

DHANALAKSHMI SRINIVASAN ENGINEERING COLLEGE

(AUTONOMOUS)
 (Approved by AICTE & Affiliated to Anna University, Chennai)
 Accredited with 'A' Grade by NAAC, Accredited by TCS
 Accredited by NBA with BME, ECE & EEE

PERAMBALUR - 621 212. Tamil Nadu.

website : www.dsengg.ac.in

**COURSE PLAN (2024 – 2025 Odd Semester)**

Name of the Faculty				
Designation/Department	Assistant Professor / Information Technology			
Course Code/Name	U23ITI33/Database Management Systems			
Year/Section/Department	II / A & B / IT			
Credits Details	L: 3	T: 0	P:0	C:3
Total Contact Hours Required	45			

Syllabus:

UNIT I - RELATIONAL DATABASES	No. of Periods: 9
Purpose of Database System – Views of data – Data Models – Database System Architecture – Introduction to relational databases – Relational Model – Keys – Relational Algebra – SQL fundamentals – Advanced SQL features – Embedded SQL– Dynamic SQL	
UNIT II - DATABASE DESIGN	No. of Periods: 9
Entity-Relationship model – E-R Diagrams – Enhanced-ER Model – ER-to-Relational Mapping – Functional Dependencies – Non-loss Decomposition – First, Second, Third Normal Forms, Dependency Preservation – Boyce/Codd Normal Form – Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form	
UNIT III - TRANSACTIONS	No. of Periods: 9
Transaction Concepts – ACID Properties – Schedules – Serializability – Transaction support in SQL – Need for Concurrency – Concurrency control –Two Phase Locking- Timestamp – Multi version – Validation and Snapshot isolation– Multiple Granularity locking – Deadlock Handling – Recovery Concepts – Recovery based on deferred and immediate update – Shadow paging.	
UNIT IV - IMPLEMENTATION TECHNIQUES	No. of Periods: 9
RAID – File Organization – Organization of Records in Files – Data dictionary Storage –column Oriented Storage– Indexing and Hashing –Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing – Query Processing Overview – Algorithms for Selection, Sorting and join operations.	
UNIT V - DISTRIBUTED DATABASE	No. of Periods: 9
Distributed Databases: Architecture, Data Storage, Transaction Processing, Query processing and optimization – NOSQL Databases: Introduction – CAP Theorem – Document Based systems – Key value Stores – Column Based Systems – Graph Databases. Database Security: Security issues – Access control based on privileges – Role Based access control.	
TOTAL: 45 PERIODS	

Objectives:

1. To learn the fundamentals of data models and to represent a database system using ER diagrams.
2. To study SQL and relational database design.
3. To understand the internal storage structures using different file and indexing techniques which will help in physical DB design.
4. To understand the fundamental concepts of transaction processing- concurrency control techniques and recovery procedures.
5. To have an introductory knowledge about the Storage and Query processing Techniques

Text Book:

- T1:** Abraham Silberschatz, Henry F. Korth, S. Sudharshan, —Database System Concepts, Sixth Edition, Tata McGrawHill, 2011.
- T2:** Ramez Elmasri, Shamkant B. Navathe, —Fundamentals of Database Systems, Sixth Edition, Pearson Education, 2011.

Reference Book:

- R1:** C. J. Date, A. Kannan, S. Swamynathan, “An Introduction to Database Systems”, Eighth Edition, Pearson Education, 2006.

Website:

- W1:** https://www.brainkart.com/subject/Database-Management-Systems_380/
- W2:** <https://www.slideshare.net/OECLIBOdishaElectron/database-management-system-ppt>

Course Plan:

Topic Number	Topic	Reference Detail	Page Number	Mode of teaching	Number of Periods Required	Cumulative Period
UNIT I						
1	Purpose of Database System – Views of data	T1	3-9	BB	1	1
2	Data Models	T1	10-22	BB	1	2
3	Database System Architecture	T1	23-25	BB	1	3
4	Introduction to relational databases – Relational Model	T1	39-42	BB	1	4
5	Keys – Relational Algebra	T1/W1	45-48	BB	2	6

