

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Integrated B.Tech.(CSE)-MBA
Course Code:	CSI0905
Course Title:	Data Visualization
Course Type:	(<input type="checkbox"/> Core/ <input type="checkbox"/> Value Added Course / <input checked="" type="checkbox"/> Department Elective / <input type="checkbox"/> Institute Elective/ <input type="checkbox"/> University Elective/ <input type="checkbox"/> Open Elective / <input type="checkbox"/> Any other)
Year of Introduction:	2022-23

L	T	Practical Component				C
		LPW	PW	W	S	
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Course Learning Outcomes (CLOs):

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

1. define the visualization concepts and their usages (BL1)
2. interpret different types of visualization techniques (BL2)
3. apply visualization techniques for visualizing streaming data of various domains (BL3)
4. discover different visualization tools to do data analysis (BL4)

Syllabus:

Total Teaching hours: 30

Unit	Syllabus	Teaching hours
Unit-I	Introduction to Visualization: Defining data visualization and its importance, the value and goals of visualization, types of visualizations, pragmatic and artistic visualization, visual principles, visualization tools like Java Script	06
Unit-II	Data Visualization with Python: Introduction to and comparison of Python for data visualization, visualization using Python libraries and techniques, standard plotting libraries, Matplotlib and Seaborn, Data management in Python and connecting to MySQL, Demos of visualizations in Python. Exploring the Data Spectrum: charting Primitives (Data Points, Line Charts, Bar Charts, Pie Charts, Area Charts, scatter plots, histogram),	08
Unit-III	Exploring advanced Visualizations: (Candlestick Charts, Bubble Charts, Surface Charts, Map Charts, Infographics). Exploring non-numeric data visualization techniques.	06
Unit-IV	Streaming Visualizations: Real-time data visualizations of devices connected to IoT/cloud, Introduction to streaming data, solving problems with visualizations tools: cloud/IOT applications	05
Unit-V	Case Study: Understanding the business problem, gathering the data, processing the data, analyzing the data, visualizing the data, presenting the visuals.	05

Self-Study: The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents

- Suggested Readings/References:
1. McKinney, Wes. Python for data analysis: Data wrangling with Pandas, NumPy, and IPython. " O'Reilly Media, Inc."
 2. Tim Grobmann, Mario Dobler. Data Visualization with Python, "O'Reilly Media, Inc."
 3. Anthony Aragues. Visualizing Streaming Data, "O'Reilly Media, Inc."
 4. Ellis, Byron. Real-time analytics: Techniques to analyze and visualize streaming data. John Wiley & Sons.
 5. Guido Van Smit. Python for Data Analysis: A Complete Crash Course on Python for Data Science to Learn Essential Tools and Python Libraries, NumPy, Pandas, Jupyter Notebook, Analysis and Visualization

Suggested List of Experiments:	Sr. No.	Title	Hours
	1	Installing the Python IDE. Writing short Python code using functions, loops, arrays, dictionaries, strings, if statements and various data structures like list, tuple, dictionaries	02
	2	Write a Python Program to explore various functionalities of numpy and pandas Explore libraries for numerical data cleaning such as filling missing values, normalization, scaling and other, taking appropriate dataset	02
	3	Perform the data visualization using the Bar Plot, Pie Chart	02
	4	Perform the python practical on seaborn scatter plot for data visualization	02
	5	Connect to the MySQL to retrieve data and perform visualization	02
	6	Explore Non-numeric Data: Visualization of Information extracted from non-numeric data such as histogram	02
	7	Explore advanced visualization techniques using candlestick	02
	8	Explore graph libraries to visualize network/structural data	02
	9	Explore Data visualization using streaming platform such as Thing speak	02
	10	Explore following tools: IBM Cognos Analytics, Qlik, Looker, Google Data Studio	02

Suggested Case List: -NA-

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