100-Hour Data Analytics and Generative AI Syllabus

Month 1: Data Analytics (50 Hours)

Week 1 (10 Hours): Introduction to Data Analytics

- Understanding Data Types (Structured, Unstructured, Semi-Structured)
- Data Collection Methods and Data Sources
- Data Cleaning and Preparation (Pandas, NumPy)
- Exploratory Data Analysis (EDA)
- Data Visualization (Matplotlib, Seaborn)

Week 2 (10 Hours): Descriptive and Inferential Statistics

- Measures of Central Tendency (Mean, Median, Mode)
- Measures of Dispersion (Variance, Standard Deviation, IQR)
- Probability Distributions (Normal, Binomial, Poisson)
- Hypothesis Testing (T-tests, Chi-Square Tests, ANOVA)
- Correlation and Causation

Week 3 (10 Hours): Machine Learning for Data Analytics

- Supervised Learning (Regression, Classification)
- Unsupervised Learning (Clustering, Dimensionality Reduction)
- Model Evaluation (Precision, Recall, F1-Score, ROC-AUC)
- Feature Engineering and Selection

Week 4 (10 Hours): Real-World Data Analytics Applications

- Customer Segmentation, Sales Analysis, and Demand Forecasting
- Building Dashboards (Power BI, Tableau, or Streamlit)
- Data-Driven Decision Making

Task for Month 1:
Build an **E-commerce Sales Analysis Dashboard** with customer segmentation, sales trends, and data visualizations. Present insights and recommendations for business growth.

Month 2: Generative AI (50 Hours)

Week 5 (10 Hours): Deep Learning Fundamentals

- Introduction to Neural Networks
- Activation Functions (ReLU, Sigmoid, Softmax)

- Loss Functions and Optimization (MSE, Cross-Entropy Loss)
- Introduction to TensorFlow and PyTorch

Week 6 (10 Hours): Generative Models Basics

- Autoencoders and Variational Autoencoders (VAEs)
- Generative Adversarial Networks (GANs) Basics
- Image Generation and Data Augmentation

Week 7 (10 Hours): Natural Language Processing (NLP)

- Tokenization, Stemming, Lemmatization
- Word Embeddings (Word2Vec, GloVe, BERT)
- Large Language Models (ChatGPT, T5, BERT)
- Prompt Engineering for LLMs

Week 8 (10 Hours): Advanced Generative AI

- Fine-Tuning Pre-Trained Models
- Image and Multimodal Generation (DALL-E, CLIP)
- Building Real-World Generative AI Systems

Task for Month 2:
Build a **Chatbot for Customer Support** using pre-trained LLMs with domain-specific training, capable of responding to common queries.

Final Capstone Project (10 Hours)

AI-Powered Personal Assistant

- Combine data analytics and generative AI skills to build a personal assistant.
- Integrate features like voice recognition, personalized recommendations, and chatbot capabilities.
- Deploy as a web or mobile app.

Final Submission: Present the project, including a project report, code, and deployment demo.
