COURSE TITLE	**DATA VISUALIZATION**
COURSE CODE	**01CE0614**
COURSE CREDITS	**3**

Objective:

1 To learn the nature of data across different domains and the concepts and skills of data visualization by understanding, questioning, and problematizing how data are generated, analyzed, and used.

Course Outcomes: After completion of this course, student will be able to:

1 Understand the fundamental design principles and different types of data visualization

2 Understand the main chart types and their recommended usage

3 Apply the fundamental concepts of data visualization to define a project in your field of study

4 Practice the core principles using widely available tools (e.g. Tableau).

5 Demonstrate the best practice that presents your story in the process of creating data visualization including connecting to different data sources, assessing the quality of the data, and converting raw data into data visualizations that provide actionable information.

Pre-requisite of course: Basic knowledge of the concepts of Tableau and Excel.

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
2	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	**Introduction to Visualisations** Bar chart, Geographic map, Crosstab report, Scatter plot, Line chart,Tableau Desktop UI, The Tableau product line, Workbook windows, Visual cues	6
2	**Data connection** Live connection, Extract data, Combine data sources, Join tables, Blend data sources, Cross-database join	6
3	**Data Filtering and Sorting** Creating Groups and Hierarchies, Date Functionality, Discrete and continuous dates, Fiscal dates, Mapping, Geographic maps, Filled maps, Mapping options, Heat Map, and Highlight Table, Difference between heat map and highlight table.	6

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Contents : Unit	Topics	Contact Hours
4	**Dashboards and Actions** Dashboards and Actions, Dashboard design, Dashboards, Dashboard actions, Sharing your Work, Tableau data source, Tableau data extract, Tableau workbook, Tableau packaged workbook	6
5	**Customized Dashboard** Dashboard Size, Steps to set overall dashboard size, Group items using layout containers, Tile or float dashboard items, Actions in Dashboard, Sharing reports, Sharing with specific users and groups, Sharing the link of the report, Embedding the report, and downloading the report.	6
Total Hours		**30**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Practical 1** Create a line chart to show trends over time.	2
2	**Practical 2** Create a pie chart to show the distribution of data.	2
3	**Practical 3** Create a scatter plot to show the relationship between two variables.	2
4	**Practical 4** Create a histogram to show the distribution of a continuous variable.	2
5	**Practical 5** Create a heatmap to show the relationship between two or more variables.	2
6	**Practical 6** Create a treemap to show the hierarchical structure of data.	2
7	**Practical 7** Create a map to show the geographic distribution of data.	2
8	**Practical 8** Create a dashboard to combine multiple visualizations into a single view.	2
9	**Practical 9** Use filters and groups to explore your data in different ways.	2
10	**Practical 10** Use custom formatting to improve the appearance of your visualizations.	2
11	**Practical 11** Publish your visualizations to Tableau Server or Tableau Public so that others can view and interact with them.	2
12	**Practical 12** Visualize the sales of a company by product category and region.	2

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Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
13	**Practical 13** Track the performance of a marketing campaign over time.	2
14	**Practical 14** Analyze customer behavior and identify trends.	2
15	**Practical 15** Create a dashboard to track key performance indicators (KPIs) for a business.	2
Total Hours		**30**

Textbook :

1 Handbook of Data Visualization, , Dr. Chun-hauh Chen, W. K. Hardle, A. Unwin, 1st edition, Springer publication, Germany, 2008

References:

1 A little book of R for multivariate analysis,, A little book of R for multivariate analysis,, Avril Coghlan,, United Kingdom, 2013

2 Visualizing Data, Visualizing Data, Ben Fry, O'Reilly Media, United States,, 2008

3 Data Visualization: Exploring and Explaining with Data,, Data Visualization: Exploring and Explaining with Data,, Michael Fry, Jeffrey Ohlmann, Jeffrey Camm, James Cochran, South-Western College Publishing, 2021

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery

Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
0.00	15.00	35.00	20.00	15.00	15.00

Instructional Method:

1 The course delivery method will depend upon the content requirement and students' needs. In addition to the conventional teaching method by the blackboard, the teacher may also use any ofthe tools such as demonstration, role play, Quiz, brainstorming, MOOCs, etc.

2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and classroom.

3 A practical examination will be conducted at the end of the semester for evaluation of the performance of students in the laboratory.

4 Students will use supplementary resources such as online videos, NPTEL videos, e-courses, and Virtual Laboratories.