DHANALAKSHMI SRINIVASAN ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)
Re-Accredited with 'A' Grade By NAAC, Accredited by TCS.
Accredited by NBA (AERO, CSE, IT & MECH)
Re-Accredited by NBA (BME, ECE, EEE)
PERAMBALUR - 621212.

COURSE PLAN (2025-2026 ODD SEMESTER)

Course Code/Name	**U20AI704 / DATA VISUALIZATION TECHNIQUES**			
Year/Section/Department	**IV/ AI&DS**			
Credits Details	**L:3**	**T:0**	**P:0**	**C:3**
Total Contact Hours Required	**45**			

Syllabus:

UNIT I	**CORE SKILLS FOR VISUAL ANALYSIS**	**9**
Information visualization – effective data analysis – traits of meaningful data – visual perception –making abstract data visible – building blocks of information visualization – analytical interaction – analytical navigation – optimal quantitative scales – reference lines and regions – trellises and crosstabs – multiple concurrent views – focus and context – details on demand – over-plotting reduction – analytical patterns – pattern examples.		
UNIT II	**TIME-SERIES, RANKING, AND DEVIATION ANALYSIS**	**9**
Time-series analysis – time-series patterns – time-series displays – time-series best practices – part-to-whole and ranking patterns – part-to-whole and ranking displays – best practices – deviation analysis – deviation analysis displays – deviation analysis best practices.		
UNIT III	**DISTRIBUTION, CORRELATION, AND MULTIVARIATE ANALYSIS**	**9**
Distribution analysis – describing distributions – distribution patterns – distribution displays – distribution analysis best practices – correlation analysis – describing correlations – correlation patterns – correlation displays – correlation analysis techniques and best practices – multivariate analysis – multivariate patterns – multivariate displays – multivariate analysis techniques and best practices.		
UNIT IV	**INFORMATION DASHBOARD DESIGN I**	**9**
Information dashboard – Introduction– dashboard design issues and assessment of needs – Considerations for designing dashboard-visual perception – Achieving eloquence.		
UNIT V	**INFORMATION GRAPHICS DESIGN II**	**9**
Advantages of Graphics _Library of Graphs – Designing Bullet Graphs – Designing Sparklines – Dashboard Display Media –Critical Design Practices – Putting it all together- Unveiling the dashboard.		

Objective:

- ❖ To develop skills to both design and critique visualizations.
- ❖ To introduce visual perception and core skills for visual analysis.
- ❖ To understand visualization for time-series analysis.

- To understand visualization for ranking analysis.
- To understand visualization for deviation analysis.
- To understand visualization for distribution analysis.
- To understand visualization for correlation analysis

Text Book:

T1. Ben Fry, "Visualizing data: Exploring and explaining data with the processing environment", O'Reilly, 2008.

T2. Edward R. Tufte, "The visual display of quantitative information", Second Edition, Graphics Press, 2001.

T3. Evan Stubbs, "The value of business analytics: Identifying the path to profitability", Wiley, 2011.

T4. Gert H. N. Laursen and Jesper Thorlund, "Business Analytics for Managers: Taking business intelligence beyond reporting", Wiley, 2010.

T5. Nathan Yau, "Data Points: Visualization that means something", Wiley, 2013.

Reference Book:

R1. Stephen Few, "Information dashboard design: Displaying data for at-a-glance monitoring", second edition, Analytics Press, 2013.

R2. Stephen Few, "Now you see it: Simple Visualization techniques for quantitative analysis", Analytics Press, 2009.

R3. Tamara Munzner, Visualization Analysis and Design, AK Peters Visualization Series, CRC Press, Nov. 2014

Website:

W1: Visualising Data: http://www.visualisingdata.com

W2: The Dashboard Spy: http://www.dashboardspy.com

Online Mode of Study (if Any):

NPTEL details can be listed.

Data Visualization-Link: http://nptel.ac.in/courses/106/106/106106179/

Course Plan:

Topic Number	Topic	Reference Detail	Page Number	Mode of teaching	Number of Periods Required	Cumulative Period
UNIT I	**CORE SKILLS FOR VISUAL ANALYSIS**					
1	Information visualization, Effective data analysis	T1	3-20	BB	1	1
2	Traits of meaningful data, Visual perception	T2	25-45	BB	1	2
3	Making abstract data visible, Building blocks of information visualization	T1	23-35	BB	1	3
4	Analytical interaction, Analytical navigation	T3	50-70	BB	1	4
5	Optimal quantitative scales	T1	40-55	BB	1	5
6	Reference lines and regions, Trellises and crosstabs	R1	90-110	BB & VIDEO	1	6
7	Multiple concurrent views, Focus and context	R2	120-140	BB & VIDEO	1	7
8	Details on demand, Over-plotting reduction	T1	60-80	BB	1	8
9	Analytical patterns, Pattern examples.	T2	100-120	BB	1	9
Outcome of Unit I: **CO1 :** Explain principles of visual perception						
UNIT II TIME-SERIES, RANKING, AND DEVIATION ANALYSIS						
10	Time-series analysis	T3	80-100	BB & VIDEO	1	10
11	Time-series patterns	T1	85-105	BB	1	11
12	Time-series displays	T1	110-130	BB	1	12
13	Time-series best practices	R1	140-160	BB & VIDEO	1	13
14	Part-to-whole and ranking patterns	T1	135-155	BB	1	14
15	Part-to-whole and ranking displays	T2	165-185	BB	1	15
16	Best practices, deviation analysis	T3	110-130	BB	1	16
17	Deviation analysis displays	T1	140-160	BB	1	17

