

# Day-wise Training Plan – Generative AI for Finance Professionals

## Training Assumptions (As per the discussion on call)

- Student already knows Python basics.
  - Duration: 4 Hours per Day
  - Focus: Practical understanding + Finance/Compliance use cases
  - Goal: Build strong applied GenAI + ML foundation without unnecessary academic depth.
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## Training Flow

### PHASE 1 — Data + ML Foundation (Days 1–8)

Purpose: Build strong practical ML understanding before GenAI.

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### Day 1 — Python for Data Science Refresher

#### Topics

- Jupyter workflow
- Virtual environments
- Git basics
- NumPy refresher
- Pandas basics
- Reading CSV/Excel/API data
- Data cleaning basics

#### Practical

- Load dataset
- Perform:
  - Null handling
  - Duplicate removal
  - Basic summaries
  - Column transformations

#### Homework

- Clean and summarize another financial dataset.
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## **Day 2 — Pandas Advanced + EDA**

### **Topics**

- Groupby
- Merge and joins
- Pivot tables
- Feature understanding
- Visualization basics
- Correlation analysis

### **Tools**

- Pandas
  - Matplotlib
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## **Day 3 — Statistics + ML Intuition**

### **Topics**

- Correlation vs causation
- Regression intuition
- Classification intuition
- Bias-variance concept
- Overfitting vs underfitting
- Train/test split
- Cross validation
- Evaluation metrics

### **Practical**

- Simple regression model
- Binary classification example

### **Tools**

- scikit-learn
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## **Day 4 — Machine Learning Foundations**

## Topics

- Supervised learning
- Unsupervised learning
- Feature engineering
- Label encoding
- Scaling
- Pipelines
- Model evaluation
- Customer segmentation

## Models

- Logistic Regression
  - Random Forest
  - KMeans
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## Day 5 — NLP Foundations

### Topics

- Text preprocessing
- Tokenization
- Stop words
- TF-IDF
- Embeddings intuition
- Sentiment analysis

### Libraries

- NLTK
  - spaCy
  - scikit-learn
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## Day 6 — Introduction to Deep Learning

### Topics

- Neural network intuition
- Forward/backward propagation

- Activation functions
- Loss functions
- Optimizers
- GPU basics

### **Practical**

- Build first neural network
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## **Day 7 — Deep Learning Training Pipeline**

### **Topics**

- Tensors
- Dataset and DataLoader
- Training loops
- Validation loops
- Batch normalization
- Dropout
- Saving/loading models

### **Practical**

- Build reusable training pipeline
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## **Day 8 — AI Ethics + Finance AI Use Cases**

### **Topics**

- Hallucination
- Bias
- Data leakage
- Privacy
- Responsible AI
- AI risks in finance
- AML and compliance use cases
- Fraud detection use cases
- Forecasting use cases

### **Practical**

- Create AI risk checklist for finance organization
  - Create GenAI opportunity mapping
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## **PHASE 2 — Generative AI + Transformers (Days 9–16)**

Purpose: Move into modern GenAI systems.

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### **Day 9 — Attention Mechanism + Transformer Architecture**

#### **Topics**

- Self-attention
- Query, Key, Value
- Multi-head attention
- Positional encoding
- Encoder vs decoder
- Why transformers replaced RNNs

#### **Practical**

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### **Day 10 — Hugging Face + Transformer Models**

#### **Topics**

- Transformers ecosystem
- Tokenizers
- Embeddings
- BERT overview
- Text classification
- Summarization
- Named entity recognition

#### **Tools**

- Hugging Face Transformers
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### **Day 11 — LLM Fundamentals**

#### **Topics**

- How LLMs work

- Tokens and embeddings
- Context window
- Temperature
- Fine-tuning vs prompting
- RAG basics
- Prompt engineering basics

### **Practical**

- Build structured prompts for finance tasks
  - Compare prompt quality
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## **Day 12 — Prompt Engineering Advanced**

### **Topics**

- System prompts
- Few-shot prompting
- Structured outputs
- JSON outputs
- Prompt chaining
- Hallucination reduction
- Evaluation techniques

### **Practical**

- Financial analysis assistant prompts
  - Compliance review prompts
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## **Day 13 — AI Agents + RAG**

### **Topics**

- AI agents
- Tool calling
- Memory
- Retrieval systems
- Vector databases
- Embeddings search

- RAG architecture

### **Practical**

- Build small finance Q&A chatbot
  - Retrieval over PDFs/documents
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## **Day 14 — Evaluation and Validation**

### **Topics**

- Accuracy vs usefulness
- Hallucination testing
- Drift monitoring
- Benchmarking
- Human evaluation
- Documentation standards

### **Practical**

- Evaluate finance chatbot responses
  - Create evaluation scorecard
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## **Day 15 — Diffusion, GAN and VAE Concepts**

### **Topics**

- What are GANs
- What are VAEs
- What are diffusion models
- Real-world use cases
- Synthetic data generation
- Finance synthetic data applications

### **Important Note**

Focus only on intuition and business applications.  
Skip heavy mathematics.

### **Practical**

- Generate simple synthetic tabular data
- Compare synthetic vs real data

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## Day 16 — Time Series Forecasting with AI

### Topics

- Time series basics
- Sliding windows
- Forecasting workflow
- Transformer-style forecasting intuition
- Comparison with ARIMA/LSTM

### Practical

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## PHASE 3 — Advanced Finance AI Applications (Days 17–22)

Purpose: Build practical industry-grade understanding.

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## Day 17 — Financial NLP

### Topics

- Financial document analysis
- Earnings reports
- Risk extraction
- Topic modelling
- Sentiment analysis for markets

### Practical

- Extract risks from annual reports
  - Summarize finance documents
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## Day 18 — Multi-Agent AI Workflows

### Topics

- Agent orchestration
- Human-in-the-loop
- Audit trails
- Workflow design

- Failure handling
- Cost optimization

### **Practical**

- Build finance review workflow
  - Compliance approval flow
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## **Day 19 — Responsible AI + Governance**

### **Topics**

- Model governance
- Auditability
- Compliance considerations
- Security concerns
- AI documentation
- Responsible deployment

### **Practical**

- Draft AI governance memo
  - AI policy checklist
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## **Day 20 — End-to-End GenAI Project Architecture**

### **Topics**

- Designing production AI systems
- Data pipelines
- APIs
- Deployment overview
- Monitoring
- Cost optimization
- Cloud overview

### **Practical**

- Design architecture for finance AI assistant
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## **Day 21 — Capstone Project Development**

## **Activities**

- Problem statement
  - Dataset preparation
  - Model building
  - Evaluation
  - Documentation
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## **Day 22 — Project Presentation + Interview Readiness**

### **Topics**

- Project presentation
- Explaining AI systems to business users
- Model interpretation
- Resume/project guidance
- Industry discussion
- Future learning roadmap

### **Final Deliverables**

- Notebook
- Presentation
- Documentation
- Evaluation report

### **Final Recommendation**

This training flow is intentionally industry-oriented rather than research-oriented.

The focus should remain on:

- Practical understanding
- Finance applications
- Hands-on implementation
- AI governance and compliance
- Prompt engineering
- Building usable AI systems