CoreDaoVip Global Curriculum for Python

1. Python and Data Science

Module 1: Python Foundations

- Introduction to Python
- Data types, variables, operators
- Control structures & functions
- Object-Oriented Programming (OOP)
- File handling & error management

Module 2: Data Handling & Visualization

- Numpy, Pandas: Data structures & preprocessing
- Matplotlib, Seaborn: Data visualization
- Exploratory Data Analysis (EDA)

Module 3: Statistics & Probability for Data Science

- Descriptive & Inferential statistics
- Hypothesis testing
- Probability distributions

Module 4: Machine Learning

- Supervised learning: Regression, Classification
- Unsupervised learning: Clustering, Dimensionality Reduction
- Model evaluation: Accuracy, Precision, Recall, F1-score

Module 5: Advanced Topics

- Time Series Forecasting
- Natural Language Processing (NLP) basics
- Introduction to Deep Learning (Neural Networks with TensorFlow/Keras)

Capstone Project

- End-to-end data science project with real-world dataset

2. Python with Gen AI (Generative AI)

Module 1: Python Refresher

- Python for AI: Numpy, Pandas, Scikit-learn
- TensorFlow / PyTorch basics

Module 2: Deep Learning Foundations

- Neural Networks & Backpropagation
- CNNs (Convolutional Neural Networks)
- RNNs (Recurrent Neural Networks)

Module 3: Generative AI Models

- Variational Autoencoders (VAE)
- Generative Adversarial Networks (GANs)
- Transformer architecture

Module 4: Large Language Models (LLMs)

- Hugging Face Transformers
- Fine-tuning GPT, BERT, LLaMA models
- Prompt engineering & embeddings

Module 5: Gen AI Applications

- Text generation & summarization
- Image generation (Diffusion models, Stable Diffusion)
- Chatbots & conversational AI
- Ethics, Bias, and Responsible AI

Capstone Project

- Build a domain-specific GenAI solution (e.g., chatbot, content generator, or AI artist)

3. Python with Blockchain and AI

Module 1: Python & Blockchain Basics

- Blockchain fundamentals (decentralization, consensus)
- Smart contracts with Solidity & Python (web3.py)
- Setting up private blockchain (Ganache, Truffle, Hardhat)

Module 2: Python for Cryptography

- Hashing (SHA, MD5)
- Digital signatures
- AES / RSA encryption with Python

Module 3: AI in Blockchain

- Fraud detection using ML models
- Consensus optimization with AI (PSO, ACO)
- Predictive analytics on blockchain transactions

Module 4: Blockchain + AI Use Cases

- DeFi risk analysis
- NFT value prediction
- Supply chain optimization with AI-enabled blockchain
- Federated Learning with Blockchain

Module 5: Advanced Topics

- DAO & Smart Governance
- Blockchain security with AI-driven anomaly detection
- Hybrid cloud & blockchain integration

Capstone Project

- End-to-end project (e.g., AI-powered fraud detection system on blockchain ledger)