING FUTURE INNOVATORS TO BUILD INTELLIGENT & CREATIVE AI SOLUTIONS FOR A SMARTER WORLD
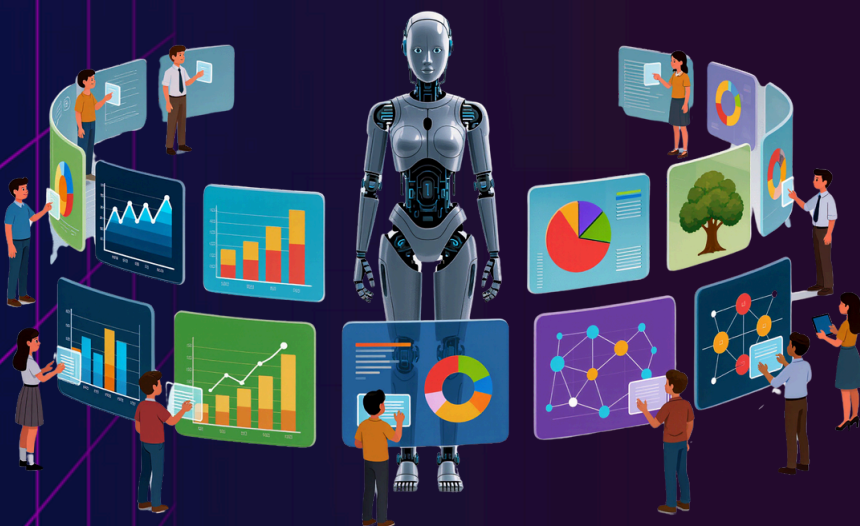
Roadmap

The Big Picture

The AI Engineering: Agentic & Generative AI program by Transfotech Academy is designed for ambitious professionals seeking to master the core of modern Artificial Intelligence, from foundational LLM concepts to advanced agentic application development. This hands-on, job-ready bootcamp blends theory and practice, empowering learners to build, fine-tune, and deploy intelligent AI systems for real-world business use. Through expert-led sessions, interactive labs, and a capstone project, students will gain in-depth exposure to Large Language Models (LLMs), prompt engineering, fine-tuning techniques, LangChain frameworks, and AI app deployment. The course combines practical coding experience with strategic AI thinking, preparing participants for roles such as AI Engineer, Generative AI Developer, and Agentic System Specialist.

Course Insights

- 20 Live Instructor-Led Classes (2 hours each)
- Hands-on Labs + Weekly Assignments
- Final Capstone Project for portfolio development
- Industry-aligned Skills for real-world AI implementation
- Career Guidance + Resume Optimization Support

AI Tools You'll Master in This Course

⚙️ Tool	🧠 Function
ChatGPT Claude Gemini	Text generation, reasoning, creativity
LangChain	Agentic workflow & chain design
🤗 Hugging Face	Pre-trained models, fine-tuning, transformers
Scikit Learn	Core ML algorithms
K Keras Or PyTorch	Deep learning frameworks
gradio Or Flask	Rapid app prototyping
FAISS Or Chroma DB Or Weaviate	Vector databases & retrieval
OPENAI WHISPER Or bark Or TTS	Speech-to-Text & audio interaction
docker Or GitHub	Deployment & collaboration
Promptfoo Or ragas Or EvalLM	Prompt evaluation frameworks

Chapter 1
Generative AI & Prompt Engineering

(Module 1–6)

Goal: Learn how LLMs work and how to communicate with them effectively.

Module 1: Introduction to Generative AI & LLMs

• What is Generative AI?

