



VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

An Autonomous Institute, Affiliated to JNTUH

Department of Electronics and Communication Engineering

IV B. TECH I SEMESTER 2021-2022

A4533–FUNDAMENTALS OF DBMS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course introduces the core principles and techniques required in the design and implementation of database systems. This course focus on relational database management systems, including database design theory: E-R modeling, data definition and manipulation languages, database security and administration. It also covers essential DBMS concepts such as: Transaction Processing, Concurrency Control, Recovery and various types of databases like distributed database, and intelligent database, Client/Server.

Course Pre/co requisites

1. A4531- Object oriented Programming

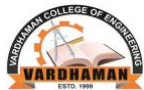
2. Course Outcomes (COs)

After the completion of the course, the learner will be able to:

CO#	CO Statement	BL#
CO1	Understand design and implementation of a database for a given problem domain.	L2
CO2	Construct Queries in Relational algebra, relational calculus and SQL.	L3
CO3	Apply Normalization techniques to reduce data redundancy in data base.	L4
CO4	Analyze various transaction control and recovery methods to keep data base consistent	L3

3. Course Articulation Matrix

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO2		3			3								3	3
CO3	2				3								3	
CO4	3		3										3	

**4. Justification for CO-PO Mapping**

S. No	CO #	PO#/ PSO#	Mapping Level	Justification
1	CO2	PO2	3	Students should be able to identify and analyze the how to structure the data and must be able to construct appropriate Queries in Relational algebra, relational calculus and SQL.
2	CO2	PO5	3	Use Oracle mySQL for writing and executing queries.
3	CO2	PSO1	3	Students can extend their knowledge for analyzing designing real time databases.
4	CO2	PSO2	3	Students can extend their knowledge for analyzing the errors and debug them accordingly while constructing the queries with real time databases.
5	CO3	PO1	2	Students must be able to apply fundamental knowledge of Normalization techniques to reduce data redundancy in data base.
6	CO3	PO5	3	Use Oracle mySQL for writing and executing queries.
7	CO3	PSO1	3	Students can extend their knowledge for analyzing designing real time databases.
8	CO4	PO1	3	Students must be able to apply fundamental engineering knowledge to analyze various transaction control and recovery methods to keep data base consistent.
9	CO4	PO3	3	Students must be able to design various transaction control and recovery methods to keep data base consistent.
10	CO4	PSO1	3	Students can extend their knowledge for analyzing designing real time databases.



5. Course Syllabus

INTRODUCTION: History of database systems, introduction to database management systems, database system applications, database systems versus file systems, view of data, data models, database languages- DDL & DML commands and examples of basic SQL queries, database users and administrators, transaction management.

SQL: Overview, the form of a basic SQL query, union, intersect and except operators, nested queries, aggregate operators, null values, complex integrity constraints in SQL, cursors, triggers.

SCHEMA REFINEMENT AND NORMAL FORMS: Functional dependencies, reasoning about FDs. Normal forms: 1NF, 2NF, 3NF, BCNF, properties of decompositions, normalization, schema refinement in database design, other kinds of dependencies: 4NF, 5NF.

TRANSACTIONS MANAGEMENT: Transaction concept, transaction state, implementation of atomicity and durability, concurrent executions, Anomalies due to interleaved execution of transactions, serializability, recoverability.

CONCURRENCY CONTROL AND RECOVERY SYSTEM: Concurrency control - lock based protocols, timestamp based protocols, validation based protocols, deadlock handling.

6. Books and Materials

Text Book:

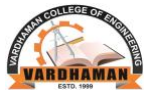
1. Raghurama Krishnan, Johannes Gehrke (2007), Database Management Systems, 3rd Edition, Tata McGraw-Hill, New Delhi, India.
2. Abraham Silberschatz, Henry F. Korth, S. Sudarshan (2010), Database System Concepts, 6th Edition, McGraw- Hill, New Delhi, India.

Reference Books:

1. ElmasriNavate (2014), Fundamentals of Database Systems, Pearson Education, India
2. C. J. Date, A. Kannan and S. Swamynathan(2009),An Introduction to Database Systems,3rd Edition,Pearson Education, India

7. Session Plan

Lecture #	Topics to be Covered
	UNIT I
1.	INTRODUCTION: History of database systems, Introduction to database management systems
2.	Database management system applications
3.	Database management systems versus file systems
4.	View of data, Database users and administrators



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Lecture #	Topics to be Covered
5.	Data models
6.	Data models
7.	Database languages - DDL commands and examples of basic SQL queries
8.	Database languages - DML commands and examples of basic SQL queries
9.	Database system structure
10.	Transaction management
11.	SQL: SQL Overview, the form of a basic SQL query, basic SQL queries examples
12.	Union, intersect and except operators
13.	Aggregate operators.
14.	Joins, Null Values
15.	Nested Queries
16.	Complex integrity constraints in SQL
17.	Cursors
18.	Triggers
19.	SCHEMA REFINEMENT AND NORMAL FORMS: Introduction to schema refinement
20.	Properties of decompositions
21.	Functional dependencies, reasoning about FDs
22.	Normalization , Normal forms: 1NF, 2NF
23.	3NF, BCNF
24.	Schema refinement in database design
25.	Other kinds of dependencies
26.	4NF
27.	5NF.
28.	Case study
29.	TRANSACTION MANAGEMENT: Transaction concept, transaction states
30.	ACID properties
31.	Implementation of atomicity and durability
32.	Concurrent executions
33.	Anomalies due to interleaved execution of transactions
34.	Serializability
35.	Recoverability
36.	CONCURRENCY CONTROL AND RECOVERY SYSTEM: Concurrency control - lock based protocols
37.	Time-stamp based protocols
38.	Validation based protocols
39.	Deadlock handling



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Lecture #	Topics to be Covered
40.	Deadlock handling
41.	Case Study or Micro-project
42.	Case Study or Micro-project

Course Lead