**2.Data Analyst Syllabus**

**(K.M.IQBAL, Duration : 14weeks – 150 Hours , lessons - 22 )**

Here’s a **general employability-focused Data Analyst syllabus** designed to help you acquire practical skills and knowledge needed for data analyst roles. This syllabus emphasizes hands-on learning, data handling, and analytical techniques that employers seek.

**Topics Covered:**

### **1. Introduction to Data Analysis**

* Difference between Data Analyst, Data Scientist, and Data Engineer
* Data Analysis Life Cycle:
  + Data Collection
  + Data Cleaning
  + Data Exploration
  + Data Visualization
  + Reporting and Communication

### **2. Data Manipulation and Processing**

#### **Programming Languages**

* **Python:**
  + Syntax and Data Types
  + Data Structures (Lists, Dictionaries, Tuples, Sets)
  + Functions and Lambda Expressions
* **R:**
  + Data Frames and Tidyverse
  + Data Cleaning and Manipulation

#### **Data Handling Libraries (Python)**

* **NumPy:** Numerical operations and arrays
* **Pandas:** Data manipulation and DataFrames
* **OpenPyXL:** Excel file handling

#### **Data Cleaning Techniques**

* Handling Missing Values
* Dealing with Duplicates
* Outlier Detection and Treatment
* Data Transformation and Encoding

### **3. Data Exploration and Analysis (EDA)**

* Descriptive Statistics:
  + Mean, Median, Mode
  + Variance and Standard Deviation
  + Skewness and Kurtosis
* Data Summarization:
  + Grouping and Aggregation
  + Pivot Tables and Cross-tabulations
* Correlation Analysis:
  + Pearson and Spearman Correlation
  + Heatmaps to visualize correlations

### **4. Data Visualization**

#### **Python Visualization Libraries**

* **Matplotlib:** Basic plotting (line, bar, pie, histogram)
* **Seaborn:** Advanced visualizations (heatmaps, violin plots, pair plots)
* **Plotly:** Interactive visualizations and dashboards

#### **Data Visualization Tools**

* **Tableau:** Interactive dashboards and storytelling
* **Power BI:** Business intelligence and reporting

#### **Best Practices**

* Choosing the right plot for data
* Creating insightful and visually appealing charts
* Storytelling with Data

### **5. SQL and Database Management**

* **SQL Basics:**
  + SELECT, INSERT, UPDATE, DELETE
  + Filtering and Sorting Data
  + Aggregate Functions (SUM, COUNT, AVG, MAX, MIN)
* **Advanced SQL:**
  + Joins (INNER, LEFT, RIGHT, FULL)
  + Subqueries and Nested Queries
  + Window Functions (ROW\_NUMBER, RANK)
  + CTEs (Common Table Expressions)
  + Data Transformation using SQL
* **Database Concepts:**
  + Normalization and Denormalization
  + Indexing and Query Optimization
  + Data Warehousing and Data Marts

### **6. Statistical Analysis**

* Probability Distributions:
  + Normal, Binomial, Poisson
* Hypothesis Testing:
  + Null and Alternative Hypotheses
  + t-tests, ANOVA
  + Chi-Square Test
  + p-values and Confidence Intervals
* **Regression Analysis:**
  + Linear Regression
  + Multiple Linear Regression
  + Correlation and Causation

### **7. Excel for Data Analysis**

* Excel Functions and Formulas:
  + VLOOKUP, HLOOKUP, INDEX-MATCH
  + Text Functions and Date Functions
* Pivot Tables and Pivot Charts
* Data Cleaning with Excel:
  + Remove Duplicates
  + Data Validation
  + Conditional Formatting
* **Advanced Excel Techniques:**
  + Macros and VBA for Automation
  + Power Query and Power Pivot

### **8. Business Intelligence and Reporting**

* Building Interactive Dashboards (Tableau, Power BI)
* Reporting Automation
* Data-Driven Decision Making
* Storytelling and Presentation Skills

### **9. Scripting and Automation**

* Automating Data Pipelines using Python
* Task Scheduling and Automation (Airflow, Cron Jobs)
* Data Extraction using Web Scraping (BeautifulSoup, Scrapy)

### **10. Data Analytics with Advanced Tools**

* **Google Analytics:** Web and marketing data analysis
* **MS Power Query:** Automating data transformation
* **Power BI Advanced Features:**
  + DAX (Data Analysis Expressions)
  + Custom Visualizations

### **11. Basic Machine Learning (for Data Analysts)**

* Simple Predictive Analytics:
  + Linear Regression for Forecasting
  + Clustering for Customer Segmentation
* Basic Classification Techniques:
  + Decision Trees
  + KNN (K-Nearest Neighbors)

**12. Choose something a project.**

* **Project 1:** Sales Data Analysis and Visualization (Excel, Power BI)
* **Project 2:** Customer Churn Analysis (Python, Pandas)
* **Project 3:** Social Media Sentiment Analysis (Python, NLP)
* **Project 4:** Financial Dashboard (Tableau or Power BI)
* **Project 5:** Web Scraping and Data Cleaning (Python, BeautifulSoup)

### **13. Communication and Presentation Skills**

* Preparing Reports and Presentations
* Effective Storytelling with Data
* Communicating Insights to Non-Technical Stakeholders

### **14. Soft Skills and Professional Development**

* Resume Building and Portfolio Creation
* Mock Interviews and Coding Challenges
* Tips for Data Analyst Job Interviews

### ****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)

**Data Analyst tools**

**Python / R / SQL / Power BI / Excel / Google Sheets / SAS** / **SPSS**

**Pandas / NumPy / Jupyter Notebook / Looker /** **Rapid Miner**