• Key models: GPT-4, Claude, Mistral, LLaMA, Gemini

• How LLMs are trained (tokens, embeddings, attention)

• Prompt vs Completion vs Chat-based interaction

• AI industry and job landscape

Lab: Use ChatGPT & Claude to answer tasks from different industries

Assignment: Compare model responses for a creative writing and business task

Module 2: Prompt Engineering Fundamentals

• Prompt anatomy: Role + Context + Instructions

• Common prompt patterns (ReAct, CoT, Summarization, QA)

• Prompting for reasoning vs creativity vs coding

Lab: Craft prompts for customer service, code generation, tutoring

Assignment: Redesign bad prompts into effective ones

Module 3: Prompt Optimization Strategies

• Zero-shot, One-shot, Few-shot learning

• Chain-of-Thought (CoT) prompting

• Self-refinement & recursive prompting

Lab: Implement CoT for solving math and logical puzzles

Assignment: Compare performance of zero-, few-, and CoT prompts on the same task

Module 4: Prompt Evaluation & Testing

• Prompt testing frameworks

• Accuracy, coherence, bias, hallucination

• Open-source prompt evaluation tools (Promptfoo, Ragas, EvalLM)

Lab: Evaluate model responses with metrics

Assignment: Run A/B test between two prompt structures using Promptfoo

Module 5: Ethical Use of Generative AI

• Bias, toxicity, misinformation

• Copyright & IP issues

• Red-teaming LLMs

• OpenAI, Anthropic, Hugging Face safety protocols

Lab: Identify problematic outputs & suggest mitigations

Assignment: Write a 1-pager on "Ethics Guidelines for Using AI at Work"

Module 6: Applied GenAI Workshop

• Comparative LLM prompt testing: ChatGPT, Claude, Mistral

• Prompt chaining with APIs

• Exploring personas and role-based prompts

Lab: Build an intelligent assistant prompt with multiple tools

Assignment: Create a portfolio prompt pack for 3 industries (Marketing, Finance, Healthcare)

Chapter 2

Machine Learning & Deep Learning Foundations for GenAI

(Module 7–12)

Goal: Understand and use the ML/DL techniques that power LLMs.

Module 7: Supervised & Unsupervised Learning Overview

• **Regression, classification, clustering basics**

• **Datasets: tabular, text, images**

• **Scikit-Learn introduction**

Lab: Train a basic classifier in Scikit-Learn (Titanic dataset)

Assignment: Choose a dataset and apply classification or clustering

Module 8: Neural Networks & Backpropagation

• **Perceptrons, activation functions**

• **Feedforward networks, loss, gradient descent**

• **Backpropagation mechanics**

Lab: Build a simple neural network from scratch using NumPy

Assignment: Visualize forward/backward pass on a 2-layer NN

Module 9: Deep Learning with Keras & PyTorch

• **Why use Keras or PyTorch?**

• **Building, training, and evaluating models**

• **GPU acceleration & reproducibility**

Lab: Image classifier with Keras (MNIST or CIFAR-10)

Assignment: Translate a Keras model into PyTorch

Module 10: Transformers Explained (BERT, GPT, T5)

• Transformer architecture: self-attention, positional encoding

• Encoder vs Decoder vs Encoder-Decoder

• Tokenization and embeddings

Lab: Visualize transformer attention (using BertViz or Hugging Face tools)

Assignment: Compare transformer vs RNN on an NLP task

Module 11: LLM Training Concepts & Architectures

• Pretraining, fine-tuning, RLHF

• Open pre-trained LLMs: GPT-2, Mistral, LLaMA, Falcon

• Model scaling and inference

Lab: Use Hugging Face to run an LLM locally

Assignment: Write a blog-style explainer on "How LLMs Are Trained"

Module 12: Fine-Tuning & LoRA/QLoRA/PEFT

• Fine-tuning vs prompt-tuning

• LoRA, QLoRA, and PEFT basics

• Tools: PEFT library, Hugging Face Trainer

Lab: Fine-tune a small model on custom text using QLoRA

Assignment: Fine-tune a model to act like a support bot

Chapter 3

Generative AI Application Development

(Module 13–18)

Goal: Build and deploy full-stack GenAI applications

Module 13: Python for AI App Development

• APIs, Flask basics, JSON, and error handling

• Gradio for rapid prototyping

• Connecting models to UIs

Lab: Build a ChatGPT API wrapper + Flask app

Assignment: Add a Gradio interface to your Flask app

Module 14: LangChain & RAG Basics

• What is LangChain?

