GUJARAT TECHNOLOGICAL UNIVERSITY

"Course Name"

Semester: 7

Branch: Artificial Intelligence And Data Science

Subject Name: Data Visualization and Modeling

Subject Code: 3174301

Prerequisite: Basics of Python Programming, Python Data Analysis

Rationale: The graphical depiction of data is known as data visualization, and it is used to effectively and dynamically communicate insights to clients, customers, and stakeholders in general. It is a means to condense your findings and present them in a way that makes them easier to read and can be used to spot patterns or trends. This course will teach you how to design engaging charts and visuals that will appeal to your audience while also increasing their usefulness.

Course Scheme:

Teaching Scheme			Total Credits	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial/ Practical		
L	T	P	C	University exams (ESE)	Progressive Assessment (PA)	External Practical /viva Exam(ESE)	Internal evaluation Practical /viva Exam(PA)	
3	-	2	4					

Course Content:

Unit No.	Content	No. of Hours	Weightage (%)
1	**Introduction to Data Visualization Tools** Python Libraries for Visualization, Power BI, Tableau	07	20%
2	**Data Visualization Tools in Python** Introduction to Matplotlib, Basic Plotting with Matplotlib, Line Plots, Area Plots, Histograms, Bar Charts, Pie Charts, Box Plots Scatter Plots, Bubble Plots	08	25%
3	**Advanced Visualization Tools** Waffle Charts, Word Clouds Introduction to Seaborn: Seaborn functionalities and usage, Spatial Visualizations and Analysis in Python with Folium, Case Study.	08	20%
4	**Power BI** Power BI Desktop: Powe BI Architecture, Power BI Dashboard, Creating Power BI Visualization, DAX functions, Power BI Service, Power BI Report Server	11	20%
5	**Data Modeling** Data model, Data modeling, Data modeling process, Levels of data abstraction, various data models, advantages and disadvantages of data models, Apply data modelling and navigation in Power BI	08	15%
	Total Hours:	42	100%

Textbook:

1. Core Python Programming - Second Edition, R. Nageswara Rao, Dreamtech Press.

2. Communicating Data with Tableau by Ben Jones, O'Reilly Media, Inc.

Reference Books:

1. Beautiful Visualization: Looking at Data through the Eyes of Experts (Theory in Practice) by by Julie Steele, O'Reilly Media, Inc.
2. Practical Tableau by Ryan Sleeper, O'Reilly Media, Inc.
3. Data Visualization with Python and JavaScript by Kyran Dale, O'Reilly Media, Inc

Course Outcomes:

No.	Course Outcomes	RBT Level*
1	Understand usage of various visualization packages	UN
2	Create various visualization charts	CR
3	Analyze various Business applications and visualize it	AN
4	Apply data visualization tools on various data sets.	AP

*RM: Remember, UN: Understand, AP: Apply, AN: Analyze, EL: Evaluate, CR: Create

Suggested Course Practical List:

1. Introduction to Matplotlib and Line Plots
2. Use Waffle Charts, Word Clouds, and Regression Plots
3. Prepare various charts using datasets
4. Prepare data model using PowerBI

List of Laboratory/Learning Resources Required:

- Software: Anaconda Distribution (https://www.anaconda.com/)
- Google Colab (https://colab.research.google.com/)
- Python with Data Visualization Libraries (Jupyter Notebooks)

Other Resources/MOOCs:

1. https://cognitiveclass.ai/courses/data-visualization-python
2. https://in.coursera.org/learn/datavisualization
3. https://www.edx.org/course/data-science-visualization