

# **FULL STACK AI CURRICULUM**

## **Batch-4**

### **JMM Technologies**

#### **Module 1: Python Fundamentals**

- Introduction to Python programming language
- Variables, Data Types, and Operators
- Control Flow: Conditionals and Loops
- Functions, Lambdas, and Scope

#### **Module 2: Fundamentals of Data Science**

- Introduction to Data Science and its applications
- The Data Science Workflow
- Exploratory Data Analysis (EDA) with Excel, Python and Pandas
- Data Visualization with Matplotlib, Seaborn, Plotly, PowerBI,
- Probability and Statistics for Data Science

#### **Module 3: Machine Learning**

- Introduction to Machine Learning and its applications
- Supervised Learning: Linear Regression, Logistic Regression, Decision Trees, Random Forests, K-Nearest Neighbors, Support Vector Machines
- Unsupervised Learning: Clustering, K-Means, PCA, Dimensionality Reduction
- Model Evaluation, Cross-Validation, Bias-Variance Tradeoff, Overfitting and Underfitting
- Hyperparameter Tuning, Grid Search, Random Search, and Bayesian Optimization

#### **Module 4: Deep Learning**

- Introduction to Deep Learning and its applications
- Neural Networks, Layers, and Activation Functions
- Convolutional Neural Networks (CNNs) for Image Classification
- Recurrent Neural Networks (RNNs) for Sequence Modeling
- Transfer Learning, Fine-Tuning, and Model Interpretability
- Basics of NLP and Computer Vision.

## Module 5: Databases and SQL

- Introduction to Databases, SQL and its applications
- Relational Databases, Tables, Rows, and Columns
- SQL Syntax: SELECT, FROM, WHERE, GROUP BY, HAVING, ORDER BY
- Joins, Subqueries, and Aggregations
- Creating and Modifying Databases, Tables, and Indexes
- MySQL, PostgreSQL

## Module 6: Web Development and Cloud Intro

- Introduction to Web Development and its Applications.
- Backend Development with Django, Dash, Flask
- RESTful APIs, CRUD Operations, and Authentication
- Machine learning models integration in a web app.
- Cloud Computing and its applications
- AWS, GCP, Azure.
- Integration of APIs
- Docker Intro

## Module 7: Generative AI

- Introduction to Generative AI.
- Prompt Engineering basics and practices.
- Building AI applications using prompt Engineering (GPT, LLAMA, Claude)
- RAG
- GPT-Finetuning (My session)

## Module 8: Software Engineering

- Git/Git-Hub
- Best Code practices
- Best Practices to hide API-Keys

## Module 9: Capstone Project

- Integrating and applying all the concepts learned in the program
- Building a Full-Stack Data Science application end-to-end
- Deploying the application to a cloud service provider
- Showcasing the application in a live demo and presentation
- Submitting the project report and code for peer review and evaluation

**Sessions with Industry Experts**

- Front end developers
- Software engineers
- Cloud experts
- UI/UX designers
- Mobile Application Developer

**Mode of sessions:** Online

**Course Instructors:**

- Mr. Sikandar  
Hayat. Data  
Scientist
- Mr. Usman Yaqoob  
AI Engineer