

Course Code	DATA VISUALIZATION	Course Type	LT
CSA3004		Credits	3
Course Objectives: <ul style="list-style-type: none">Equip the students with understanding and appreciation of Data visualization in bridging the gap between data and decisions.Assist the students to model complex real-world problems to which the traditional modeling can be impractical.Enable the students to explore the principles of statistical analysis, machine learning, and data visualization.			
Course Outcomes: <ul style="list-style-type: none">Understanding of the current visualization technique in practiceAnalysis and design of visual context for domain applicationsAwareness of the major challenges in data visualization and the complexity of typical problems within the field.Explore the visualization frames for modeling data-driven applications.Apply the mechanisms to analyze data and build data visualization frames where Data is an asset.Analyze, visualize, and improve the processes based on the data.			
Student Outcomes (SO): a, b, c, e, l a. An ability to apply the knowledge of mathematics, science, and computing appropriate to the discipline. b. An ability to analyze a problem, identify and define the computing requirements appropriate to its solution. c. An ability to design, implement, and evaluate a system / computer-based system, process, component, or program to meet desired needs. e. An ability to identify, formulate, and solve engineering problems. l. An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems (CS)			
Module No.	Module Description	Hours	SO
1	Context of Data Visualizations Data Visualizations: Basic Concept - Taxonomy – Significance of Visualization - Design Objectives, Methodologies – Design Approach – Visualization as a Discovery Tool – The Foundation of Visualization Knowledge – Visualization Sills – Creating Accessibility Through Intuitive Design, Design Challenges.	5	b, e
2	Principles of Data Visualizations Computational Statistics And Data Visualization – Static Graphics – Graphical Representations – Graph Theoretic Graphics- High Dimensional Data Visualization - Multivariate Data Glyphs: Principles and Practice - Linked Views for Visual Exploration - Linked Data Views - Visualizing Trees and Forests.	6	b, c, l

3	Methodologies of Data Visualizations Geographically Referenced Statistical Data - Multidimensional Data Visualization - Multivariate Visualization by Density Estimation - Structured Sets of Graphs - Propagation–Separation Methods - Smoothing Techniques for Visualization -Visualizing Cluster Analysis - Visualizing Knowledge Discovery Process	6	a, b, e
4	Applications of Data Visualizations : Applications and Real life Problems - Visualization, and Analysis of Medical Images- Financial Dataset- Functional Data with an Application to eBay’s Online Auctions - Data Visualization Options for Real-Time Decision Support- Visualization in Real-World Machine Learning Applications	5	b, c, e
5	Contextual Big Data visualization and Tools Big Data Visualization: Visualizations Philosophy - Challenges – Investigation and Adjudication – Operational Intelligence: Splunk And Big Data - Splunk Visualizations - Real Time Log Analysis. Data Visualization tools: Big Data Frameworks - Integrated Approach to Big Data – Run Through Of Tableau Tool: Dashboard for Big Data-Data Visualization With Python: Matplotlib and Seaborn - Data Visualization Case in Point.	6	b,c, e, l
6	Guest Lecture on Contemporary Topics	2	
Total Hours		30	
Mode of Teaching and Learning: Flipped Classroom, Activity Based Teaching/Learning, Digital/Computer based models, wherever possible to augment lecture for practice/tutorial and minimum 2 hours lectures by industry experts on contemporary topics.			
Mode of Evaluation and assessment: The assessment and evaluation components may consist of unannounced open book examinations, quizzes, student’s portfolio generation and assessment, and any other innovative assessment practices followed by faculty, in addition to the Continuous Assessment Tests and Term End Examinations.			
Text Book(s)			
1.	Kirk, Andy. Data Visualization: a successful design process. Packt Publishing Ltd, 2012.		
2.	Handbook of Data Visualization by Robert Haralick		
Reference Books			
1.	Toomey, Dan. Jupyter for data science: Exploratory analysis, statistical modeling, machine learning, and data visualization with Jupyter. Packt Publishing Ltd, 2017.		
2.	Grinstein, Usama M. Fayyad Georges G., and Andreas Wierse. Information visualization in data		

	mining and knowledge discovery. Morgan Kaufmann, 2002.
3.	Simon, Phil. The visual organization: Data visualization, big data, and the quest for better decisions. John Wiley & Sons, 2014.
4.	Miller, James D. Big Data Visualization. Packt Publishing Ltd, 2017.

Recommendation by the Board of Studies on	24.06.2020
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