• Chains, tools, and memory

• RAG architecture: retrieve → ground → generate

Lab: Create a simple RAG chatbot using LangChain + FAISS

Assignment: Turn your RAG bot into a study assistant

Module 15: Working with Hugging Face Transformers

• Loading, modifying, and using models

• Pipelines: text generation, summarization, translation

Lab: Build a text summarizer using Hugging Face pipeline

Assignment: Explore and document 3 interesting Hugging Face models

Module 16: Speech-to-Text & Voice Interfaces

• Whisper, Bark, TTS, Mozilla TTS

• Integrating voice with LLMs

• Audio-to-text pipelines

Lab: Voice-controlled chatbot using Whisper + ChatGPT

Assignment: Design a voice-based app idea

Module 17: Vector Databases & Retrieval Mechanisms

• Embeddings: sentence-transformers, OpenAI

• FAISS, ChromaDB, Weaviate basics

• Chunking and similarity search

Lab: Build a personal knowledge chatbot using Vector DB + LangChain

Assignment: Document your chunking logic and retrieval flow

Module 18: Full-Stack LLM App Build

• Frontend + Backend integration (Gradio/Flask + LangChain)

• Session memory and data storage

• Dockerization introduction

Lab: Finalize your capstone app skeleton

Assignment: Upload your working MVP to GitHub with README

Chapter 4
Capstone Project & Demo

(Module 19–20)

Goal: Apply everything you've learned to build a job-ready portfolio project.

Module 19: Capstone Development & Feedback

• Project templates: AI Tutor, JobBot, Health Advisor, Resume Analyzer

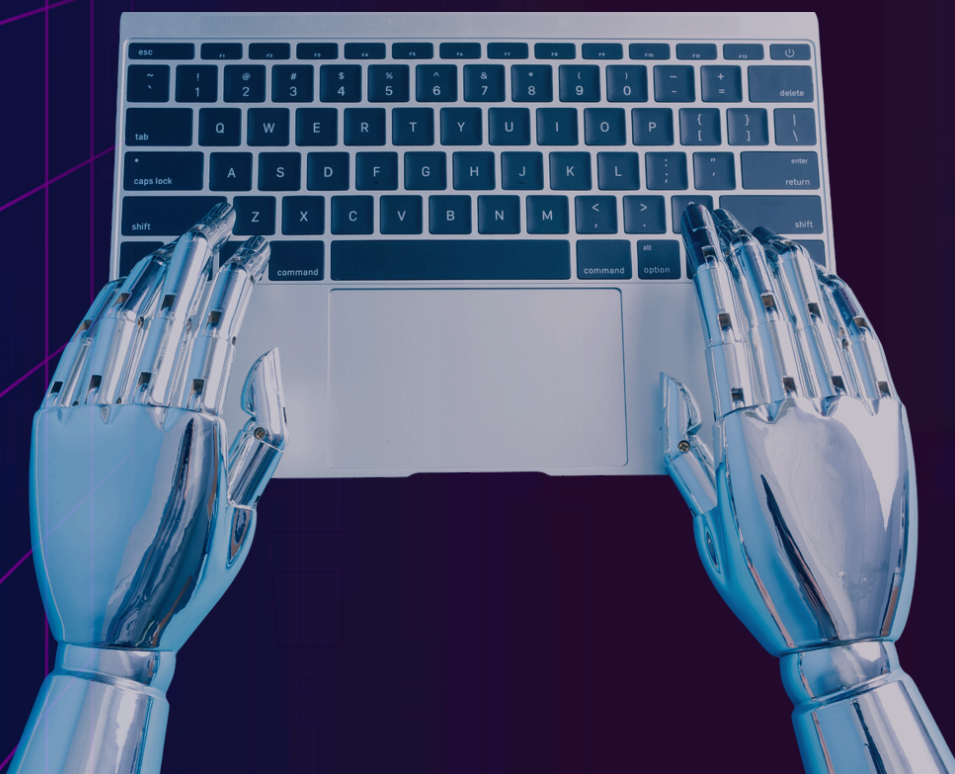• Group feedback, debugging, and improvement

