PROFESSIONAL DATA SCIENCE WITH AI PROGRAM | CAREER-FOCUSED CURRICULUM

Learning Roadmap

A visual path through the complete 11-module curriculum.

10 Months	11 Modules	Projects + Career Prep
Program Duration	Complete Curriculum	Applied Learning

01 Computer Fundamentals & Career Orientation Foundation	**02** Microsoft Excel (Basic to Advanced) Analytics Tooling
03 SQL (Beginner to Advanced) Databases & Querying	**04** Python for Data Analytics Programming & Analysis
05 Statistics Statistical Foundations	**06** Power BI Business Intelligence
07 Tableau (Optional) Data Visualization	**08** Real-World Projects Applied Practice
09 Data Science Machine Learning & AI	**10** Interview Preparation Career Readiness
11 Capstone Project End-to-End Delivery	

MODULE 01

Computer Fundamentals & Career Orientation 01

Foundation-level orientation to data analytics, essential computing concepts, software setup, and career readiness.

Topics Covered

- Introduction to Data Analytics
- Data, Information, and Business Intelligence
- Data Analyst vs Data Scientist vs Data Engineer
- Software Development Life Cycle (SDLC) and Data Life Cycle
- Types and Categories of Data
- Common Data File Formats (CSV, Excel, JSON, XML, Parquet)

Software to Install

- Microsoft Excel
- MySQL or PostgreSQL
- Python
- Visual Studio Code
- Power BI
- Git and GitHub

Assignment

- Install and verify all required software
- Create and configure a GitHub account
- Download and organize practice datasets from Kaggle

MODULE 02

Microsoft Excel (Basic to Advanced)

02

Comprehensive spreadsheet analysis, formula development, data preparation, pivot reporting, and dashboard-oriented Excel skills.

Part 1: Excel Basics

- Excel Interface
- Workbook and Worksheet Management
- Rows and Columns
- Data Entry
- Formatting
- Cell Referencing
- Relative Referencing
- Absolute Referencing
- Mixed Referencing
- Number Formats
- Fonts and Alignment
- Borders
- Fill Series
- Freeze Panes
- Hide and Unhide
- Page Layout and Printing

Practice dataset: Office Employee Dataset.

Part 2: Basic Formulas

- SUM
- AVERAGE
- COUNT
- COUNTA
- MIN
- MAX
- ROUND
- ROUNDUP
- ROUNDDOWN
- SUBTOTAL
- AGGREGATE

Part 3: Logical Functions

- IF
- Nested IF
- IFS
- AND
- OR
- NOT
- IF with AND
- IF with OR

Includes hands-on practice questions.

Part 4: Text Functions

- LEFT
- RIGHT
- MID
- LEN
- TRIM
- CONCAT
- CONCATENATE
- TEXTJOIN
- UPPER
- LOWER
- PROPER
- FIND
- SEARCH
- SUBSTITUTE
- REPLACE
- TEXT

Part 5: Date Functions

- TODAY
- NOW
- DATE
- DAY
- MONTH
- YEAR
- DATEDIF
- EDATE
- EOMONTH
- NETWORKDAYS
- WORKDAY
- WEEKDAY

Part 6: Lookup Functions

- VLOOKUP
- HLOOKUP
- XLOOKUP
- INDEX
- MATCH
- INDEX + MATCH
- Dynamic Lookup Techniques

Part 7: Conditional Functions

- SUMIF
- SUMIFS
- COUNTIF
- COUNTIFS
- AVERAGEIF
- AVERAGEIFS

Part 8: Data Analysis Tools

- Sorting
- Filtering
- Advanced Filter
- Remove Duplicates
- Text to Columns
- Flash Fill
- Data Validation
- Conditional Formatting

Part 9: Pivot Tables

- Pivot Tables
- Pivot Charts
- Slicers
- Timelines
- Dashboard Design

Part 10: Advanced Excel

- Dynamic Arrays
- FILTER
- SORT
- UNIQUE
- SEQUENCE
- Named Ranges
- Error Handling
- Power Query
- Basic VBA
- Macros

MODULE 03

SQL (Beginner to Advanced)

03

Structured database learning from relational fundamentals and query syntax through joins, window functions, optimization, and applied SQL projects.

