KOENIG SOLUTIONS · COURSE OUTLINE

Python Interactive Dashboard Development

Learn to analyse and visualise data with NumPy, Pandas, Matplotlib, Seaborn and Plotly in Jupyter Notebooks.

6	86	20
MODULES	TOPICS	HANDS-ON ACTIVITIES

COURSE OVERVIEW

This course covers array creation, reshaping, indexing and operations with NumPy, followed by slicing, filtering, transforming and aggregating data with Pandas. It then addresses data visualisation using Matplotlib, including line, bar, pie and 3D charts, interactive widgets and choropleth maps, before moving to statistical plotting with Seaborn across relational, categorical and distribution plots. It continues with interactive charting using Plotly and Cufflinks, and concludes with working in Jupyter Notebooks, covering the ecosystem, installation, cell types and code execution.

WHO THIS COURSE IS FOR

- **Data Analysts**
- **Data Scientists**
- **Python Developers**
- **Business Intelligence Analysts**
- **Data Visualisation Specialists**

LEARNING OBJECTIVES

- Create and reshape arrays using NumPy
- Apply indexing, sorting and broadcasting to arrays
- Filter, transform and aggregate data with Pandas
- Build charts such as line, bar and pie with Matplotlib
- Develop statistical plots such as box and violin with Seaborn
- Configure interactive plots using Plotly and Cufflinks
- Explain the Jupyter Notebook ecosystem and cell types
- Execute code and markdown cells in Jupyter Notebooks

COURSE SYLLABUS

6 Modules, 86 Topics

01

4 Demos

NumPy Package

TOPICS

- Introduction of NumPy
- Install Numpy
- Array Creation
- Array Reshaping
- Indexing
- Operation
- Sorting and Stacking
- BroadCasting
- Saving and Loading

02

Demo

Pandas

TOPICS

Introduction · Slicing Dataframe · Filtering Dataframe · Transforming Dataframe · Advanced indexing · Stack and unstack · Groupby and aggregations

03

7 Demos

Matplotlib

TOPICS

- Introduction to Matplotlib
- Exploring Data using Python
- Matplotlib with Jupyter
- Load data
- How to pyplot Works
- Troubleshooting issues
- Line Chart
- Multi Line Plot
- Fill Plot
- Bar Chart
- Pie Chart
- Histogram
- Scatterplot
- Themes
- Scatter
- Subplot
- 3d plot
- Grid
- Save Image
- Legend
- Style Sheets
- Custom Style Sheets
- Handling Event
- Create An Interface With ipywidgets
- Basemap
- Creating a Choropleth With Matplotlib

04

4 Demos

Seaborn

TOPICS

- Introduction to Seaborn
- Importing Dataset
- Seaborn Vs Matplotlib
- Using Seaborn with Matplotlib
- Loading a built-in Seaborn data
- Loading a Pandas Dataframe
- LinePlot
- Distplot
- BarGraph
- ScatterPlot
- JointPlot (KDE)
- StripPlot
- Box
- Point Plot
- FacetGrid
- Pair Grid
- CatPlot
- Changing Figure Aesthetic
- Removal of Spines
- Changing the figure Size
- Scaling the plots
- the Style Temporarily
- Relational Plots
- Categorical Plots
- Distribution Plots
- Regression Plots
- Diverging Colour Palette
- Sequential Colour Palette
- Setting the default Colour Palette

05

4 Demos

Plotly and Cufflinks

TOPICS

Installation and Setup · Line Plot · Scatter Plot · Bar Plot · Box Plot and Area Plot · 3D Plot · Spread Plot and Hist Plot · Bubble Plot and Heatmap

06

Jupyter Notebooks

TOPICS

- Understanding the Jupyter ecosystem
- Advantages of using Jupyter Notebooks for interactive computing
- Installing Jupyter using pip or conda
- Launching the Jupyter Notebook server
- Working with Jupyter Notebooks (Hands-on)
- Understanding cell types (Code, Markdown)
- Executing code cells

NOTES

- Project Work - Problem to solve: Create rich data visualizations inside the dot net application the same way it can be found for data visualization using Python and Jupyter Notebooks. Example: rich data visualization can be created with Jupyter notebook, saving the data in the app Database; at the end, the same rich data visualization should be created in the application.
- Additional Considerations 1) Development of Interactive Dashboards in Python: develop interactive dashboards using Python, ensuring seamless integration directly into the application; this approach eliminates the need to export dashboards as images.
- Additional Considerations 2) Effective integration with other libraries: effective integration with other libraries to facilitate real-time updates; this integration is essential to increase the accuracy of analysis and predictions in the application.
- Additional Considerations 3) Embedding Graphics in Web Applications: explore methods for embedding graphics directly into web applications, aiming to improve the overall user experience by providing a more fluid and interactive interface.

HANDS-ON ACTIVITIES

Practise What You Learn

#	MODULE	ACTIVITY
01	**NumPy Package**	**DEMO 1:** - Array Creation **DEMO 2:** - Array Reshaping **DEMO 3:** - Array Operations **DEMO 4:** - Maths Function
02	**Pandas**	**DEMO 5:** - Pandas Basic operations
03	**Matplotlib**	**DEMO 6:** - Matplotlib Line Plot **DEMO 7:** - Plotting Histogram **DEMO 8:** - Bar Chart **DEMO 9:** - Pie Chart **DEMO 10:** - SubPlot **DEMO 11:** - Save Figure **DEMO 12:** - Matplotlib imshow
04	**Seaborn**	**DEMO 13:** - Seaborn- LinePlot, Distplot, BarGraph, Scatter **DEMO 14:** - KDE - jointplot() - PairPlot **DEMO 15:** - Distribution - BoxPlot **DEMO 16:** - Violin - Point Plots
05	**Plotly and Cufflinks**	**DEMO 17:** - Chart Gallery **DEMO 18:** - Cufflinks - Colors **DEMO 19:** - Cufflinks - Offline **DEMO 20:** - Quantfig

WHAT IS INCLUDED

Everything You Need to Succeed

- Koenig course material for every module
- Delivery by certified instructors and subject matter experts
- Hands-on exercises throughout the course
- Course completion certificate from Koenig

ABOUT KOENIG

Who We Are

Established in 1993, Koenig Solutions is a globally recognised training provider with 35+ technology partnerships, 5,000+ training programmes and a network of certified instructors and subject matter experts, supporting individuals and enterprise teams worldwide.

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