

COURSE TITLE	DATA VISUALIZATION, ETHICS & DATA PRIVACY
COURSE CODE	04MI0204
COURSE CREDITS	3

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

- 1 Apply the data visualization techniques in data-driven decision-making
- 2 Create clear and effective data visualizations using various tools and techniques
- 3 Apply design principles for visual communication
- 4 Analyze and critique data visualizations for accuracy and clarity.
- 5 Apply ethical principles and privacy guidelines when creating visualizations

Pre-requisite of course:NA

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	0	0	30	20	50	0

Contents : Unit	Topics	Contact Hours
1	Introduction to Data Visualization The role of data visualization in data analysis and communication, Types of data visualizations (e.g., charts, graphs, maps), Data visualization tools and software, Overview of popular data visualization tools and software (e.g., Tableau, Excel, Python libraries), Features and capabilities of selected tools.	9
2	Data Visualization Principles Design principles for effective data visualization, Color theory and usage in data visualization, Human perception and cognition in visualization design, Tools and Techniques, Introduction to data visualization tools (e.g., Tableau, Python libraries), Creating basic charts and graphs.	9
3	Exploratory Data Visualization Data exploration and visual data profiling, Univariate and multivariate data visualization, Visualizing patterns, outliers, and distributions, Storytelling with Data, Narrative structure in data storytelling, building data-driven narratives, using visualizations to support storytelling.	10

Contents : Unit	Topics	Contact Hours
4	Introduction to PowerBI Working with data – Importing from flat files, excel files, other sources – PowerPivot data types – Column operations - Table relationship – PowerPivot data analysis – PivotTable and PivotChart – Slicers – Dashboard Implementation – Dates, hierarchies, and perspectives – Data Analysis Expressions – Introduction to Power Query – Introduction to Power View – Power View visualizations – Power View filtering options	8
5	Ethics and Data Privacy in Data Visualization Introduction to Data Ethics Definition and importance of ethics in data science and visualization. Consequences of deceptive visuals in business, media, and public policy Ethical decision-making frameworks, Data Privacy Concerns: Personally Identifiable Information (PII) and its implications, Anonymization and data masking techniques, Ethical Design Principles in Visualization : Transparency and honesty in visual storytelling, Attribution, consent, and audience consideration	9
Total Hours		45

Textbook :

- 1 Storytelling with Data: A Data Visualization Guide for Business Professionals , Cole Nussbaumer Knaflic, WILEY, 2015
- 2 The Visual Display of Quantitative Information, Edward R. Tufte, Graphics Press, 2001
- 3 Data Points: Visualization That Means Something, Nathan Yau, Wiley, 2013

References:

- 1 Learning Tableau, Learning Tableau, Joshua N. Milligan, Packt Publishing Ltd., 2015
- 2 Practical Tableau, Practical Tableau, Ryan Sleeper, O'Reilly Media, Inc, 2018

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 and evaluation

Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
0.00	0.00	25.00	30.00	25.00	20.00

Instructional Method:

- 1 Combine experiential learning through projects and case studies, with a modular approach that integrates ethical discussions throughout the curriculum

Supplementary Resources:

- 1 <https://www.tableau.com/learn/training>
- 2 <https://docs.microsoft.com/en-us/power-bi/guided-learning/>
- 3 <https://help.plot.ly/tutorials/>
- 4 <https://code.tutsplus.com/tutorials/getting-started-with-chartjs-introduction--cms-28278>