8 weeks Data Science and AI curriculum

Week 1: Introduction to Python Basics

- Introduction to Python and its relevance in data science
- Setting up the Python environment (Anaconda, Jupyter Notebooks)
- Python syntax, variables, and data types
- Basic operations and expressions
- Understanding conditional statements and loops
- Writing and defining functions
- Importing and using modules
- Basic hands-on exercises to reinforce concepts

Week 2: Python Basics Continued

- Lists, tuples, dictionaries, and sets
- Operations on different data structures
- Manipulating and querying data structures
- Reading and writing files in Python

Week 3: Data Analysis and statistical analysis with Python

- Data Cleaning and EDA
- Handling missing data
- Data wrangling with Pandas
- Basic data cleaning exercises
- Exploratory Data Analysis
- Descriptive statistics and data visualization
- Feature engineering
- Introduction to statistical tests using SciPy
- Hypothesis testing and p-values
- Applying statistical concepts to data

Week 4: Introduction to Database Management System

- Mongo DB
- My Sql
- Apache Cassandra Database

Week 5: Machine Learning Fundamentals with Scikit-Learn

- Overview of machine learning types (supervised, unsupervised)
- Introduction to Scikit-Learn
- Choosing the right model for a task
- Splitting data into training and testing sets
- Training and evaluating machine learning models
- Importance of feature engineering
- Hyperparameter tuning for better model performance
- Model evaluation strategies

Week 6: Introduction to Neural Networks and Deep Learning

- Understanding neurons and layers
- Activation functions
- Loss Functions
- Optimizers
- Introduction to TensorFlow and Keras
- Creating a basic neural network using Keras
- Training and evaluating the neural network
- Basics of image data and convolutional layers
- Building and training a Convolutional Neural Network (CNN)
- Applications of CNNs in computer vision
- Understanding sequence data and Recurrent Neural Networks (RNNs)
- Recap of key concepts from the entire curriculum

Week 7: Natural Language Processing (NLP) and Text Mining

- Basics of NLP.
- Text preprocessing
- Sentiment analysis.
- Generative Ai and LLM
- Google Gemini
- Open AI
- Langchain

Week 8: MLOPs techniques

- Github Action CI/CD pipelines
- Circle CI
- Kubeflow
- MLflow
- Deployment Techniques In AWS, AZURE, GCP, Dockers And Kubernetes
- Evidently AI
- Grafana(Monitoring)
- AirFlow
- BentoML
- AWS Sagemaker
- DVC
- Dockers