
TechSOL
We Build Professionals
DATA
ANALYTICS
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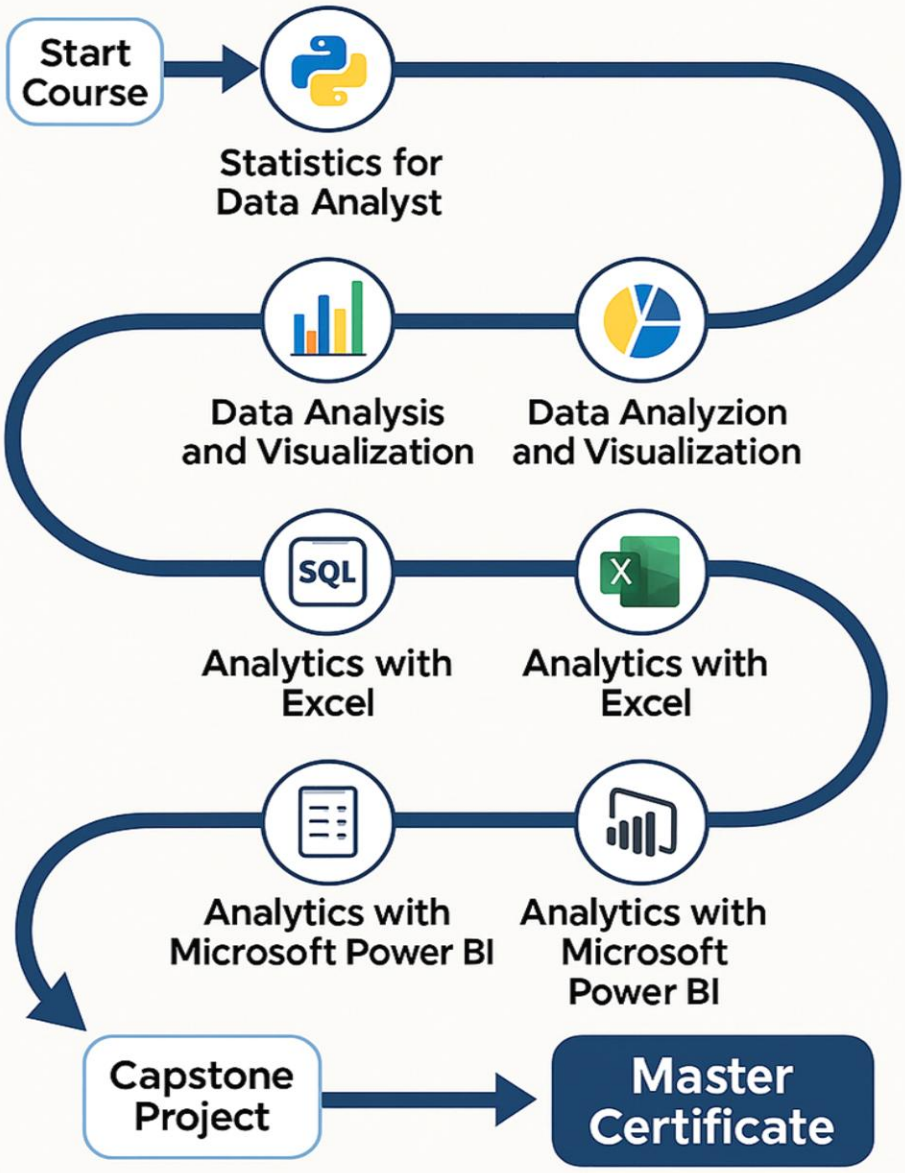
Modules of Data Analyst with PowerBI



➔ Module 1 - Fundamentals of Programming using Python

- Python Basics
  - Installation & Setup (Anaconda, Jupyter, VS Code)
  - Data Types: int, float, str, bool, complex
  - Variables and Typecasting
  - Input/Output operations
- Control Flow in Python
  - if, elif, else
  - for and while loops
  - break, continue, pass
- Data Structures
  - Lists, Tuples, Sets, Dictionaries
  - Indexing, slicing, nesting
  - List/Dict Comprehension
- Functions
  - Defining and calling functions
  - Default, keyword, variable-length arguments
  - Lambda functions
  - Scope (local, global, nonlocal)
- Object-Oriented Programming
  - Classes and Objects
  - Constructors, Inheritance, Polymorphism
  - Encapsulation, Abstraction
- File Handling
  - Read/Write files (txt, csv, json)
  - OS module operations
- Exception Handling
  - Try, Except, Finally, Else
  - Raising exceptions
- Numpy
  - Arrays, Vectorization
  - Indexing, slicing, reshaping
  - Broadcasting and math functions
- Pandas
  - DataFrames, Series
  - Filtering, Merging, Grouping
  - Handling missing values
- Matplotlib
  - Line, bar, pie, scatter, hist plots

    - Titles, labels, legends
- Seaborn
    - Categorical and distribution plots
    - Heatmaps, Pairplots

➔ Module 2 - Statistics for Data Analysis

- Introduction to Statistics
    - Population vs Sample
    - Data types (nominal, ordinal, interval, ratio)
- Central Tendency
    - Mean, Median, Mode
- Dispersion
    - Range, Variance, Standard Deviation
    - IQR, Boxplots
- Correlation & Covariance
    - Pearson, Spearman
    - Multicollinearity
- Visualization
    - Histogram, Boxplot, Scatter, Violin
- Probability
    - Basic concepts, Conditional, Bayes' Theorem
    - Permutations, Combinations
- Distributions
    - Normal, Binomial, Poisson
    - Skewness, Kurtosis
- Central Limit Theorem
- Confidence Intervals
- Hypothesis Testing
    - Null/Alternate Hypothesis, p-value
    - t-test, z-test, ANOVA, Chi-square

