🐍 12-Hour Python Workshop: From Basics to Data Science
"Master Python and Start Your Data Journey"

🗓️ 2-Day Schedule (12 Hours Total)
Ideal for a full-day workshop (with breaks) for 2-day split session.

🕘 Session 1 (1 Hour): Getting Started with Python
- Why Python? Industry use cases in Data, AI, Automation, etc.
- Installing Python and Jupyter Notebook / Google Colab
- Writing your first program: print(), input(), type()
- Variables and Data Types (int, float, str, bool)
- Typecasting, Comments, and Indentation
- Hands-on: Simple calculator, greeting app

🕘 Session 2 (1 Hour): Control Flow and Loops
- Conditional Statements: if, elif, else
- Loops: for, while, range(), break, continue
- Nested conditions and loops
- Hands-on: Number checker, pattern printing

🕙 Session 3 (1 Hour): Functions & File Handling
- Defining and using functions (def, return, arguments)
- *args, **kwargs (intro only)
- File operations: open(), read(), write(), with block
- Hands-on: Create a text-based student record system

🕐 Session 4 (1 Hour): Python Data Structures
- Strings and string functions
- Lists: indexing, slicing, methods
- Tuples, Sets, Dictionaries
- List comprehensions – *important*
- Hands-on: Create a student grade tracker

🟤 Break – 30 mins

🕑 Session 5 (1 Hour): Introduction to NumPy
- What is NumPy and why use it?
- Creating arrays, array types
- Indexing, slicing, reshaping
- Basic operations: mean, std, sum, etc.
- Hands-on: Create a marksheet matrix and perform calculations

🕒 Session 6 (1 Hour): Pandas for Data Manipulation
- What is Pandas? Series and DataFrames
- Reading data from CSV
- Selecting rows/columns, filtering data
- Common methods: head(), tail(), info(), describe()
- Hands-on: Load and analyze Titanic dataset

🕒 **Session 7 (1 Hour): Data Cleaning with Pandas**

- Handling missing values: isnull(), dropna(), fillna()
- Filtering, sorting, groupby
- Creating new columns
- Hands-on: Clean and transform a student or sales dataset

🕓 **Session 8 (1 Hour): Data Visualization with Matplotlib**

- What is Matplotlib? Line plots, Bar charts, Pie charts
- Labels, titles, legends, color customization
- plt.figure() and subplot creation
- Hands-on: Visualize student scores and sales data

🕔 **Session 9 (1 Hour): Advanced Visualization with Seaborn**

- Introduction to Seaborn: Aesthetics + simplicity
- Barplot, Countplot, Boxplot, Histogram, Heatmap
- Pairplot and correlation matrix
- Hands-on: Explore Titanic/Iris dataset visually

🕗 **Session 10 (1 Hour): Mini Project – Data Analysis Pipeline**

- Choose a dataset: Titanic / Student Performance / Sales
- Project Steps:
  - Load and inspect data
  - Clean and preprocess
  - Analyze using Pandas
  - Visualize with Matplotlib/Seaborn
- Hands-on: Complete an end-to-end mini project in teams

🕐 **Session 11 (1 Hour): Final Touch – Wrap-up, Career Roadmap, Q&A**

- Summary of key concepts
- How Python powers Data Science, AI, and ML
- Career roadmap: Python → Pandas → ML
- Resume + GitHub + LinkedIn tips
- Q&A, Feedback, Certificate Distribution

🎁 **Deliverables**

- Certificate of Completion
- Practice Notebooks + Mini Project
- Python + Data Science Roadmap PDF
- GitHub Repository Template
- Cheat Sheets (NumPy, Pandas, Seaborn, etc.)

🎯 **Learning Outcomes**

Students will:

- Grasp core Python programming fundamentals
- Analyze real-world datasets using Pandas and NumPy
- Visualize data clearly with Matplotlib and Seaborn
- Be ready to explore ML, AI, and Data Analytics further