

11. Computation on NumPy arrays using Universal Functions and Mathematical methods.
12. Load an image file and do crop and flip operation using NumPy Indexing.
13. Create Pandas Series and Data Frame from various inputs.
14. Import any CSV file to Pandas Data Frame and perform the following:
 - (a) Visualize the first and last 10 records
 - (b) Get the shape, index and column details
 - (c) Select/Delete the records (rows)/columns based on conditions.
 - (d) Perform ranking and sorting operations.
 - (e) Do required statistical operations on the given columns.
 - (f) Find the count and uniqueness of the given categorical values.
 - (g) Rename single/multiple columns
15. Import any CSV file to Pandas Data Frame and perform the following:
 - (a) Handle missing data by detecting and dropping/ filling missing values.
 - (b) Transform data using apply () and map() method.
 - (c) Detect and filter outliers.
 - (d) Perform Vectorized String operations on Pandas Series.
 - (e) Visualize data using Line Plots, Bar Plots, Histograms, Density Plots and Scatter Plots.

Skill/Hands-on: Field Work/Mini Project (15 Hrs.)

Visit any of the agencies like Agriculture dept, statistical cell, irrigation department, Ground water department, CPO office, Rural Water Supply and Sanitation department etc or search online to get real time data like Aids database, weather forecasting database, social networking data, etc and identify any one database, implement and present the necessary charts in Python language.

Prescribed Text Book

- Data Science from Scratch by Joel Grus O'Reilly Media.

Reference Text Book

- Wes McKinney, "Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython", O'Reilly, 2nd Edition, 2018.

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Practical-Scheme of Valuation

Time: 3 Hrs.

Max. Marks: 50

Practical	Marks
Program Writing	15 M
Program Execution	15 M
Viva	10 M
Practical Record	10 M
Total	50 M