Complete Data Science Course Details

Preface

In today's rapidly evolving technological landscape, data has emerged as one of the most valuable assets for businesses and organizations across the globe. The IT industry, in particular, has been revolutionized by the application of data science, enabling companies to unlock actionable insights, drive innovation, and enhance decision-making processes.

Data science empowers IT professionals to turn vast amounts of raw data into meaningful information, facilitating advancements in automation, artificial intelligence, cybersecurity, cloud computing, and beyond.

Course Objective

To equip learners with the fundamental and advanced skills required to analyze data, build predictive models, and derive actionable insights using Python, Excel, MySQL and PowerBI

Course Outline

A. Python for Data Science

Day 1: Python Fundamentals

- Introduction to Python
- Installing Python & Jupyter Notebook
- Variables and Data Types
- Input/Output Functions
- Type Casting
- Practice Programs

Day 2: Python Operators & Decision Making

- Arithmetic Operators

- Comparison Operators
- Logical Operators
- Membership & Identity Operators
- if, if-else, elif Statements
- Real-world Decision Making Programs

Day 3: Loops and Pattern Programs

- while Loop
- for Loop
- Nested Loops
- break, continue, pass
- Pattern Programs
- Interview Questions

Day 4: Strings

- Creating Strings
- Indexing & Slicing
- String Methods
- String Formatting
- f-Strings
- String Manipulation Programs

Day 5: Lists and Tuples

- List Creation and Operations
- List Methods
- Nested Lists
- Tuple Operations
- List Comprehensions
- Practical Exercises

Day 6: Dictionaries and Sets

- Dictionary Creation
- Dictionary Methods
- Nested Dictionaries
- Set Operations
- Real-world Examples

Day 7: Functions

- Defining Functions
- Arguments and Parameters
- Return Statements
- Lambda Functions
- Recursive Functions
- Scope of Variables

Day 8: Exception Handling & File Handling

- Try-Except Blocks
- Finally Block
- Reading Text Files
- Writing Files
- CSV File Handling
- Error Logging

Day 9: NumPy Basics

- Introduction to NumPy
- Arrays
- Array Operations
- Indexing & Slicing
- Mathematical Functions

- Practice Exercises

Day 10: Advanced NumPy

- Multi-dimensional Arrays
- Reshaping Arrays
- Aggregation Functions
- Statistical Functions
- Performance Comparison with Lists

Day 11: Pandas Fundamentals

- Series
- DataFrames
- Reading CSV & Excel Files
- Data Selection
- Filtering Data
- Basic Data Analysis

Day 12: Data Cleaning with Pandas

- Handling Missing Values
- Removing Duplicates
- Data Transformation
- Sorting and Grouping
- Merge and Join Operations

Day 13: Data Visualization

- Introduction to Matplotlib
- Line Charts
- Bar Charts
- Pie Charts

- Histograms
- Real-world Dashboard Examples

Day 14: Advanced Visualization

- Seaborn Basics
- Heatmaps
- Box Plots
- Scatter Plots
- Correlation Analysis
- Data Storytelling

Day 15: Statistics for Data Science

- Mean, Median, Mode
- Standard Deviation
- Variance
- Percentiles
- Correlation
- Business Use Cases

Day 16: Introduction to Machine Learning

- What is Machine Learning?
- Types of ML & ML Workflow
- Training & Testing Data with Scikit-Learn Introduction

Day 17: Regression Models

- Linear Regression
- Model Building
- Prediction
- Model Evaluation
- Real-world Project

Day 18: Classification Models

- Logistic Regression
- Decision Trees
- K-Nearest Neighbors (KNN)
- Accuracy Metrics
- Mini Project

Day 19: End-to-End Data Science Project

- Data Collection
- Data Cleaning
- Data Visualization
- Model Building
- Prediction
- Report Preparation

B. Advanced Excel

Day 1: Advanced Excel Foundations

- Review of Excel Interface
- Advanced Cell Referencing (Absolute, Relative, Mixed)
- Named Ranges
- Data Validation
- Conditional Formatting
- Custom Number Formats
- Freeze Panes & Split Windows
- Practical Exercises

Day 2: Advanced Formulas and Functions

- IF, Nested IF

- IFS Function
- AND, OR, NOT Functions
- SUMIF, SUMIFS
- COUNTIF, COUNTIFS
- AVERAGEIF, AVERAGEIFS
- XLOOKUP
- VLOOKUP & HLOOKUP
- INDEX and MATCH
- Real-time Business Scenarios

Day 3: Data Analysis and Reporting

- Sorting and Advanced Sorting
- Filtering and Advanced Filtering
- Remove Duplicates
- Text to Columns
- Flash Fill
- Consolidate Data
- Pivot Tables
- Pivot Charts
- Slicers and Timelines
- Dashboard Components

Day 4: Data Cleaning and Automation

- Text Functions (LEFT, RIGHT, MID, LEN)
- CONCAT, TEXTJOIN
- TRIM, CLEAN
- FIND and SEARCH

- DATE and TIME Functions
- Working with Large Datasets
- Introduction to Macros
- Recording Macros
- Assigning Macros to Buttons
- Automation Examples

Day 5: Dashboard Creation & Interview Preparation

- KPI Dashboard Design
- Interactive Charts
- Dynamic Drop-Down Lists
- Dynamic Charts
- Dashboard Formatting Best Practices
- Sales Dashboard Project
- HR Dashboard Project

