GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Post Graduate Diploma In Data Science
Level: PG
Branch: Data Science
Subject Code: DS02080011
Subject Name: Data Visualization

w. e. f. Academic Year:	2024-25
Semester:	2
Category of the Course:	Core Course

Prerequisite:	Understanding of Data Types: Categorical, numerical, ordinal, and time-series data. Familiarity with spreadsheets, tables, and database. Statistics Basics: Mean, median, standard deviation, distributions, and correlations. Working knowledge of Programming Language, DBMS, JavaScript and HTML5.
Rationale:	Nil

Course Outcomes:

Sr. No.	CO statement	Marks% weightage
01	Explain principles of visual perception	UN
02	Apply core skills for visual analysis	AP
03	Apply visualization techniques for various data analysis tasks	AN
04	Develop Dashboards for Comprehensive Data Insights and Critically Evaluate Visualization Techniques	EL

Teaching and Examination Scheme:

Teaching / Learning Scheme (in Hours per semester)			Total Credits	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial / Practical		
L	T	PR		ESE (E)	PA / CA (M)	PA/CA (I)	ESE (V)	
0	0	6	3	0	0	30	70	100

Content:

Sr. No.	Content	Total Hrs
1	**Introduction to Data Visualization**: Acquiring and Visualizing Data, Principles of effective visualization: clarity, simplicity, and audience focus, Applications of Data Visualization, Best practices for choosing visualization types, Keys factors of Data Visualization (Control of Presentation, Faster and Better JavaScript processing, Rise of HTML5, Lowering the implementation Bar) Exploring the Visual Data Spectrum: charting Primitives (Data Points, Line Charts, Bar Charts, Pie Charts, Area Charts), Exploring advanced Visualizations (Candlestick Charts, Bubble Charts, Surface Charts, Map Charts, Infographics). Making use of HTML5 CANVAS, Integrating SVG	3
2.	**Basics of Data Visualization – Tables**: Reading Data from Standard text files (.txt, .csv, XML), Displaying JSON content Outputting Basic Table Data (Building a table,	5

	Using Semantic Table, Configuring the columns), Assuring Maximum readability (Styling your table, Increasing readability, Adding dynamic Highlighting), Interactive data tables with sorting, filtering, and pagination, Including computations, Using data tables library, relating data table to a chart	
3.	**Visualizing data Programmatically**: Creating HTML5 CANVAS Charts (HTML5 Canvas basics, Linear interpolations, A Simple Column Chart, Animations), Introduction to Plotly and Matplotlib for programmatic visualizations, Starting with Google charts (Google Charts API Basics, A Basic bar chart, A basic Pie chart, Working with Chart Animations)	5
4.	**Introduction to D3.js**: Getting setup with D3, Making selections, changing selection's attribute, Data formats you can use with D3, Creating a server to upload your data, D3's function for loading data, Dealing with Asynchronous requests, Loading and formatting Large Data Sets	5
5.	**Advanced Data Visualization**: Making charts interactive and Animated: Data joins, updates and exits, interactive buttons, Updating charts, Adding transactions, using keys Adding a Play Button, Incorporating tooltips, legends, and interactivity in charts, Customizing themes and aesthetics in advanced visualization libraries	4
6.	**Information Dashboard Design**: Introduction, Dashboard design issues and assessment of needs, Considerations for designing dashboard-visual perception, Achieving eloquence, Advantages of Graphics, Accessibility considerations for inclusive design, Library of Graphs, Designing Bullet Graphs, Designing Sparklines, Dashboard Display Media, Critical Design Practices, Putting it all together - Unveiling the dashboard.	6
	TOTAL	

Reference Books:

1. Jon Raasch, Graham Murray, Vadim Ogievetsky, Joseph Lowery, "JavaScript and jQuery for Data Analysis and Visualization", WROX
2. Ritchie S. King, Visual story telling with D3" Pearson
3. Ben Fry, "Visualizing data: Exploring and explaining data with the processing environment", O'Reilly, 2008.
4. A Julie Steele and Noah Iliinsky, Designing Data Visualizations: Representing Informational Relationships, O'Relly
5. Andy Kirk, Data Visualization: A Successful Design Process, PAKT
6. Scott Murray, Interactive Data Visualization for Web, O'Relly
7. Nathan Yau, "Data Points: Visualization that means something", Wiley, 2013.
8. Tamara Munzner, Visualization Analysis and Design, AK Peters Visualization Series, CRC Press, Nov. 2014

Suggested Course Practical List:

That will suggested by course instructor

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