Phase 1: Database Fundamentals

- Data vs. Information
- Database Management Systems (DBMS)
- Relational Database Management Systems (RDBMS)
- Introduction to SQL
- Database Architecture
- Keys
- Constraints
- Schema
- Normalization
- ACID Properties

Phase 2: SQL Basics

- CREATE
- ALTER
- DROP
- TRUNCATE
- INSERT
- UPDATE
- DELETE
- SELECT
- WHERE
- ORDER BY
- LIMIT
- DISTINCT
- LIKE
- IN
- BETWEEN
- NULL Handling
- CASE

Phase 3: Aggregate Functions

- COUNT
- SUM
- AVG
- MIN
- MAX
- GROUP BY
- HAVING

Phase 4: Joins

- INNER JOIN
- LEFT JOIN
- RIGHT JOIN
- FULL JOIN
- SELF JOIN
- CROSS JOIN

Phase 5: Intermediate SQL

- Subqueries
- Correlated Subqueries
- Common Table Expressions (CTE)
- Recursive CTE
- UNION
- UNION ALL
- INTERSECT
- EXCEPT

Phase 6: Window Functions

- ROW_NUMBER
- RANK
- DENSE_RANK
- NTILE
- LEAD
- LAG
- FIRST_VALUE
- LAST_VALUE

Phase 7: Advanced SQL

- Views
- Indexes
- Stored Procedures
- Functions
- Transactions
- Query Optimization
- Performance Tuning

SQL Projects

- HR Database
- Sales Analysis
- Customer Retention
- Banking Database
- Hospital Database

GOAL

QUERY

Build accurate business queries using joins, CTEs, aggregates and window functions.

VALIDATE

Check logic, edge cases and performance so results are reliable and repeatable.

EXPLAIN

Turn query outputs into clear reporting insights, decisions and recommended actions.

MODULE 04

Python for Data Analytics

04

Practical Python programming for data handling, analysis, visualization, and reusable analytical workflows.

Python Basics

- Variables
- Data Types
- Operators
- Strings
- Lists
- Tuples
- Dictionaries
- Sets

Control Flow

- IF Statements
- ELIF Statements
- ELSE Statements
- Loops
- Break
- Continue
- Pass

Functions

- User-Defined Functions
- Lambda Functions
- Map
- Filter
- Reduce

Object-Oriented Programming (OOP)

- Classes
- Objects
- Constructors
- Inheritance
- Polymorphism

File Handling

- Read Files
- Write Files
- CSV Files
- Excel Files
- JSON Files

Exception Handling

- Try
- Except
- Finally

NumPy

- Arrays
- Broadcasting
- Mathematical Operations

Pandas

- Series
- DataFrame
- Merge
- GroupBy
- Pivot
- Missing Values
- Data Cleaning

Matplotlib

- Line Chart
- Bar Chart
- Pie Chart
- Histogram
- Scatter Plot

Seaborn

- Heatmap
- Pairplot
- Boxplot
- Violin Plot

ANALYTICAL WORKFLOW

01 LOAD
Import trusted data sources.

02 CLEAN
Fix types, duplicates and missing values.

03 EXPLORE
Find patterns, outliers and key questions.

04 VISUALIZE
Choose charts that make findings easy to read.

05 EXPLAIN
Connect evidence to business meaning and action.

MODULE 05

Statistics

05

Statistical foundations required to interpret data, evaluate relationships, test assumptions, and support evidence-based business decisions.

Descriptive Statistics

- Mean
- Median
- Mode
- Variance
- Standard Deviation
- Percentiles
- Quartiles

Additional Topics

- Probability
- Sampling
- Inferential Statistics
- Hypothesis Testing
- Correlation
- Regression
- A/B Testing

WHAT THIS MODULE SUPPORTS

SUMMARIZE

Select the right measures of centre, spread, percentiles and probability to describe data accurately.

COMPARE

Evaluate groups and relationships using sampling, hypothesis tests, correlation, regression and A/B testing.

DECIDE & COMMUNICATE

Interpret uncertainty responsibly, distinguish evidence from assumption, and state business conclusions clearly.

Focus: sound assumptions, practical significance, clear evidence and decision-ready conclusions.

MODULE 06

Power BI

06

Business intelligence reporting, data modeling, DAX, interactive visualization, and secure dashboard publication.

Data Preparation

- Power BI Interface
- Data Import
- Power Query
- Data Cleaning

Modeling & DAX

- Data Modeling
- Relationships
- Star Schema
- DAX Basics
- Time Intelligence

Reporting & Publishing

- Visualizations
- KPI Dashboard
- Drill-through Analysis
- Bookmarks
- Publishing Reports
- Row-Level Security (RLS)

BUSINESS INTELLIGENCE OUTCOME

PREPARE & MODEL

Clean data in Power Query, define relationships and build a clear star-schema model.