➔ Module 3 - Data Analysis using Python

- Data Collection
    - Reading CSV/Excel
    - APIs (requests/json)
    - Web Scraping (BeautifulSoup, Selenium)
- Data Cleaning
    - Handling missing/duplicate values
    - Type conversion, Outlier removal
- Exploratory Data Analysis (EDA)

  - Univariate & Bivariate analysis
  - Feature Engineering
- Data Storytelling
  - Choosing right charts
  - Presenting insights clearly
- Streamlit
  - Interactive dashboards
  - Uploads, filters, widgets
  - Deploying apps

➔ Module 4 - Data Analysis using SQL

- Database Fundamentals
  - RDBMS, Schema, ERD
- OLTP vs OLAP
- SQL Basics
  - DDL: CREATE, DROP, ALTER
  - DML: SELECT, INSERT, UPDATE, DELETE
- Filtering & Grouping
  - WHERE, ORDER BY, GROUP BY, HAVING
- Joins
  - INNER, LEFT, RIGHT, FULL
- Subqueries & Nested Queries
- Window Functions
  - RANK(), ROW_NUMBER(), LAG(), LEAD()
- Views, Triggers, Stored Procedures
- Query Optimization (Indexing, Explain Plan)
- Case Studies in SQL

➔ Module 5 - Power BI for Dashboarding

- Introduction & Setup
- Visualizations
  - Bar, Line, Pie, Matrix, Map, Custom
- Interactivity
  - Filters, Slicers, Bookmarks
- DAX
  - Measures, Calculated Columns
  - Aggregation, Time Intelligence
- Advanced DAX & Modeling
  - Star/Snowflake Schema
  - Relationships

- Power Query
  - Data transformation (M language)
  - Merging & appending
- Data Integration
  - Excel, SQL, APIs
- Power BI Service
  - Sharing, Workspaces
  - Scheduled Refresh
- Power BI AI Features
  - Q&A, Smart Narratives

➔ Module 6 - Excel for Data Analysis

- Excel Basics
  - Interface, Shortcuts
- Functions
  - IF, AND, OR, NOT
  - VLOOKUP, XLOOKUP, INDEX-MATCH
  - CONCAT, LEN, LEFT, RIGHT
- Data Structuring
  - Excel Tables
  - Named Ranges
- Pivot Tables & Charts
  - Advanced filtering and grouping
- Conditional Formatting
- Dashboard Design
  - Layout, KPI Cards
  - Charts, Slicers, Buttons
- Power Query in Excel
  - Data cleaning & transformation

➔ Module 7 - Advanced Excel + VBA & Macros

- **Understanding Concepts of Excel**
  - Basic Excel navigation and worksheet management
  - Creating structured Excel data sheets
  - Using Range Name, Format Painter
  - Wrap Text, Merge & Centre
- **Data Handling & Formatting**
  - Conditional Formatting
  - Sorting (Single & Multi-level)

  - Filtering and Advanced Filters
  - Sorting by icons, colour
  - Restoring data to original order
- **Charting and Visualization**
  - Creating different types of Charts
  - Column, Bar, Line, Pie, Combo
  - Pivot Charts
  - Slicers with Pivot Tables and Charts
- **Auditing and Formula Management**
  - Trace Precedents and Dependents
  - Setting Print Area
  - Printing row and column headers on each page
- **Data Validation and Analysis Tools**
  - Data Validation rules (List, Custom, Numbers)
  - Subtotals and Multi-level Subtotals
  - Grouping (Row-wise and Column-wise)
  - Consolidation across multiple worksheets
- **What-If Analysis Tools**
  - Goal Seek
  - Scenario Manager
  - Data Table (1D & 2D)
  - Advanced use of Data Tables
  - Solver Tool
- **Excel Functions (Basic to Advanced)**
  - Math & Trig: SUM, AVERAGE, MAX, MIN, ROUND
  - Text: CONCAT, LEFT, RIGHT, MID, LEN, TRIM
  - Lookup: LOOKUP, VLOOKUP, HLOOKUP, XLOOKUP
  - Reference: INDEX, MATCH, INDIRECT
  - Logical: IF, AND, OR, NOT
  - Date & Time: TODAY, NOW, DATEDIF, NETWORKDAYS
  - Database: DSUM, DCOUNT
  - Statistical: STDEV, VAR, CORREL
  - Financial: PMT, NPV, IRR, FV
  - Depreciation: DB, DDB, SLN
- **Excel for MIS & Dashboard Reporting**
  - MIS Report Generation
  - Dashboard Background and Elements
  - Creating Interactive Dashboards
  - Types of Reporting in India (Media, Business, Financial)
  - Industry-specific dashboards

- **Excel Security**
  - Workbook Protection
  - Worksheet Protection
  - Range-specific protection

➔ **VBA & Macros in Excel**

- **Introduction to Macros**
  - What is Macro?
  - Understanding Macro recording
  - Different components of a Macro
  - Creating and running simple macros
- **Working with VBA (Visual Basic for Applications)**
  - What is VBA and why use it?
  - Writing your first macro in VBA
  - Using the VBA Editor (Title, Module, UserForm)
- **Hands-On VBA Tasks**
  - Apply arithmetic operations using macros
  - Align text using macros
  - Change background colour of cells
  - Change border colour and style
  - Font colour customization
  - Use of cell referencing
  - Copy-paste operations using macros
- **Real-Life Macro Assignments**
  - Automating report generation
  - Cleaning and formatting raw data
  - Automating repetitive tasks in MIS