

**DS832OE: DATA VISUALIZATION USING PYTHON (Open Elective –III)****B.Tech. IV Year II Sem.**

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**Course Objectives:**

- Learn data wrangling techniques
- Introduce visual perception and core skills for visual analysis

**Course Outcomes:**

- Perform data wrangling
- Explain principles of visual perception
- Apply core skills for visual analysis
- Apply visualization techniques for various data analysis tasks
- Evaluate visualization techniques

**UNIT - I**

An Introduction to Data Visualization in Python, Types of Plots- statistical plots, Images, Networks/ Graphs, Geographical, 3D and Interactive, Grids and Meshes

**UNIT - II**

Manipulating and visualizing data with Pandas: defining data frames, Creating and manipulating data frames, visualization with pandas

**Matplotlib:** Features of matplotlib, Anatomy and Customization of matplotlib plot, Plotting and plot customization, Customizing a plot, Visualization examples,

**UNIT - III**

**Seaborn:** Features of seaborn, Creating plots with seaborn, Visualization examples

**Altair:** Altair's declarative API, creating an Altair Chart and Plot, Changing mark/PlotTypes, Global Configuration, Encoding arguments, Altair Datatypes, CreatingTitles, Properties, Tooltips, Saving Altair Charts, Making Plots Interactive, Visualization Examples,

**UNIT - IV**

Plotly: Plotly and JSON, Online and Offline plotting, Structure of Plotly Plot, Graph Objectives VS Dictionaries, Plotly Express, updating plots- Adding and Updating Traces, Creating Subplots, Drop-Down Menus, Dash Interactivity, Example Plots

**UNIT - V**

**CGPlot2/Plotnine:** The Grammar of Graphics, Creating Plots, Changing Geoms, Stats, Faceting, Coordinates, Annotations, Scaling, Themes, Legends, and Palettes, Visualization Examples.

**TEXT BOOKS:**

1. Daniel Nelson, Data Visualization in Python
2. Ward, Grinstein Keim, Interactive Data Visualization: Foundations, Techniques, and Applications. Natick A K Peters, Ltd.

**REFERENCE BOOKS:**

1. Jacqueline Kazil and Katharine Jarmul, Data Wrangling with Python: Tips and Tools to Make Your Life Easier, O'Reilly.
2. E. Tufte, The Visual Display of Quantitative Information, Graphics Press.