Generative AI
Level : Basic to Intermediate

Prerequisite: Basic Knowledge in Python

Introduction to Gen AI
Python Introduction
Advanced Data structures - Pandas and Numpy
List Comprehension
Lambda functions
Iteration

Lab Practice: Python programs for above topics

NLP
Introduction to Natural Language Processing
NLP concepts- Tokenization, Stemming and Lemmatization, NER, Sentiment Analysis, Word Embedding,Bag of Words, Vector Embedding

Introduction to AI
Introduction to Machine Learning
Machine Learning Algorithms,
Supervised Learning, Unsupervised Learning, Deep Learning and Reinforcement Algorithm.
Industry Use cases of Machine Learning
Regression Algorithms
Predictions, errors, accuracy
Gradient Descent & Convergence of Learning Algorithm
Learning Function, Learning Rate, Accuracy

Lab Practice: Text Summarization
Demo: Running Machine Learning Algorithm in Python Scikitlearn
Linear Regression

Deep Learning
Introduction to Deep Learning
Deep Learning Introduction, Tensorflow& Keras Basics, Artificial Neural Networks(ANN) Basics, Back Propagation, Weights & Biases, Loss Functions & Optimizers in Feedforward Neural Networks
Introduction to Convolutional Neural Networks

Introduction to Recurrent Neural Network

Lab Practise: Image Classification

Introduction to Generative AI

Introduction to Transformers
Why Generative AI
Generative AI: The future of development
Introduction to LLM, LLM Models
Prompting the LLM like a chatbot
Prompt Engineering a General Overview
Prompt Techniques
LLM Opensource Models
Industry practices , infrastructure and tools related to LLM stack
Open Source Base Models

- ChatGPT/GPT-3.5/4
- LlaMA
- Cohere
- Hugging face

Lab Practice: Working with different prompts

Langchain and RAG

Langchain Framework
Introduction
Fuctions, Tools and Agents with Langchain
Understanding Context Window, Character Splitter, Recusrive Character Splitter, Semantic Splitter
Retrieval Augmented Generation(RAG)
Augment your LLM with RAG
Sentence Window Retrieval
Vector Embedding
Vector Stores
RAG with Langchain

Lab Practice: Creating RAG system, Use your own data with LLM.

Langchain Agents, chatbots, retrievals, graph models

Other framework – Llama Index

Advanced RAG and LLM fine tuning

Advanced RAG –, query, indexing , nlp to database -- Multi document RAG
When to apply RAG and
RAG as agent tool
Chatbot

Lab Practice: Advanced RAG

LLM Fine Tuning

Need for FineTuning LLMs
Standard and Instructional fine tuning
Parameter Efficient Fine Tuning(PEFT)
Low Rank Adapters(LoRA)

Lab Practice: Fine tuning LLM model with PEFT and LoRA

Day 9: Generative AI Cloud Platforms

Introduction to AWS Bedrock
Amazon Bedrock Playgrounds
Base Foundation Model
Custom Models,
Training jobs, Model Evaluation

Lab Practice – Working with Amazon Bedrock