**Data Analytics using Pandas**

**Duration**: 4 Hours  
**Prerequisites**: Basic Python, NumPy fundamentals

**Outcomes**

By the end of this course, learners will be able to:

* Understand and manipulate data using Pandas Series and DataFrames
* Perform data cleaning and preprocessing
* Conduct exploratory data analysis (EDA)
* Summarize and visualize datasets using Pandas

**Hour 1: Introduction to Pandas**

**Goal**: Understand core data structures and basic operations

**Topics**:

* What is Pandas? Why use it for data analysis?
* Series vs DataFrame
* Creating Series and DataFrames
* Reading data: read\_csv, read\_excel
* Basic DataFrame operations:
  + Viewing data: head(), tail(), info(), describe()
  + Indexing and selecting data: .loc[], .iloc[]

**Exercise**:

* Load a sample dataset (e.g., Titanic or Iris) and explore it

**Hour 2: Data Manipulation Techniques**

**Goal**: Learn how to modify and shape data

**Topics**:

* Filtering and conditional selection
* Adding and modifying columns
* Sorting: sort\_values(), sort\_index()
* Handling missing data: isnull(), fillna(), dropna()
* Grouping and aggregation: groupby(), agg(), value\_counts()

**Exercise**:

* Clean a dataset by handling nulls and duplicates
* Group data and generate summary statistics

**Hour 3: Data Transformation & EDA**

**Goal**: Conduct data transformation and basic exploratory analysis

**Topics**:

* Merging & joining DataFrames: merge(), concat(), join()
* Pivot tables and cross-tabulation
* Feature engineering basics
* Correlation analysis
* Basic plotting with Pandas: .plot() (line, bar, histogram)

**Exercise**:

* Merge two small datasets and generate summary insights
* Create pivot tables and visualize them

**Hour 4: Mini Project & Wrap-up**

**Goal**: Apply everything learned in a mini project

**Mini Project**: Perform data analysis on a real-world dataset  
(e.g., Netflix Movies Dataset, Titanic Dataset, COVID-19 Data)

**Steps**:

1. Load and explore the dataset
2. Clean the data
3. Generate summary statistics
4. Visualize trends and correlations
5. Present findings