



## **Sub Committee - Specialization for Curriculum Development**

### **Post Graduate/ Under Graduate**

**Course Title:** Data Visualization

**Course Code:** T3612

**Number of Credits:** 4

**Level:** 3

**Learning Objective/Outcome (s):** Visualization is increasingly important in this era where the use of data is growing in many different fields. Data visualization techniques allow people to use their perception to better understand this data. The goal of this course is to introduce students to data visualization including both the principles and techniques. Students will learn the value of visualization, specific techniques in information visualization and scientific visualization, and how understand how to best leverage visualization methods. It introduces students to design principles for creating meaningful displays of quantitative and qualitative data to facilitate managerial decision-making.

At the end of this course, the student should be able to:  
Learn and understand the importance of data visualization.  
Learn what is user experience in data visualization and its importance.  
Learn about basic and advance chart types used in data visualization.  
Learn the psychology of visualization with Gestalt Principles.  
Get a solid understanding of how people work in data visualization project.

#### **Pedagogy:**

Class Room  
Lab Session using open data on data.gov.in  
Tutorials

#### **Pre-learning:**

An understanding of basic charting and statistical terms and practices will be helpful, but not required. Student has knowledge about statistics and data analysis.

General computer skills and a familiarity with charting tools like Microsoft Excel are necessary, along with access to the Internet for research and data gathering.

Familiarity with Web technologies and JavaScript is also useful.

## Course Outline:

Sr. No.	Topic	Hours.
1	What is data? Categorical and continuous variables; basic operations for interviewing a dataset; sampling and margins of error; plotting and summarizing distributions; basic math; correlation and its pitfalls; exploring differences between groups; scatter plots and box plots. levels of measurement; statistical concepts (i.e., normal distribution, statistical significance, population and sample, and descriptive and inferential stats Understanding context of data with respective domain.	5
2	Data Analysis Regression modelling, Correlational Analysis, Time Series Analysis ,	10
3	Data visualization: basic principles Why visualize data? Encoding data using visual cues; choosing chart types to show comparisons, composition (parts of the whole) and connections; using colour effectively; using chart furniture, minimizing chart junk and highlighting the story; avoiding pitfalls; good practice, including for interactive graphics. The Value of Visualization	10
4	Interviewing data: Acquiring, cleaning, and formatting data, exploratory graphical analysis :- create a wide variety of interactive charts, maps and tables and organize them into dashboards and stories	5
5	Data Visualization by Spread Sheet: - This module covers advanced topics like statistical modelling, forecasting and prediction, pivot tables and VBA scripting.	10
6	Web Visualization: - This module teaches how to use the core web development technologies (D3.JS, HTML, CSS and JavaScript) to create new and interactive data visualizations that you can share with everyone on the web.	10
7	Manipulating data with R /Python or Making static graphics with R /python /Orange	10
	<b>Total</b>	<b>60</b>

## Books Recommended:

1. The Visual Display of Quantitative Information by Edward Tufte
2. The Functional Art: An Introduction to Information Graphics and Visualization , by Alberto Cairo
3. Storytelling With Data: A Data Visualization Guide for Business Professionals by Cole Nussbaumer Knaflic
4. Information Dashboard Design by Stephen Few
5. Data Visualisation with R: 100 Examples by Thomas Rahlf
6. Data Visualization with JavaScript by Stephen Thomas

**Suggested Assessment/ Evaluation Methods:**

- Written Exam
- Project Work
- Assignments
- Lab Exam
- Quiz

**Benchmarked against similar courses in other national/ international universities /organizations**

S. No.	Name of the Course	Name of University where it is offered
1		
2		
3		

Name of Members					
Designation					
Org. / Inst.					
Signature					

Name of Experts					
Designation					
Org. / Inst.					
Signature					

Signature of Dean:

Date: