



**DHANALAKSHMI SRINIVASAN ENGINEERING COLLEGE
(AUTONOMOUS)**

(Approved by AICTE & Affiliated to Anna University, Chennai)

Re-Accredited by NAAC with 'A' Grade

Accredited by NBA for AERO, BME, CSE, ECE, EEE, IT & MECH.

PERAMBALUR-621212, TAMILNADU, INDIA.

Website: www.dsengg.ac.in



COURSE PLAN (2025-2026 EVEN SEMESTER)

Course Code/Name	U23ITV31 / DATA WAREHOUSING			
Year/Section/Department	III / A,B,C / AI&DS			
Credits Details	L:3	T:0	P:0	C:3
Total Contact Hours Required	45			

Syllabus:

UNIT I INTRODUCTION TO DATA WAREHOUSE	9
Introduction - components- operational database Vs data warehouse – Data warehouse Architecture – Three - tier Data Warehouse Architecture - Autonomous Data Warehouse- Autonomous Data Warehouse Vs Snowflake - Modern Data Warehouse	
UNIT II ETL AND OLAP TECHNOLOGY	9
ETL Vs ELT – Types of Data warehouses - Data warehouse Design and Modeling - Delivery Process - Online Analytical Processing (OLAP) - Characteristics of OLAP - Online Transaction Processing (OLTP) Vs OLAP - OLAP operations- Types of OLAP- ROLAP Vs MOLAP Vs HOLAP.	
UNIT III META DATA, DATA MART AND PARTITION STRATEGY	9
Meta Data – Categories of Metadata – Role of Metadata – Metadata Repository – Challenges for Meta Management - Data Mart – Need of Data Mart- Cost Effective Data Mart- Designing Data Marts- Cost of Data Marts- Partitioning Strategy – Vertical partition – Normalization – Row Splitting – Horizontal Partition.	
UNIT IV DIMENSIONAL MODELING AND SCHEMA	9
Dimensional Modeling- Multi-Dimensional Data Modeling – Data Cube- Star Schema- Snowflake schema- Star Vs Snowflake schema- Fact constellation Schema- Schema Definition - Process Architecture- Types of Data Base Parallelism – Data warehouse Tools.	
UNIT V SYSTEM & PROCESS MANAGERS	9
Data Warehousing System Managers: System Configuration Manager- System Scheduling Manager - System Event Manager - System Database Manager - System Backup Recovery Manager - Data Warehousing Process Managers: Load Manager – Warehouse Manager- Query Manager – Tuning – Testing	

Objective:

The main learning objective of this course is to prepare the students:

- ❖ To introduce the fundamental concepts of data warehouse architecture, design, and implementation.
- ❖ To equip students with knowledge of ETL processes (extraction, transformation, loading).
- ❖ To teach data modeling techniques like star and snowflake schemas.
- ❖ To differentiate schema types and explore data warehousing process architecture and parallelism.
- ❖ To understand the roles of Data Warehousing Process and System Configuration Managers.

Text Book:

T1: Jiawei Han and Micheline Kamber, Data Mining: Concepts and Techniques, Morgan Kaufmann Publishers, Third Edition, 2011, ISBN: 1558604898.

T2: Alex Berson and Stephen J. Smith, Data Warehousing, Data Mining & OLAP, Tata McGraw-Hill, Tenth Reprint, 2007.

T3: G. K. Gupta, Introduction to Data Mining with Case Studies, Eastern Economy Edition, Prentice Hall of India, 2006.

Reference Book:

R1: Ponniah, Paulraj, Data Warehousing Fundamentals for IT Professionals, Wiley Publications, Second Edition, 2010.

R2: Ralph Kimball and Margy Ross, The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling, Wiley Publications, Third Edition, 2013.

R3: W. H. Inmon, Building the Data Warehouse, Wiley Publications, Fourth Edition, 2005.

R4: Michael J. A. Berry and Gordon S. Linoff, Data Mining Techniques:

For Marketing, Sales, and Customer Relationship Management, Wiley Publications, Third Edition, 2011.

R5: Sam Anahory and Dennis Murray, Data Warehousing in the Real World: A Practical Guide for Building Decision Support Systems, Pearson Education, 2003.

Website:

Here are some direct website links to learn about Data Mining:

W1: <https://www.geeksforgeeks.org/data-science/data-mining/> (Geeks for Geeks)

W2: https://www.tutorialspoint.com/data_mining/index.htm (Tutorials Point)

W3: <https://www.edx.org/learn/data-mining> (edx.org)

Online Mode of Study (if Any):

❖ https://onlinecourses.nptel.ac.in/noc20_mg24/preview

❖ https://onlinecourses.nptel.ac.in/noc26_cs58/preview

Course Plan:

S. No	Topic	Reference Detail	Page No.	Mode of Teaching	Periods	Cumulative
UNIT I – INTRODUCTION TO DATA WAREHOUSE						
1	Introduction	T1	105–110	BB	1	1
2	Components of Data Warehouse	T2	21–40	BB	1	2
3	Operational Database vs Data Warehouse	T1	106–108	BB	1	3
4	Data Warehouse Architecture	T1	108–112	BB	1	4

