Anant Webtics Data Analytics Complete Syllabus

🧩 Module 1: Introduction to Data Analytics

Objective: Understand the basics of data analytics, its process, and use cases.

Topics:

- What is Data Analytics?
- Types of Data Analytics: Descriptive, Diagnostic, Predictive, Prescriptive
- Role of a Data Analyst
- Data Analytics Workflow: Data Collection → Cleaning → Analysis → Visualization → Reporting
- Applications of Data Analytics in different industries
- Overview of tools: Excel, Python, SQL, Power BI

🐍 Module 2: Python for Data Analytics

Objective: Learn Python programming for data handling, cleaning, and analysis.

2.1 Python Basics

- Installing Python & Jupyter Notebook
- Python IDEs: VS Code, Jupyter, Google Colab
- Variables, Data Types, Operators
- Conditional Statements (if, else, elif)
- Loops (for, while)

- Functions, Lambda Functions
- Lists, Tuples, Sets, Dictionaries
- String Manipulation
- File Handling (Reading/Writing CSV, JSON)

2.2 Python Libraries for Data Analytics

NumPy

- Introduction to NumPy Arrays
- Array Creation, Indexing, Slicing
- Mathematical & Statistical Operations
- Broadcasting

Pandas

- Introduction to Series and DataFrames
- Reading/Writing Data (CSV, Excel, SQL, JSON)
- Data Cleaning (handling missing values, duplicates)
- Data Transformation (merge, join, groupby, pivot)
- Descriptive Statistics with Pandas

Matplotlib & Seaborn

- Data Visualization Basics
- Line, Bar, Scatter, Pie Charts
- Histograms & Boxplots
- Customization (titles, labels, legends)

- Heatmaps & Pairplots using Seaborn

🗄️ Module 3: MySQL for Data Analytics

Objective: Understand how to query, manage, and manipulate databases.

3.1 SQL Basics

- Introduction to Databases & MySQL
- Installing and Using MySQL Workbench
- SQL Syntax, Datatypes, and Constraints
- CRUD Operations (Create, Read, Update, Delete)

3.2 SQL Intermediate

- Filtering with WHERE, LIKE, BETWEEN, IN
- Sorting and Limiting Data
- Aggregate Functions: COUNT(), SUM(), AVG(), MIN(), MAX()
- GROUP BY and HAVING Clauses
- Joins (INNER, LEFT, RIGHT, FULL)
- Subqueries and Nested Queries

3.3 SQL Advanced

- Views and Indexes
- Stored Procedures and Functions
- Triggers and Transactions

- Window Functions (RANK, ROW_NUMBER, LAG, LEAD)
- Case Statements and Conditional Logic
- Importing & Exporting Data from CSV

3.4 SQL + Python Integration

- Connecting Python with MySQL using `mysql-connector` or `SQLAlchemy`
- Running SQL Queries in Python
- Loading SQL Data into Pandas DataFrames

📊 Module 4: Data Cleaning and Preprocessing

Objective: Prepare raw data for analysis.

Topics:

- Handling Missing Data
- Removing Duplicates
- Outlier Detection & Treatment
- Data Type Conversions
- String Operations (split, replace, extract)
- Feature Engineering
- Scaling and Normalization
- Encoding Categorical Data

📈 Module 5: Exploratory Data Analysis (EDA)

Objective: Derive insights through statistical and visual analysis.

Topics:

- Understanding Distributions
- Correlation & Covariance
- Hypothesis Testing (t-test, chi-square)
- Trend and Pattern Identification
- Detecting Relationships between Variables
- Using Pandas, Matplotlib, and Seaborn for EDA
- Case Study: Real-world dataset (Sales, Finance, etc.)

📉 Module 6: Data Visualization with Power BI

Objective: Create interactive dashboards and reports.

6.1 Power BI Basics

- Introduction to Power BI Desktop
- Importing Data (Excel, CSV, SQL, Web, etc.)
- Data Transformation using Power Query
- Understanding Data Model and Relationships

6.2 Power BI Visualization

- Bar, Line, Pie, Donut, and Map Visuals

- Cards, Tables, and Matrix Visuals
- Slicers, Filters, and Drill-down Features
- Conditional Formatting
- Tooltips and Custom Visuals

6.3 DAX (Data Analysis Expressions)

- Calculated Columns and Measures
- DAX Functions: SUMX, COUNTX, AVERAGE, IF, CALCULATE
- Time Intelligence Functions
- KPI & Performance Metrics

6.4 Power BI Advanced

- Dashboard Design Best Practices
- Publishing Reports to Power BI Service
- Sharing & Collaboration
- Power BI Gateways and Scheduled Refresh
- Integration with Excel and Teams

🧠 Module 7: Statistics & Probability for Data Analytics

Objective: Understand the statistical foundation of data analytics.

Topics:

- Types of Data and Scales of Measurement

- Measures of Central Tendency (Mean, Median, Mode)
- Measures of Dispersion (Variance, Standard Deviation)
- Probability Basics
- Probability Distributions (Normal, Binomial, Poisson)
- Correlation & Regression
- Hypothesis Testing

🧮 Module 8: Data Analysis Projects

Objective: Apply all tools and techniques on real datasets.

Sample Projects:

1. **Sales Data Analysis** using Python & Power BI
2. **Customer Segmentation** using MySQL + Python
3. **E-commerce Performance Dashboard** in Power BI
4. **HR Analytics** – Employee Attrition Study
5. **Financial Data Analysis** – Profit/Loss Report

🧾 Module 9: Capstone Project + Resume Preparation

Objective: End-to-end analytics project with presentation.

Topics:

- Choose Domain Dataset (Retail, Healthcare, Finance, etc.)

- Data Cleaning, EDA, SQL Querying, Visualization in Power BI
- Storytelling with Data
- Report Writing and Presentation Skills
- Building Data Analytics Resume & Portfolio

🧠 Tools Covered

- **Programming:** Python (NumPy, Pandas, Matplotlib, Seaborn)
- **Database:** MySQL
- **Visualization:** Power BI
- **Supporting Tools:** Excel, Jupyter Notebook, GitHub