Marwadi University

FACULTY OF COMPUTER APPLICATIONS
Bachelors of Science (Data Science)

- **Sem.** : **5**
- **Subject Code** : **05DS0502**
- **Subject** : **Data Visualization**
- **Course Objectives** :

1. To understand fundamental concepts data science and its processes.
2. To explore different types of charts and plots using matplotlib.
3. To learn data visualization using excel and various functions of excel.
4. To explore knowledge and skills using Tableau
5. To learn data visualization using Power BI.

- **Prerequisites**: Basic knowledge of Python Programming

Unit No	Topics Covered	No of lectures required
1	**Introduction to Data Science** Defining data science, Recognizing the different types of data, Gaining insight into the data science process, Fields of data science.	**05**
2	**Data Visualization Using Matplotlib** Quick setup and importing Matplotlib's essential modules, Understanding Figure Structure, Creating plots like lines, scatter plots, bars, and histograms, Saving and Exporting, Customizing Aesthetics.	**10**
3	**Data Visualization in Microsoft Excel** Introduction to MS Excel, various techniques and tools available in Excel for creating effective and impactful visual representations of data, hands-on exercises and practical examples for following charts and graphs	**10**

	using MS Excel. • Bar Chart • Column Chart • Line Chart • Pie Chart • Scatter Plot • Histogram Plot • Area Chart • Static Pareto Chart • Dynamic Pareto Chart • Gantt Chart	
4	**Data Visualization using Tableau** Introduction to Tableau, installation of Tableau, File types , Data Terminology. Follow given steps to create various charts and Dashboard in Tableau. • Step 1: Connect to your data • Step 2: Drag and drop to take a first look • Step 3: Focus your results • Step 4: Explore your data geographically • Step 5: Drill down into the details • Step 6: Build a dashboard to show your insights • Step 7: Build a story to present • Step 8: Share your findings with others	**10**
5	**Data Visualization using Power BI** Overview of Power BI and its features, Installation and setup, connecting to data sources, creating basic and advance graphs like bar charts, line charts, pie charts waterfall charts, funnel charts, etc, customizing visuals: colours, labels, and formatting, Adding interactivity with slicers and filters.	**10**

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Course Outcomes :

1. Students will be able to understand the role of data science in Data Visualization.
2. Students will be able to gain proficiency in Matplotlib Library for visualization.
3. Students will gain understanding of effective data visualization in Excel.
4. Students will be able to demonstrate proficiency in applying data science techniques using Tableau Software
5. Students will be able to create charts and graphs in Power BI.

Course Outcomes – Program Outcomes Mapping Table :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	L	L			M						
CO2				M					L		
CO3			M				M				
CO4					H					M	
CO5						M		H			H

Text Book :

"Introducing Data Science" , By Davy Cielen ,Arno D. B. Meysman , Mohamed Ali , Manning Publications , ISBN: 9781633430037

Reference Books:

1. "Introduction to Computation and Programming Using Python", John V Guttag. ,2nd Edition, Prentice Hall of India
2. Core Python Programming, R Nageswara Rao, 2nd Edition, Dreamtech Press
3. Core Python Applications Programming, Wesley J Chun, 3rd Edition. Pearson

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Web References:

1. "Matplotlib Tutorial" , https://matplotlib.org/stable/tutorials/index.html
2. "MS Excel Tutorial " ,"https://www.datacamp.com/tutorial/visualizing-data-in-excel
3. "Tableu Tutorial", https://help.tableau.com/current/guides/get-started-tutorial/en-us/get-started-tutorial-home.htm
4. https://learn.microsoft.com/en-us/power-bihttps://learn.microsoft.com/en-us/power-bi//

App References:

1. https://play.google.com/store/apps/details?id=com.androfrenzy.datascience&hl=en_IN&gl=US

2. https://play.google.com/store/apps/details?id=com.admob9931.python_panda&hl=en_IN&gl=US

Syllabus Coverage from text /reference book & web/app reference:

Unit #	Chapter Numbers
1	Book 1 - Chapter 1
2	Web reference - 1
3	Web reference – 2
4	Web reference – 3
5	Web reference – 4

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PRACTICALS

List of Practicals
1) Write a program to create bar plot for sample data using matplotlib.
2) Write a program to create stacked-bar plot for sample data using matplotlib.
3) Write a program to create pie plot for sample data using matplotlib.
4) Write a program to create pie plot using explode parameter for sample data using matplotlib.
5) Write a program to create scatter plot for sample data using matplotlib.
6) Write a program to create line plot for sample data using matplotlib.
7) Write a program to create Multi-line plot for sample data using matplotlib.
8) Write a program to create Histogram for sample data using matplotlib.
9) Write a program to create box plot for sample data using matplotlib.
10)Write a program to create 3D plot for sample data using matplotlib.
11)Write a program to create bar chart for sample data using Excel.
12) Write a program to create column chart for sample data using Excel.
13) Write a program to create line chart for sample data using Excel.
14) Write a program to create pie chart for sample data using Excel
15) Write a program to create scatter plot for sample data using Excel.
16) Write a program to create histogram plot for sample data using Excel.
17) Write a program to create area chart for sample data using Excel.
18) Write a program to create static Pareto Chart for sample data using Excel.
19) Write a program to create Dynamic (Interactive) Pareto Chart for

sample data using Excel.

20)Write a program to create Gantt for sample data using Excel.

21) Write a program to reads data from a CSV file and generates a simple bar chart using Tableau, representing a basic comparison between different categories.

22) Write a program that reads time series data from a database or API and creates a line chart in Tableau to visualize trends over time.

23) Write a program that takes categorical data as input and generates a pie chart in Tableau to show the distribution of different categories.

24) Write a program that reads data related to different categories over time and generates a stacked area chart in Tableau to visualize the cumulative values.

25) Write a program that reads two sets of numerical data and creates a scatter plot in Tableau to visualize the relationship between them.

26)Write a program that reads numerical data and generates a histogram in Tableau to visualize the distribution of values.

27) Write a program that reads three sets of numerical data and generates a bubble chart in Tableau, where the size of the bubble represents the third variable.

28) Write a program that reads numerical data and generates a box plot in Tableau to visualize the distribution of values along with key statistics.

29)Write a program that reads two categorical variables and one numerical variable, and generates a heat map in Tableau to visualize the relationship between the variables.

30)Write a program that reads data related to tasks and their durations, and generates a Gantt chart in Tableau to visualize the timeline of tasks.

31) Write a program to create bar chart for sample data using Power BI.

32) Write a program to create column chart for sample data using Power BI.

33) Write a program to create line chart for sample data using Power BI.

34) Write a program to create pie chart for sample data using Power BI

35) Write a program to create bubble chart for sample data using Power BI.

36) Write a program to create donut chart for sample data using Power BI.

37) Write a program to create Funnel chart for sample data using Power BI.

38) Write a program to create Treemap for sample data using Power BI.

39) Write a program to create Radial gauge chart for sample data using Power BI.

40) Write a program to create Area Chart for sample data using Power BI.