**Python** **for data Science, Ai & Development**

**(K.M.IQBAL , Duration : 12weeks – 125 Hours, lessons - 15 )**

Here is a **Python** **for data Science, Ai & Development Practical Syllabus** for **AI and Data Science** organized as a clear and practical

**1. Python Programming**

1.1. Write a Python program to demonstrate variables and data types  
1.2. Use conditional statements (if, elif, else)  
1.3. Use loops (for, while) with examples  
1.4. Define and call functions  
1.5. Use lists, dictionaries, sets, and tuples

**2. Data Handling with NumPy and Pandas**

2.1. Create and manipulate NumPy arrays  
2.2. Perform vectorized operations using NumPy  
2.3. Load and explore data using Pandas DataFrames  
2.4. Handle missing values and duplicates  
2.5. Grouping, filtering, and sorting data

**3. Data Preprocessing and Cleaning**

3.1. Handle null values using fill, drop techniques  
3.2. Encode categorical variables (Label Encoding / One-hot Encoding)  
3.3. Normalize and standardize data  
3.4. Feature selection and extraction basics  
3.5. Split dataset into train-test sets

**4. Data Visualization**

4.1. Plot graphs using Matplotlib (line, bar, histogram)  
4.2. Use Seaborn for statistical plots (boxplot, pairplot, heatmap)  
4.3. Create correlation matrix and heatmaps  
4.4. Create pie charts and scatter plots  
4.5. Dashboard basics using Streamlit (optional for visual app)

**5. Introduction to Machine Learning**

5.1. Build a Linear Regression model (predict marks or price)  
5.2. Build a Logistic Regression model (predict diabetes or pass/fail)  
5.3. Apply K-Nearest Neighbors (KNN) classifier  
5.4. Build a Decision Tree and Random Forest model  
5.5. Evaluate models using accuracy, confusion matrix, precision, recall

**6. Basics of AI Applications**

6.1. Understand difference: AI vs ML vs DL  
6.2. Create a rule-based Chatbot using Python  
6.3. Perform Sentiment Analysis on text data (using TextBlob)  
6.4. Use OpenCV to detect faces in an image  
6.5. Use a pre-trained model (e.g., MobileNet or ResNet) to classify an image

**7. Mini Project**

* House Price Prediction (Regression)
* Student Performance Prediction
* Fake News Detection
* Movie Recommendation System
* Face Mask Detection using AI
* Weather Forecast using past data

**8. Soft Skills and Professional Development**

* Resume Building and Interview Preparation:
* Mock Interviews
* Behavioral Interview Tips

**Educational Background**

* **Bachelor’s Degree** in:
* BE / B.Tech (From any Branch)
* BBA / B.Com / BSc (in any Branch)
* **Master’s Degree**
* M.Tech / MBA / MCA / M.Sc. / M.Com (in any Branch)

**Tools & Libraries**

* **Programming:** Python (Jupyter Notebook, VS Code)
* **Libraries:** scikit-learn, pandas, seaborn, matplotlib,opencv
* **Data Sources:** Kaggle, GitHub