



SRI VENKATESWARA UNIVERSITY

4-Year UG Honours in B.Sc. (Data Mining) as Major in consonance with Curriculum framework (W.E.F. AY-2026-27)

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
II	IV	8	Data Warehousing & OLAP	3	3
			Data Warehousing & OLAP-Practical	2	1
		9	Big Data Tools & Technologies	3	3
			Big Data Tools & Technologies-Practical	2	1
		10	Data Communications and Computer Networks	3	3



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II Year Syllabus for 4-Year UG Honours in B.Sc. (Data Mining) as Major in consonance with the Curriculum framework w.e.f. AY 2026-27

II Year IV Semester

Sl. No.	Category	Course No.	Course Name	No. of Hours		Total No. of Hours	No. of Credits		Total No. of Credits
				Theory	Practical		Theory	Practical	
1	Major-Core	8	Data Warehousing & OLAP	3	2	5	3	1	4
2	Major-Core	9	Big Data Tools & Techniques	3	2	5	3	1	4
3	Major-Core	10	Data Communications and Computer Networks	3	2	5	3	1	4
4	Minor	2		3	2	5	3	1	4
5	MDC	3		2	0	2	2	0	2
6	SEC	4	SEC: Design Thinking/Problem solving/ others	2	0	2	2	0	2
				16	8	24	16	4	20

SEMESTER-IV

COURSE 8: DATA WAREHOUSING AND OLAP

Theory

Credits: 3

3 hrs/week

Course Objectives:

1. To understand the fundamentals of data warehousing, OLTP vs OLAP, architectures, data sources, and ETL processes.
2. To learn data modeling techniques including star, snowflake, and fact constellation schemas with cube operations.
3. To study OLAP concepts, types (ROLAP, MOLAP, HOLAP), and query processing for analytical decision-making.
4. To explore data warehouse implementation stages like ETL, cleansing, integration, and modern tools.
5. To gain knowledge of optimization, security, real-time warehousing, cloud solutions, and BI tool integration.

Syllabus:

UNIT-1:

Introduction to Data Warehousing, Basics of Data Warehousing, Difference between OLTP and OLAP, Data Warehouse Architecture, Data sources, ETL (Extract, Transform, Load) process, Data staging, Data warehouse storage, Metadata and tools, Data Marts (dependent and independent)

Data Warehouse models: Top-down vs Bottom-up

UNIT-2: Data Modeling and Design

Multidimensional data model, Star Schema, Snowflake Schema, Fact Constellation

Fact tables and Dimension tables, Measures: additive, semi-additive, non-additive, Data Cube and operations: roll-up, drill-down, slice, dice, pivot, Concept hierarchies

UNIT 3: OLAP Technology

OLAP: Concepts and need, OLAP vs OLTP,

Types of OLAP systems: ROLAP (Relational OLAP), MOLAP (Multidimensional OLAP), HOLAP (Hybrid OLAP), OLAP Operations, OLAP Query Processing

UNIT 4: Data Warehouse Implementation

Data warehouse lifecycle, ETL Process: Data extraction from heterogeneous sources, Data transformation, Data loading and refresh, Data Cleansing and Data Integration,

Tools for ETL (e.g., Informatica, Talend, Apache Wi-fi)

UNIT 5: Data Warehouse Optimization and Management

Indexing techniques, Materialized views, Partitioning, Aggregation and performance tuning,

Backup and Recovery, Security and Privacy issues in data warehousing

Prescribed Textbooks:

1. "Data Warehousing in the Real World" by Sam Anahory and Dennis Murray
2. "Building the Data Warehouse" by W.H. Inmon
3. "Data Mining: Concepts and Techniques" by Jiawei Han and Micheline Kamber – for some OLAP topics

SEMESTER-IV

COURSE 8: DATA WAREHOUSING AND OLAP

Practical

Credits: 1

2 hrs/week

List of experiments:

1. Create OLTP tables and compare OLTP vs OLAP queries.
2. Design a Star Schema for Sales data warehouse.
3. Design a Snowflake Schema.
4. Design a Fact Constellation Schema.
5. Implement Fact Table and Dimension Tables with sample data.
6. Perform ROLL-UP and DRILL-DOWN operations using SQL.
7. Perform SLICE and DICE operations.
8. Perform PIVOT operation on sales data.
9. Implement a simple ETL process (Extract–Transform–Load).
10. Demonstrate Data Cleansing (remove duplicates, handle NULLs).
11. Create a Materialized View and test query performance.
12. Implement Partitioning and Indexing on warehouse tables.

SRI VENKATESWARA UNIVERSITY::TIRUPATI
B.Sc. Data Mining Honours
II year IV Semester
COURSE 8: Data Warehousing & OLAP

MODEL QUESTION PAPER

Time: **3 Hours**

Max. Marks: **75**

PART-A

Answer any **FIVE** of the following. Each Question Carries 3 marks.

(5X3=15)

1. Short answer question from unit-I
2. Short answer question from unit-I
3. Short answer question from unit-II
4. Short answer question from unit-II
5. Short answer question from unit-III
6. Short answer question from unit-III
7. Short answer question from unit-IV
8. Short answer question from unit-IV
9. Short answer question from unit-V
10. Short answer question from unit-V

PART-B

Answer **FIVE** of the following. Each Question Carries 12 marks.

(5X12=60)

11. a) Essay question from Unit-I
OR
b) Essay question from Unit-I
12. a) Essay question from Unit-II
OR
b) Essay question from Unit-II
13. a) Essay question from Unit-III
OR
b) Essay question from Unit-III
14. a) Essay question from Unit-IV
OR
b) Essay question from Unit-IV
15. a) Essay question from Unit-V
OR
b) Essay question from Unit-V