ALCHERINGA
IIT Guwahati

Indian Institute of Technology, Guwahati
भारतीय प्रौद्योगिकी संस्थान (IIT) गुवाहाटी

Bsates
India's Fastest growing
EdTech Company

GENERATIVE AI

1 Week in Campus Residential Program

COURSE CURRICULUM

Introduction

This prgram has been designed to provide a holistic learning experience. The curriculum balances theoretical knowledge and hands-on practice, ensuring participants gain both foundational understanding and practical expertise. Interactive sessions, real- world use cases, and collaborative hackathons help embed key concepts effectively. The structured flow, from basic concepts to advanced applications, caters to diverse learning paces while promoting teamwork and problem-solving. This methodology ensures a robust, engaging, and outcome-driven learning journey for all participants.

Duration

1 Week - Residential Program

19th – 25th Jan 2026

Venue

Indian Institute of Technology Guwahati

For any queries:
Whatsapp: 9211287397

1 Week Residential Program at IIT Guwahati Campus

Day 1 — Foundations of Generative AI

Topics

1. **Introduction to AI, ML & Deep Learning**
   - Evolution of Generative AI
   - Understanding Generative Models
   - Generative vs Discriminative
   - Latent space, embeddings, representations

2. O**verview of Modern Models**
   - GANs
   - VAEs
   - Diffusion Models
   - LLMs

Hands-on
- Setting up Python + PyTorch/TF environment
- Simple text & image generation demos using pre-trained models

Day 2 — Large Language Models (LLMs)

Topics

- Transformer Architecture (Attention, Multi-head Attention, Decoders/Encoders)
- How LLMs work internally
- Prompt Engineering Basics
- Tokenization & model inference pipelines
- Open-source LLMs (LLama 3, Mistral, GPT models, Phi models)

Hands-on
- Running LLMs locally
- Basic prompt engineering tasks
- Creating a Q&A chatbot using HuggingFace models

Day 3 — Fine-Tuning & Customization of LLMs

Topics

- Why & When to Fine-tune
- Fine-tuning Techniques:
- Full fine-tuning
- LoRA / QLoRA
- PEFT (Parameter Efficient Fine Tuning)
- Retrieval Augmented Generation (RAG)
- Vector Stores (FAISS, Chroma)
- Embeddings
- Knowledge-base Integration

Hands-on
- Fine-tuning an LLM for a custom domain dataset
- Building a RAG-based assistant

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Day 4 — Image, Video & Multimodal Generative AI

Topics

- Diffusion Models (Stable Diffusion, SDXL)
- Text-to-Image, Image-to-Image
- Generative Video Models (Sora, Pika)
- Audio & Speech Generation
- Multimodal Models
- CLIP
- LLaVA
- GPT-4o style models

Hands-on

- Generate images using Stable Diffusion
- Build a multimodal captioning model
- Simple audio generation demo

Day 5 — Applications, Deployment & MLOps for GenAI

Topics

- Real-world Applications
- EdTech, Healthcare, FinTech, Robotics, Marketing
- AI Agents & Workflow Automation
- Model Optimization
- Quantization
- Distillation
- Deployment Techniques
- API deployment
- Dockerization
- FastAPI/Streamlit integration
- Ethics, Safety, Bias, Evaluation Metrics

Hands-on

- Deploy a GenAI app on a local/Cloud server
- Create an interactive GenAI-based web application

Day 6 — Capstone Project + Industry Sessions + Evaluation

Activities
Capstone Project (Group Activity):
Choose one:

- Custom Chatbot for Institution/Business
- Image Generation Application
- RAG-based Document Assistant
- AI Agent for Workflow Automation
- Multimodal App (image + text)

Industry Expert Lecture / IIT Guwahati Faculty Session

- Project Presentation & Evaluation
- Feedback & Certification Ceremony

Deliverables / Takeaways

- Certificate of Completion (Joint certificate of Alchringa IIT Guwahati & Bsates)
- Source Code for all labs
- Deployed GenAI applications
- Project Portfolio for career use

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