Course Code	Course Title	L	T	P	C
OLMCA618	Data Visualization	3	1	0	4
Pre-requisite	NIL	Syllabus Version			
		1.0			

Course Objectives

1. Understand the fundamentals of data visualization.
2. Develop proficiency in visualization tools and techniques.
3. Analyze and interpret data through visuals.

Course Outcome

At the end of the course the student will be able to

1. Understand the concepts behind the data visualization with the help of various visualization tools.
2. Apply the principles of design and human perception to create visually compelling and informative charts, graphs, and dashboards
3. Develop the ability to analyze large and multidimensional data sets, identify trends, patterns, and relationships
4. Interpret the data visualizations and communicate the insights and narratives.

Module:1	Introduction To Data Visualization

Introduction - Categories - Labelling of images - Mapping data onto aesthetics - Types of Aesthetics - Types of Data - Scales Mapping Data to Aesthetics - Coordinate Systems and Axes- Cartesian coordinates - Nonlinear axes - Coordinate systems with curved axes - Color scales - Directory of visualizations

Module:2	Quantity Visualization

Bar plots - Grouped and stacked bars – heatmaps - Histograms and density plots - Empirical cumulative distribution functions and q-q plots

Module:3	Multivariate Visualization and Relation Representation

Visualizing distributions along the vertical axis - horizontal axis- Visualizing proportions -Visualizing nested proportions - Mosaic plots and treemaps - Nested pies - Parallel sets - Quantitative variables visualization - Scatter plots – Correlograms - Dimension reduction - Paired data

Module:4	Time Series and Geospatial Data Visualization

Time Series Visualization - Individual time series - Multiple time series and dose–response curves - Two or more response variables- Visualizing trends – Smoothing - Visualizing geospatial data – Projections – Layers - Choropleth mapping – Cartograms - Point map - Proportional symbol map – Cluster Map

Module:5	Text data Visualization and Data Stories

Text data Visualization – Word Cloud - Term Co-occurrence Network - Word Tree - Document Similarity Matrix - Dashboard – Stories in Tableau

Module:6	Proportional Representation and Handling Overlapping

Visualizations along linear axes - logarithmic axes - Direct area visualizations - Handling overlapping points - 2D histograms - Contour lines

Module:7	Best Practices in Data Visualization

Common pitfalls of color use - Redundant coding - Multi-panel figures - Titles, captions, and tables - Balance the data and the context - Use larger axis labels - Choosing the right visualization

	Total Hours of Study:	**120 hours**
Text Book(s)		
1.	Claus O. Wilke, “Fundamentals of Data Visualization: A Primer on Making Informative and Compelling Figures”, O’Reilly, 1st Edition, 2019.	
Reference Books		
1.	Kieran Healy, “Data Visualization: A Practical Introduction”, Princeton, NJ: Princeton University, Second Edition, 2023	
2.	Jack Dougherty , Ilya Ilyankou, “Hands-On Data Visualization Interactive Storytelling from Spreadsheets to Code ”, O’Reilly, 1st Edition, 2024.	
3.	Marleen Meier, “Mastering Tableau ” , Packt Publishing, 4th Edition, 2023.	
Mode of Evaluation: Quiz, Assignment , Mid Term , FAT		
Recommended by Board of Studies	28-10-2024	
Approved by Academic Council	No. 76	Date 28-11-2024