5	Three-tier Data Warehouse Architecture	T3	402–406	PPT	1	5
6	Autonomous Data Warehouse	T2	200–220	BB	1	6
7	Autonomous DW vs Snowflake	T3	410–414	BB	1	7
8	Modern Data Warehouse	T2	236–250	PPT	2	9
Outcome of Unit I:						
CO1: Design a Data warehouse system and perform business analysis with OLAP tools						
UNIT II – ETL AND OLAP TECHNOLOGY						
9	ETL Overview & Extraction	T1	255–265	BB	1	10
10	Transformation & Loading	T1	266–280	BB	1	11
11	ETL Tools & Data Cleaning	T2	281–295	PPT	1	12
12	OLAP Concepts	T1	310–325	BB	1	13
13	OLAP vs OLTP	T1	326–330	PPT	1	14
14	Types of OLAP Servers	T3	430–438	BB	1	15
15	OLAP Operations	T1	331–340	BB	3	18
Outcome of Unit II:						
CO2: Apply suitable pre-processing and visualization techniques for data analysis						
UNIT III – DATA WAREHOUSE MODELLING						
16	Multidimensional Data Model	T1	345–352	BB	1	19
17	Data Cubes	T1	353–360	BB	1	20
18	Star Schema	T2	150–160	BB	1	21
19	Snowflake Schema	T2	161–170	BB	1	22
20	Fact Constellation Schema	T2	171–178	BB	1	23
21	Schema Comparison	T3	450–455	PPT	1	24
22	Modeling Case Study	T3	524-529	BB	3	27
Outcome of Unit III:						
CO3: Compare and contrast KDD versus Data mining.						
UNIT IV – DATA WAREHOUSE IMPLEMENTATION & TOOLS						
23	DW Implementation Steps	T1	380–390	BB	1	28
24	Metadata Management	T2	190–198	BB	1	29
25	Data Warehouse Security	T3	201-209	BB	1	30
26	Data Warehouse Testing	T3	423-428	BB	1	31
27	Commercial DW Tools	T3	470–480	PPY	2	33
28	Cloud Data Warehouse	T2	221–235	BB	3	36
Outcome of Unit IV:						
CO4: Apply appropriate classification and clustering techniques for data analysis.						
UNIT V – BUSINESS INTELLIGENCE & APPLICATIONS						
29	Business Intelligence Concepts	T1	500–510	BB	1	37
30	BI Architecture	T1	511–520	BB	1	38
31	Dashboards & Reporting	T2	300–315	PPT	2	40
32	Data Warehouse Applications	T3	420-424	BB	1	41
33	Case Studies	T3	511-515	BB	1	42
34	Emerging Trends in BI	T3	428-434	BB	3	45
Outcome of Unit V:						
CO5: Explain the concept of Spatial databases and temporal databases.						
CO6: Understand the concept of Graph mining and web mining.						

Course Outcome:**At the end of course: (Consolidated outcome)****Students should be able to do:****CO1:** Design a Data warehouse system and perform business analysis with OLAP tools.**CO2:** Apply suitable pre-processing and visualization techniques for data analysis.**CO3:** Compare and contrast KDD versus Data mining.**CO4:** Apply appropriate classification and clustering techniques for data analysis.**CO5:** Explain the concept of Spatial databases and temporal databases.**CO6:** Understand the concept of Graph mining and web mining.**Course Outcome Vs Program Outcome Mapping:**

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	2	2	3	2	2	1	–	1	–	1	–	1	3	2	2
CO2	3	3	2	2	3	1	–	1	–	1	–	1	3	3	2
CO3	2	3	–	–	–	–	–	1	–	–	–	1	1	1	1
CO4	3	3	2	2	3	1	–	1	–	1	–	1	3	3	2
CO5	2	2	–	–	–	1	–	1	–	–	–	1	1	1	1
CO6	2	2	–	–	2	1	–	1	–	–	–	1	2	2	2
AV G	3	3	2	2	3	1	–	1	–	1	–	1	3	3	2

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

Content Beyond Syllabus:

<ul style="list-style-type: none"> ❖ Big data ❖ R tool ❖ Data Analytics 	<ul style="list-style-type: none"> ❖ Weka Tool ❖ Enterprise data warehouse
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Internal Evaluation Components:

Web portal	Assignment	Components	Topic Number with Topic / Unit Details	Relevance to CO
Web portal 1	--	Assessment – I (60)	Unit I and II	CO 1 & CO2
	1	Assignment –I Handwritten (20)	1. Building a Data warehousing 2. Data Staging (ETL) Design and Development warehouses	
	2	Assignment – II Poster Presentation / PPT (20)	1. Stars, Snowflakes, and Fact constellations 2. Types of OLAP servers	
Web portal 2	--	Assessment – II (60)	Unit III and IV	CO3 & CO4
	3	Assignment – III Seminar (20)	1. Stages of the Data Mining Process 2. Bayesian Classification	
	4	Assignment – IV Case Study Report (20)	1. Data mining query languages 2. Decision Tree Induction	
Web portal 3	--	Model Exam (75)	Unit I to V	CO1 to CO6
	5	Assignment – V 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: III-B

Link: <https://classroom.google.com/c/ODI0MDQzMTAyMTA3?cjc=twkh72gy>

PLAN OF ASSESSMENT TEST –DISTRIBUTION OF MARKS:

TEST	CO- MARK WISE DISTRIBUTION						BLOOM'S LEVEL MARK WISE DISTRIBUTION					
	CO 1	CO 2	CO 3	CO 4	CO 5	CO 6	BTL1	BTL2	BTL3	BTL4	BTL5	BTL6
AT-1												
AT-2												
MODEL												

Prepared By

Verified By

**Approved By
Principal**