GUJARAT TECHNOLOGICAL UNIVERSITY
Integrated- MCA
Year – V (Semester – IX) (W.E.F. JUNE 2017)

Subject Name: Data Visualization (DV)
Subject Code: 4490607

1. Objectives:

1. To understand various data visualization techniques
2. To understand basics of D3.js
3. To get an overview of advanced data visualization techniques and applications

2. Prerequisites:

Working knowledge of a Programming Language, Database Concepts, JavaScript, and HTML5

3. Course Contents:

Sr. No.	Course Content	No. of sessions
1	**Unit 1: Introduction to Data Visualization** Acquiring and Visualizing Data, Simultaneous acquisition and visualization, Applications of Data Visualization, 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	08
2	**Unit 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, Using Semantic Table, Configuring the columns), Assuring Maximum readability (Styling your table, Increasing readability, Adding dynamic Highlighting), Including computations, Using data tables library, relating data table to a chart	08
3	**Unit 3: Visualizing data Programmatically** Creating HTML5 CANVAS Charts (HTML5 Canvas basics, Linear interpolations, A simple column Chart, Adding animations), Google charts, Google Charts API Basics, A Basic bar chart, A basic Pie chart, Working with Chart Animations	06
4	**Unit 4: Introduction to D3.js** Getting setup with D3, Making selections, changing selection's attribute (attr()), Changing methods, appending new elements, Putting all together, Selecting multiple elements with d3.selectall(), Building Bar	12

	charts with selections Data-joins; Conceptual overview of data joins, Enter and binding data, using a data join to make a Bar chart, Using anonymous functions to access bound data, finishing the rest of chart, storing data in objects Sizing charts and Axes (Linear scales, Using smart margin conventions, adding axes, Ordinal scales and axes), Loading and filtering External data : Building a graphic that uses all of the population distribution data, 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	**Unit 5: Advanced Data Visualization** **Making charts interactive and Animated:** Data joins, updates and exits, interactive buttons, Updating charts, Adding transactions, using keys **Play Button:** wrapping the update phase in a function, Adding a Play button to the page, Making the Play button go, user interrupt of the play sequence	06

4. Text Book(s):

1. Jon Raasch, Graham Murray, Vadim Ogievetsky, Joseph Lowery, "JavaScript and jQuery for Data Analysis and Visualization", WROX
2. Ritchie S. King, Visual story tellying with D3" Pearson

5. Other Reference Books:

1. A Julie Steele and Noah Iliinsky, Designing Data Visualizations: Representing Informational Relationships, O'Relly
2. Andy Kirk, Data Visualization: A Successful Design Process, PAKT
3. Scott Murray, Interactive Data Visualization for Web, O'Relly

Web Resources

a. https://D3js.org

6. Unit wise coverage from Text book(s):

Unit 1	Book#	Topics
I	1	Chapter. 1,3
II	1	Chapter. 4,7
III	1	Chapter. 9
IV	2	Chapter. 4,5,6,7
V	2	Chapter. 8,9

7. Accomplishment

Student will understand fundamentals of Data visualization and visualize data programmatically.

8. Laboratory Exercises

Tools: HTML5, D3.js, Google API

Develop using GOOGLE API, HTML5 and D3.js

1. Showing Data as a column chart
2. Showing Data as a Line chart
3. Showing Data as a Pie Chart
4. Showing Data as a Bar Chart
5. Read Data .txt file and draw Data Table / Chart
6. Read Data .csv file and draw Data Table / Chart
7. Read Data XML file and draw Data Table / Chart
8. Read JSON Data and draw Data Table / Chart

Case Study:

1) Building an interconnected Dashboard
2) Building an Timer series Data chart e.g stock