18	Deviation analysis best practices.	T2	190-210	BB	1	18
Outcome of Unit II: **CO2 :** Apply core skills for visual analysis						
UNIT III DISTRIBUTION, CORRELATION, AND MULTIVARIATE ANALYSIS						
19	Distribution analysis, describing distribution	T1	170-190	BB	1	19
20	Distribution patterns	R2	220-240	BB & VIDEO	1	20
21	Distribution displays	T1	200-220	BB	1	21
22	Distribution analysis best practices	T1	230-250	BB	1	22
23	Correlation analysis, describing correlations	T3	140-160	BB	1	23
24	Correlation patterns , correlation displays	T1	260-280	BB	1	24
25	Correlation analysis techniques and best practices	T2	230-250	BB	1	25
26	Multivariate analysis, multivariate patterns, multivariate displays	T1	270-290	BB	1	26
27	Multivariate analysis techniques and best practices.	T3	170-190	BB	1	27
Outcome of Unit III: **CO3:** Apply visualization techniques for various data analysis tasks						
UNIT IV INFORMATION DASHBOARD DESIGN I						
28	Information dashboard	T1	300-320	BB	1	28
29	Introduction	T1	320-340	BB	1	29
30	Dashboard design issues	R1	250-270	BB & VIDEO	1	30
31	Dashboard design assessment of needs	R1	280-300	BB & VIDEO	1	31
32	Considerations for designing dashboard	R1	310-330	BB	1	32
33	Considerations for designing dashboard	T1	350-370	BB	1	33
34	Considerations for designing dashboard	T1	380-400	BB	1	34
35	Visual perception	T2	270-290	BB	1	35
36	Achieving eloquence	T1	410-430	BB	1	36
Outcome of Unit IV: **CO4 :** Design information dashboard.						

UNIT V INFORMATION GRAPHICS DESIGN II						
37	Advantages of Graphics	T1	440-460	BB	1	37
38	Library of Graphs	T1	470-490	BB	1	38
39	Library of Graphs	R3	290-310	BB & VIDEO	1	39
40	Designing Bullet Graphs	T2	300-320	BB	1	40
41	Designing Sparklines	T1	330-350	BB	1	41
42	Dashboard Display Media	R1	360-380	BB & VIDEO	1	42
43	Critical Design Practices	R3	390-410	PPT	1	43
44	Putting it all together	R3	420-440	PPT	1	44
45	Unveiling the dashboard	R3	450-470	PPT	1	45
Outcome of Unit V: **CO5:** Design information dashboard.						

Course Outcome:

At the end of course:(Consolidated outcome)

Students should be able to do:

CO1 : Explain principles of visual perception

CO2 : Apply core skills for visual analysis

CO3: Apply visualization techniques for various data analysis tasks

CO4 & CO5: Design information dashboard.

Course Outcome Vs Program Outcome Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	3	-	-	-	-	-	-	-	2	2
CO 2	3	3	1	-	-	-	-	-	-	-	2	2
CO 3	3	3	1	-	-	-	-	-	-	-	2	2
CO 4	3	3	1	-	-	-	-	-	-	-	2	2
CO 5	3	3	1	-	-	-	-	-	-	-	2	2
AVG	3	3	1	-	-	-	-	-	-	-	2	2

[Levels of correlation: 3 (High), 2 (Medium), 1(Low)]

Content Beyond Syllabus:

- Case Study: Visualization in Business Analytics
- Case Study: Visualization in Healthcare

Internal Evaluation Components:

Webportal	Assignment	Components	Topic Number with Topic / Unit Details	Relevance to CO
Webportal 1	--	Assessment – I (60)	Unit I and II	CO 1 & CO2
	1	Assignment – Handwritten (20)	1. Building blocks of information visualization 2. Analytical interaction and navigation 3. Time-series analysis and time-series patterns	
	2	Assignment – Poster Presentation / PPT (20)	1. Over-plotting reduction 2. Part-to-whole and ranking displays 3. Deviation analysis displays	
Webportal 2	--	Assessment – II (60)	Unit III and IV	CO3 & CO4
	3	Seminar (20)	1. Distribution analysis best practices 2. Multivariate analysis, patterns and displays 3. Dashboard design issues and assessment of needs	
	4	Case Study Report (20)	1. Multivariate analysis techniques and best practices. 2. Considerations for designing dashboard 3. Visual perception	
Webportal 3	--	Model Exam (75)	Unit I to V	CO1 to CO6
	5	MCQ (15)	Unit I to V	CO1 to CO6
	-	Course Attendance (10)	--	--

Submission Details:

Phase 1(Before AT 1)		Phase 2 (Before AT 2)		Phase 3 (Model)
Assignment 1	Assignment 2	Assignment 3	Assignment 4	Assignment 5

Google Class Code Details:

Class Name:IV AI&DS Data Visualization

Link:https://classroom.google.com/c/NzAwNzkzODQ4ODI4?cjc=tqbr543

PLAN OF ASSESSMENT TEST –DISTRIBUTION OF MARKS:

TEST	CO- MARK WISE DISTRIBUTION						BLOOM'S LEVEL MARK WISE DISTRIBUTION					
AT-1	CO 1	CO 2	CO 3	CO 4	CO 5	CO 6	BTL 1	BTL 2	BTL 3	BTL 4	BTL 5	BTL6
AT-2	CO 1	CO 2	CO 3	CO 4	CO 5	CO 6	BTL 1	BTL 2	BTL 3	BTL 4	BTL 5	BTL6
MODEL	CO 1	CO 2	CO 3	CO 4	CO 5	CO 6	BTL 1	BTL 2	BTL 3	BTL 4	BTL 5	BTL6

Prepared By **Verified By**

Approved By

Principal