

Data Analytics Course Syllabus

Section 1: Expressions Unleashed: The Building Blocks

- Variables
- Literals & Constants
- Operators and Their Types
- Arithmetic Operators
- Comparison Operators
- Logical Operators
- Assignment Operators
- Bitwise Operators
- Identity and Membership Operators
- Expression Evaluation

Section 2. Dive into Data: Python Data Types & Structures

- Basic Data Types: int, float, str, bool
- Sequence Types: list, tuple, range
- Mapping Type: dict
- Set Types: set, frozenset
- Type Conversion
- Mutable vs Immutable Types

Section 3. Speak Python: Mastering Statements

- Assignment Statements
- Conditional Statements (if, elif, else)
- Looping Statements (for, while)
- Jump Statements (break, continue, pass)

- Input and Output (input(), print())
- Import Statements

Section 4. Function Junction: Write Once, Reuse Forever

- Defining and Calling Functions
- Parameters & Return Values
- Default and Keyword Arguments
- *args and **kwargs
- Lambda (Anonymous) Functions
- Variable Scope & global Keyword

Section 5. Object Crafter: OOP with Python Classes

- Creating Classes and Objects
- The *init()* Method
- Instance vs Class Variables
- Method Definitions
- Inheritance and Polymorphism
- *super()* Function

Section 6. Plug and Play: Working with Modules

- Creating and Using Modules
- Importing Modules: import, from ... import, as
- Built-in Modules Overview
- Custom Modules
- *name == "main"* Idiom

Section 7. Graceful Failures: Error Handling in Python

- Types of Errors (Syntax vs Runtime)
- try, except, else, finally
- Common Exceptions: ValueError, TypeError, etc.
- Raising Exceptions with raise

Section 8. File Fusion: Reading and Writing Files

- File Modes: r, w, a, x, b
- Reading and Writing Text Files
- Using with open() Context Manager
- File Handling with CSV (csv module)

Section 9. NumPy Ninja: Crunching Numbers with Arrays

- Introduction to NumPy Arrays
- Array Creation and Properties
- Indexing, Slicing, and Shaping
- Mathematical and Statistical Operations
- Broadcasting

Section 10. Pandas Power: The Data Wrangler's Toolkit

- Series and DataFrames
- Reading/Writing CSV, Excel, JSON
- Selecting, Filtering, and Slicing Data
- Handling Missing Data
- GroupBy and Aggregation
- Merging and Joining DataFrames

Section 11. Plot Like a Pro: Data Visualization Essentials

- Matplotlib Basics: Line, Bar, Scatter, Pie Charts
- Seaborn for Statistical Visualization
- Histograms, Boxplots, Countplots, Pairplots
- Customizing Plots (Titles, Labels, Legends)

Section 12. Detective Mode: Exploratory Data Analysis (EDA)

- Data Inspection: head(), info(), describe()
- Outlier Detection
- Correlation and Heatmaps
- Data Cleaning and Transformation
- Feature Scaling & Encoding (basic)

Section 13. Real World Hacks: Practice with Popular Datasets

- Sales Data (Superstore)
- Titanic Dataset
- Iris Flower Dataset
- COVID-19 Dataset
- Finance or eCommerce Examples

Section 14. Time Travel: Basics of Time Series Analysis

- Parsing Dates and Timestamps
- Time-based Indexing
- Resampling and Frequency Conversion
- Rolling Averages and Trends

Section 15. ML Lite: Tiny Steps into Machine Learning

- Intro to scikit-learn

- Train/Test Split
- Linear Regression and Classification
- Model Evaluation Basics



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