SARVAJANIK UNIVERSITY
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SARVAJANIK UNIVERSITY
Sarvajanik College of Engineering and Technology
Bachelor of Technology

Year: B. Tech IV (Semester VII)

Subject Name: Data Analysis and Visualization **Subject Code:** BTCO15702
Type of course: Open Elective - 3
Prerequisite (if any): Python programming, Statistics

List of Courses where this course will be prerequisite: -

Rationale: In Today's commercial world, automation helps the users with a sophisticated set of Data analytic and visualization tools to organize data, analyze and visualize data in meaningful forms. Data visualisation is a powerful method for communicating data-driven results, inspiring analyses, and identifying flaws. This in turn, helps in taking important decisions for improvising the businesses / other walks of life. This course will teach you how to analyse and visualize those analytics in order to gain valuable insights and advance your career.

Teaching and Examination Scheme:

Teaching Scheme				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	
2	0	2	3	60	25	15	30	20	150

CA1: Continuous Assessment (assignments/projects/open book tests/closed book tests CA2: Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems TEE: Term End Examination TEP: Term End Practical Exam (Performance and viva on practical skills learned in course) CA3: Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in course

Content:

Sr. No	Content	Total Hrs
1	Data Analysis Fundamentals: Scales of Measurement - Categorical, Quantitative (Ordinal, Nominal, Interval, Ratio), Statistical and non-statistical analysis	2
2	Introduction to Data Visualization : Acquiring, Creating and Visualizing Data, Anatomy of Data Visualization, Applications of Data Analysis and Visualization	3
3	Data Analysis and Visualization with Excel: Create and Modify Tables, Sort and Filter Data, Data Visualizations using conditional formatting, sparklines and number formats, create charts in Microsoft Excel using various charting techniques with real-world examples, Pivot Tables, Basics of Macros	10

4	Plotting with Python library Matplotlib : Introduction to Matplotlib, , Statistical Graphics for univariate, bivariate, multivariate, 2D Plotting: Scatter plot, Line Plot, Boxplot, Histograms, Density plot, Heat map	7
5	Tableau : Getting to Know Tableau for Data Visualization, Tableau Data Sources, Tableau Worksheets, Tableau Calculations, Tableau Sort & Filters, Tableau Charts, Tableau Dashboard, Motion Charts, Tell the Story of Your Data	8

Reference Books:

Sr No	Title of book /article	Author(s)	Publisher and details like ISBN	Year of publication	Publication Edition
1	The Visual Display of Quantitative Information	E. Tufte.	Graphics Press,	2001	2nd Edition
2	Statistical Analysis with Excel For Dummies	Joseph Schmull	For Dummies ISBN-13	2019	4th Edition
3	Excel Data Analysis For Dummies	Paul McFedries	John Willy and sons	2019	.4th Edition
4	Mastering python for data science	Samir Madhavan	Ingram short title, ISBN : 978-1784390150	2015	1st Edition
5	Visual Analytics with Tableau	Alexander Loth	Wiley		1st Edition
6	Storytelling with Data: Let's Practice!	Cole Nussbaumer Knaflic	wiley		1st Edition

Course Outcomes:

Sr. No.	CO statement	Marks % weightage
CO-1	Distinguish between statistical and non-statistical data analysis	15

CO-2	Distinguish various visual presentations of data used for effective communication	20
CO-3	Apply various principles of visual perception using excel	20
CO-4	Demonstrate the use of various tools for visualization	25
CO-5	Analyse the data acquired using appropriate tool	20

List of Open learning website:

List of Open Source Software:

1. Matplotlib
2. Dashboards
3. Googel Charts and
4. Google Maps API

FOR LAB SESSIONS:

List of Experiments:

Sr. No.	Practical
1	Develop Following Program Using Excel a. Develop the simple bar chart b. Read the data .txt file and draw Data Table c. Read the data .txt file and draw Simple Bar Chart d. Read the data .csv file and draw Data Table e. Read the data .csv file and draw Column Bar Chart F. Plot the speedo meter chart for the point e F. Explore basic functionalities of Macro
2	Features and functions to manage and analyze large amounts of data with Excel. (Self learning on cars dataset) **Resource:** https://www.tutorialspoint.com/excel_data_analysis/excel_data_analysis_quick_guide.htm 1. Sort Excel data on one column or multiple columns. 2. Filter Excel data to display records that meet certain criteria.

	3. Apply conditional formatting to highlight cells with a certain color, depending on the cell's value. 4. Creating charts with excel. 5. Pivot table 6. Analysis ToolPak for financial, statistical and engineering data analysis.
3	Develop different charts like Histograms, Line Plot, Density plot, Scatter plot, Boxplot, HeatMap using MatplotLib
4	Develop different charts like Bar Chart, Line Chart, Pie Chart, Gantt Chart , Scatter Plot with Tableau
5	Implement Simple Tableau Dashboard for appropriate data
4	Mini Project to app ly the visualization skills using various tools.