



**SkillSprintTech**  
From Basics To Breakthrough

# Generative AI Curriculum

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# Module Wise 54 hour Course Curriculum

## 1. Streamlit + Python Essentials

- Introduction to Python: variables, datatypes, control structures
- Functions, modules, error handling
- Numpy and Pandas basics for data manipulation
- Getting started with Streamlit
- Using widgets, layout, and components
- Creating interactive dashboards and LLM UI mockups

## 2. Machine Learning Foundations

- Understanding supervised and unsupervised learning
- Scikit-learn model building: Linear & Logistic Regression
- Train-test split, cross-validation
- Hyperparameter tuning and evaluation metrics
- Use case: spam detection / customer churn

## 3. Deep Learning with PyTorch

- Neural network basics: perceptron, multi layer networks
- Introduction to PyTorch tensors and autograd
- Building simple neural networks using nn.Module
- Training loop with loss functions and optimizers
- GPU acceleration and model evaluation

## 4. NLP Fundamentals

- Text: cleaning, stemming, lemmatization
- Vectorization using Bag of Words, TF-IDF, Word2Vec
- Sequence models: RNN, LSTM concepts
- NER, sentiment analysis hands-on
- Limitations of traditional NLP techniques

## 5. Transformers & Hugging Face

- Transformer architecture (self-attention, encoder-decoder)
- BERT, GPT-2 overview and use cases
- Using Hugging Face's transformers pipeline
- Downloading and using pre-trained models
- Hands-on: sentiment classifier, text summarizer

## 6. LangChain Essentials

- LangChain architecture: Chains, Agents, Memory
- Building LLM chains using prompts and tools
- Creating a conversational bot with LangChain
- Integration with OpenAI API
- LangChain toolkits: calculator, Python REPL

## 7. RAG with Hugging Face & LangChain

- Understanding RAG and how it enhances LLM's
- Vector databases: FAISS, Pinecone basics
- Document loading and chunking for retrieval
- Creating context-aware Q&A systems
- Build a private chatbot using LangChain + RAG

## 8. Deployment & Optimization

- Prompt engineering patterns and anti-patterns
- Using Streamlit Cloud and Hugging Face Spaces for deployment
- Monitoring LLM behavior and optimization techniques
- Caching, truncation, rate limits and usage metrics
- Addressing hallucinations, bias, and safety in LLMs

## 9. Capstone Project

- Plan and design a complete GenAI solution
- Possible projects: Resume screener, PDF-based chatbot, AI tutor
- Incorporate Streamlit + LangChain + RAG
- Model evaluation and improvement
- Presentation and deployment