C. MySQL – Course Details

Day 1: Introduction to Databases and MySQL

- What is a Database?
- RDBMS Concepts
- Installing MySQL Server and Workbench
- Creating Database
- Creating Tables
- Data Types in MySQL
- Constraints Overview
- Hands-on Lab

Day 2: SQL Fundamentals

- SELECT Statement
- WHERE Clause
- DISTINCT
- ORDER BY
- LIMIT
- Aliases
- Practice Queries

Day 3: Filtering Data

- Comparison Operators
- Logical Operators (AND, OR, NOT)
- BETWEEN
- IN Operator
- LIKE Operator
- Wildcards
- NULL Handling

Day 4: DML Commands

- INSERT Statement
- UPDATE Statement
- DELETE Statement
- TRUNCATE Statement
- Real-world Examples

Day 5: Constraints and Table Management

- PRIMARY KEY
- FOREIGN KEY
- UNIQUE

- NOT NULL
- CHECK Constraint
- DEFAULT Constraint
- ALTER TABLE
- DROP TABLE

Day 6: Single Row Functions

- String Functions
- Numeric Functions
- Date Functions
- Conversion Functions
- Practical Examples
- Interview Questions

Day 7: Aggregate Functions

- COUNT()
- SUM()
- AVG()
- MIN()
- MAX()
- Real-time Business Reports
- Practice Queries

Day 8: Grouping Data

- GROUP BY
- HAVING Clause
- Multiple Grouping Columns
- Business Reporting Queries
- Hands-on Exercises

Day 9: Joins - Part 1

- Introduction to Joins
- INNER JOIN
- LEFT JOIN
- RIGHT JOIN
- FULL JOIN Concept
- Practical Scenarios

Day 10: Joins - Part 2

- Self Join
- Cross Join
- Multiple Table Joins
- Complex Join Queries
- Performance Considerations

Day 11: Subqueries

- Single Row Subqueries
- Multiple Row Subqueries
- Correlated Subqueries
- Nested Queries
- Real-world Examples

Day 12: Views and Indexes

- Creating Views
- Updating Views
- Advantages of Views
- Creating Indexes
- Performance Optimization Basics

Day 13: Set Operators

- UNION
- UNION ALL
- INTERSECT Concept
- MINUS/EXCEPT Concept
- Data Comparison Queries

Day 14: Stored Procedures

- Introduction to Stored Procedures
- Creating Procedures
- Parameters in Procedures
- Calling Procedures
- Business Use Cases
- Practice Exercises

Day 15: Functions and Triggers

- User Defined Functions
- Creating Functions
- BEFORE Triggers
- AFTER Triggers
- Real-time Automation Examples

Day 16: Cursors and Exception Handling

- Introduction to Cursors
- Cursor Operations
- Exception Handling
- Error Management
- Practical Implementations

Day 17: Transactions and TCL Commands

- COMMIT
- ROLLBACK
- SAVEPOINT
- ACID Properties
- Transaction Management
- Banking Scenarios

Day 18: Advanced SQL Concepts

- Common Table Expressions (CTE)
- Recursive CTE
- Window Functions
- ROW_NUMBER()
- RANK()
- DENSE_RANK()
- LEAD() and LAG()

Day 19: Performance Tuning and Optimization

- Query Optimization
- Explain Plan
- Index Optimization
- Query Best Practices
- Performance Troubleshooting

D. POWERRBI - Course Details

Day 1: Introduction to Business Intelligence and Power BI

- What is Business Intelligence (BI)?
- Introduction to Power BI
- Installing Power BI Desktop
- Understanding Power BI Components
- Connecting to Data Sources
- Importing Excel, CSV, and Database Data
- Overview of Power BI Interface
- Hands-on Exercises

Day 2: Data Preparation and Transformation

- Introduction to Power Query Editor
- Data Cleaning Techniques
- Handling Missing Values
- Removing Duplicates
- Splitting and Merging Columns
- Changing Data Types
- Creating Custom Columns
- Data Transformation Exercises

Day 3: Data Modeling

- Understanding Data Models
- Relationships in Power BI
- One-to-One Relationships
- One-to-Many Relationships
- Many-to-Many Relationships
- Star Schema and Snowflake Schema

- Managing Relationships
- Data Modeling Best Practices

Day 4: DAX Fundamentals

- Introduction to DAX (Data Analysis Expressions)
- Calculated Columns
- Calculated Tables
- Measures
- Aggregate Functions
- Logical Functions
- Date and Time Functions
- DAX Practice Exercises

Day 5: Data Visualization and Reporting

- Creating Tables and Matrix Reports
- Bar Charts
- Column Charts
- Pie Charts
- Line Charts
- Maps and Geographic Visualizations
- KPI Cards
- Slicers and Filters
- Formatting Reports Professionally

Day 6: Dashboard Development

- Designing Interactive Dashboards
- Drill Down and Drill Through Features
- Bookmarks
- Buttons and Navigation

- Conditional Formatting
- Advanced Visualizations
- Publishing Reports to Power BI Service
- Sharing Dashboards

Day 7: Project

- End-to-End Dashboard Development
- Sales Dashboard Project
- HR Analytics and Financial Dashboard Project

Total Duration of the Course

- Total duration: around 50 days
- Days: Monday to Friday (1 hour daily)
- Mode: Online

Certificate

A course completion certificate will be awarded once you have successfully completed this course.

Wishing you a Smooth Coding ahead!