

DSE 2a

Data Analytics and Visualization

60 Hours
(45hrs Lect. + 15hrs Tut.)

Course Title & Code	Credits	Credit Distribution of the Course			Eligibility Criteria	Pre-Requisite of the Course (if any)
		Lecture	Tutorial	Practical/ Practice		
DSE 2a: Data Analytics and Visualization	4	3	1	0	BLISc	-

Course Objectives

This course introduces the principles of data analytics and visualization within library settings. Students will master the data lifecycle, from cleaning usage statistics to performing exploratory analysis while learning to create impactful visual stories using bibliometric, network, and geographic visualization tools for evidence-based reporting.

Learning Outcomes

After completing this course, students will be able to:

- ☞ Introduce the concept of data analytics and visualization in the library environment.
- ☞ Analyze and interpret library datasets effectively.
- ☞ Apply techniques for visual representation of library data.
- ☞ Use modern analytics and visualization tools in library contexts.

UNIT I: Foundations of Data Analytics and Visualization

11 Hours

- ☞ Data Sources in Libraries: Usage Statistics, OPAC Logs, Repository Data, Bibliographic and Citational Data
- ☞ Data Lifecycle: Collection, Cleaning, Processing, Analysis, and Interpretation
- ☞ Data Analytics: Concept, Need, Scope, Purpose and Types
- ☞ Data Visualization: Concept, Need, Purpose and Principles
- ☞ Ethical Issues in Data Analytics and Visualization

UNIT II: Data Preparation and Exploratory Data Analysis

12 Hours

- ☞ Data Collection Methods and Formats
- ☞ Data Cleaning and Preprocessing
- ☞ Exploratory Data Analysis
- ☞ Descriptive and Inferential Statistics for Data Analysis
- ☞ Data Tabulation and Graphical Presentation

UNIT III: Data Visualization Techniques

12 Hours

- ☞ Principles of Effective Visualization and Storytelling with Data
- ☞ Types of Visualizations
- ☞ Network and Citation Visualization
- ☞ Visualization of Time-Series and Multivariate Data
- ☞ Geographic Visualization and Mapping
- ☞ Visualization of Bibliometric and Scientometric Data

UNIT IV: Tools and Applications of Data Visualization

10 Hours

- ☞ Tools for Data Analysis and Visualization
- ☞ Data Visualization for Digital Libraries and Institutional Repositories
- ☞ Bibliometric and Scientometric Visualization Tools
- ☞ Dashboard Creation and Reporting
- ☞ Trends in Data Analytics and Visualization

Essential Readings

- ☞ CHEN (C). CiteSpace: A practical guide for mapping scientific literature. New York, Nova Science Publishers. 2016.
- ☞ EVERGREEN (SDH). Effective data visualization: The right chart for the right data. Thousand Oaks, CA, SAGE Publications. 2016.
- ☞ FRIENDLY (M) and DENIS (D). Milestones in the history of thematic cartography, statistical graphics, and data visualization. Toronto, York University. 2001.
- ☞ HEALY (K). Data visualization: A practical introduction. Princeton, Princeton University Press. 2018.

Suggested Readings

- ☞ KNAFLIC (CN). *Storytelling with data: A data visualization guide for business professionals*. Hoboken, NJ, Wiley. 2015.
- ☞ MUNZNER (T). *Visualization analysis and design*. Boca Raton, CRC Press. 2014.
- ☞ TUFTE (ER). *The visual display of quantitative information*. Cheshire, CT, Graphics Press. 2001.
- ☞ WILKE (CO). *Fundamentals of data visualization: A primer on making informative and compelling figures*. Sebastopol, CA, O'Reilly Media. 2019.