Lab: 1:1 mentoring, testing, and polish

Assignment: Finalize repo with README and deployment link

Module 20: Capstone Showcase & Career Workshop

• Demo Day: Present your AI application

• GitHub optimization & LinkedIn portfolio

• Resume review & interview preparation

Final Presentation: Certificate & career roadmap delivery

Who Are We?

Transfotech Academy is a leading IT training institute with over **12 years** of experience in preparing students for successful careers in the tech industry. As an **E-Verified** organization recognized by USCIS, we specialize in job-ready, industry-aligned training programs supported by lifetime career guidance. Founded by Sheikh Galib Rahman, Transfotech Academy operates as a core entity of **Shera International Group**, a U.S.-based education and technology organization.

Over the years, **we have trained more than 3,000 students, with over 60% successfully placed into competitive job roles across the United States and beyond.** Our programs are designed to meet both current market demands and future workforce needs, equipping students with hands-on experience, real-world projects, and mentorship from certified professionals. We are also affiliated with several accredited universities in the United States, expanding academic and career pathways for our learners.

With physical **offices located in New York and Los Angeles**, Transfotech Academy stands as a trusted bridge between education and employment—providing a robust foundation for students to thrive in today's rapidly evolving tech landscape.
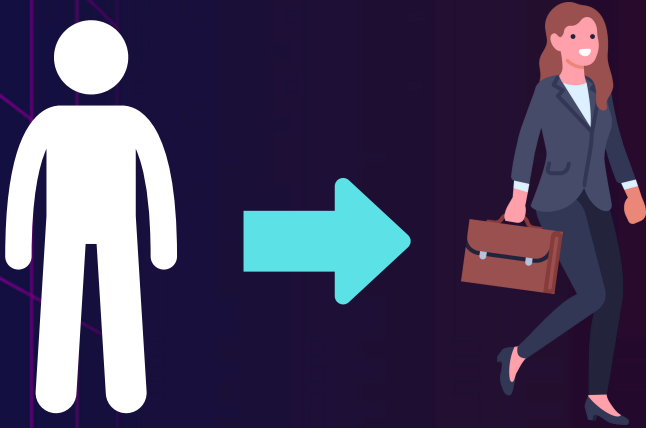
Sheikh Galib Rahman
Founder & CEO

Fuad Bin Saif
AI Expert & Data Analyst

Why Choose Transfotech?

AI isn't just the future, it's transforming how we work right now. From automation to intelligent decision-making, AI is redefining industries across the globe. Our AI Engineering: Agentic & Generative AI course is built to help you design, build, and deploy intelligent systems using next-generation AI frameworks. Learn to harness Agentic AI for autonomous problem-solving and Generative AI for creative innovation—no advanced coding required. At Transfotech Academy, we've empowered professionals to lead the AI revolution. Now it's your turn to shape the future.
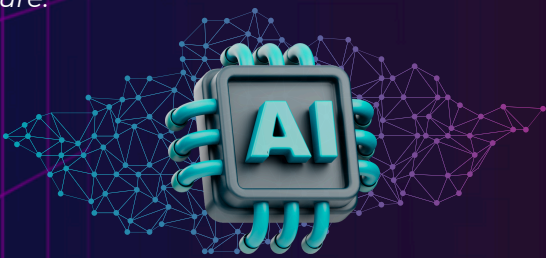
This isn't just a course, it's your gateway to the future of intelligent work!
Our AI Engineering: Agentic & Generative AI program gives you hands-on experience with cutting-edge tools that build, automate, and create.
From developing autonomous systems to generating creative solutions, you'll gain real-world skills that redefine productivity.
Start learning now, lead with Agentic AI and Generative AI, and engineer the smarter, faster future you deserve.

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