MEASURE & ANALYZE

Create DAX measures, time intelligence and KPIs that answer business questions.

VISUALIZE & INTERACT

Design readable dashboards with drill-through, bookmarks and purposeful report navigation.

PUBLISH & SECURE

Publish reports, apply row-level security, and communicate insights with recommended actions.

MODULE 07

Tableau (Optional)

07

Optional visualization module covering dashboard creation, calculations, parameters, stories, and publishing workflows.

Topics

- Tableau Interface
- Charts
- Dashboards
- Stories
- Parameters
- Calculated Fields
- Level of Detail (LOD) Expressions
- Publishing

VISUAL STORYTELLING FOCUS

DESIGN

Choose charts, hierarchy and layouts that make comparisons and trends immediately understandable.

INTERACT

Use parameters, calculated fields and LOD expressions to let users explore the analysis.

PRESENT

Organize dashboards into clear stories and publish audience-ready views with a decision-focused narrative.

MODULE 08

Real-World Projects

08

Applied portfolio work designed to reinforce business analysis, dashboard development, insight generation, and presentation skills.

01	HR Analytics Dashboard	02	Sales Dashboard
03	Finance Dashboard	04	Customer Churn Analysis
05	Retail Dashboard	06	E-commerce Dashboard
07	Hospital Dashboard	08	Banking Dashboard
09	IPL Analysis	10	Netflix Dashboard

Portfolio Practice

Build sector-based dashboards across HR, sales, finance, retail, e-commerce, healthcare, banking, sports and media. Each project emphasizes KPI selection, dashboard design, insight generation and presentation.

MODULE 09

Data Science

09

Applied machine learning foundations spanning exploratory analysis, feature engineering, model building, evaluation, and deployment.

Topics

- Exploratory Data Analysis (EDA)
- Feature Engineering
- Machine Learning
- Linear Regression
- Logistic Regression
- Decision Tree
- Random Forest
- KNN
- SVM
- Naive Bayes
- K-Means Clustering
- Model Evaluation
- Hyperparameter Tuning
- Deep Learning Basics
- NLP Basics
- Time Series Analysis
- Model Deployment (Flask/FastAPI)

WHAT THIS MODULE SUPPORTS

BUILD

Engineer features and train models across regression, classification and clustering.

EVALUATE

Validate performance with the right metrics and tune hyperparameters for reliable results.

DEPLOY

Package trained models behind an API so they can be used in real applications.

MODULE 10

Interview Preparation

10

Structured preparation for technical interviews, business case discussions, portfolio presentation, resume development, and mock interview practice.

Technical Preparation

- Excel Interview Questions
- SQL Interview Questions
- Python Coding Questions
- Power BI Interview Questions
- Statistics Questions

Career Readiness

- Case Studies
- Resume Building
- Mock Interviews
- Portfolio Presentation Practice
- Explain Projects in Business Language

INTERVIEW GOAL

PROBLEM

State the business question, audience, data context and success metric.

METHOD

Explain tool choice, data preparation, analysis steps and why the approach fits.

RESULT

Quantify findings, KPIs, dashboard insights and the practical business impact.

REFLECTION

Discuss limitations, assumptions, trade-offs and the recommended next action.

Practice this structure in mock interviews and portfolio walkthroughs so answers stay clear, concise and business-focused.

MODULE 11

Capstone Project

11

A complete end-to-end analytical project integrating data preparation, SQL analysis, Python exploration, dashboard development, business insights, and professional documentation.

01 CAPSTONE STAGE **Data Collection**	02 CAPSTONE STAGE **Data Cleaning**
03 CAPSTONE STAGE **SQL Analysis**	04 CAPSTONE STAGE **Python Exploratory Data Analysis (EDA)**
05 CAPSTONE STAGE **Power BI Dashboard**	06 CAPSTONE STAGE **Business Insights**
07 CAPSTONE STAGE **Final Presentation**	08 CAPSTONE STAGE **GitHub Documentation**

PROGRAM OUTCOME

END-TO-END DELIVERY

Combine cleaning, SQL, Python EDA and Power BI in one complete analytical workflow.

DECISION-READY INSIGHTS

Turn findings into clear business conclusions, recommendations and a professional presentation.

PORTFOLIO-READY OUTPUTS

Finish with a polished dashboard, final presentation and organized GitHub documentation.

PROFESSIONAL PRACTICE

Show reproducible analysis, clean documentation and confident business communication.

This curriculum is suitable for a 10-month professional training program, progressing from fundamentals to industry-level projects and interview preparation.