6	SQL fundamentals	T1/W1	57-63	PPT & Video	1	7
7	Advanced SQL features	T1	63-65	BB	1	8
8	Embedded SQL– Dynamic SQL	T1	65-72	BB	1	9
Outcome of Unit I:						
CO1: Explain the fundamental concepts of relational database and SQL. (K2)						
UNIT II						
9	Entity-Relationship model	T1	262-274	BB	1	10
10	E-R Diagrams	T1	274-283	BB	1	11
11	Enhanced-ER Model – ER-to- Relational Mapping	T1	295-304	BB & Video	1	12
12	Functional Dependencies – Non-loss Decomposition	T1	338-348	BB	1	13
13	First, Second, Third Normal Forms	T1	327-329	BB	1	14
14	Dependency Preservation – Boyce/Codd Normal Form	R1	229-238	BB	2	16
15	Multi-valued Dependencies and Fourth Normal Form	T1	355-360	PPT	1	17
16	Join Dependencies and Fifth Normal Form	T1	355-360	BB	1	18
Outcome of Unit II:						
CO2: Use ER model for Relational model mapping to perform database design effectively. (K3)						
UNIT III						
17	Transaction Concepts – ACID properties	T1	627-629	BB	1	19
18	Schedules	T1	635-641	BB	1	20
19	Serializability	T1/W2	641-646	BB	2	22
20	Transaction support in SQL – Need for Concurrency Control & Need	T1	661-674	BB	1	23
21	Two Phase Locking – Timestamp – Multi version	T1	620-625	BB	1	24

22	Validation and Snapshot isolation– Multiple Granularity locking	T1/W2	679-682	BB	1	25
23	Deadlock Handling – Recovery Concepts	T1	682-685	PPT & Video	1	26
24	Recovery based on deferred and immediate update – Shadow paging	T1	685-691	BB	1	27
Outcome of Unit III:						
CO3: Summarize the properties of transactions and concurrency control mechanisms. (K2)						
UNIT IV						
25	RAID	T1	441-449	BB	1	28
26	File Organization – Organization of Records in Files	T1	451-457	BB	1	29
27	Indexing and Hashing –Ordered Indices	T1	475-476	BB	1	30
28	B+ tree Index Files	T1/W1	485-500	BB	2	32
29	B tree Index Files	T1	500-506	BB	1	33
30	Static Hashing – Dynamic Hashing	R1	309-318	BB	1	34
31	Query Processing Overview – Algorithms for SELECT and JOIN operations	T1	537-541	PPT & Video	1	35
32	Data dictionary Storage – Column Oriented Storage.	T1	541-542	BB	1	36
Outcome of Unit IV:						
CO4: Outline the various storage and optimization techniques. (K2)						
UNIT V						
33	Distributed Databases: Architecture	T1	825-826	BB	2	37
34	Data Storage, Transaction processing	T1	826-830	PPT & Video	1	38
35	Query processing and optimization	T1/W1	946-949	BB	1	39
36	NOSQL Databases: Introduction – CAP Theorem	T1	963-964	BB	1	40

37	Document Based systems – Key value Stores	T1	964-973	BB	1	41
38	Column Based Systems – Graph Databases	T1	981-990	BB	1	42
39	Database Security: Security issues – Access control based on privileges	T1/W2	998-1008	BB	1	43
40	Role Based access control.	T1	915-927	BB	2	45

Outcome of Unit V:

CO5: Compare and contrast various indexing strategies in different database systems. (K2)

CO6: Explain the different advanced databases. (K2)

Course Outcome:

At the end of course:

Students should able to learn:

CO1: Explain the fundamental concepts of relational database and SQL. (K2)

CO2: Use ER model for Relational model mapping to perform database design effectively. (K3)

CO3: Summarize the properties of transactions and concurrency control mechanisms. (K2)

CO4: Outline the various storage and optimization techniques. (K2)

CO5: Compare and contrast various indexing strategies in different database systems. (K2)

CO6: Explain the different advanced databases. (K2)

Course Outcome Vs Program Outcome Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	3	1	-	-	-	-	-	-	-	-	-	-	3	1
CO 2	3	2	1	1	-	-	-	-	-	-	-	-	3	2
CO 3	3	1	-	-	-	-	-	-	-	-	-	-	3	1
CO 4	3	1	-	-	-	-	-	-	-	-	-	-	3	1
CO 5	3	2	-	-	-	-	-	-	-	-	-	-	3	1
CO 6	3	1	-	-	-	-	-	-	-	-	-	-	3	2
AVG	3.00	1.33	1.00	1.00	-	-	-	-	-	-	-	-	3.00	1.33

Content beyond Syllabus:

- ❖ JDBC connectivity using databases.
- ❖ Creating Databases

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)	Unit - I 1. Views of data. 3. Database system architecture.	CO 1
	2	Poster / PPT Presentation (20)	Unit – II 9. ER model 12. Functional Dependencies	CO2
Webportal 2	--	Assessment – II (60)	Unit III and IV	CO3 & CO4
	3	Seminar (20)	Unit – III 17. Transaction concepts & ACID Properties 18. Schedules	CO3
	4	Case Study Report/ Mini Project/Model Making (20)	Unit – IV 32. Query optimization using Heuristics and Cost Estimation. 40. IR Concepts, Retrieval Models, Queries in IR systems	CO4
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 (Before Model Exam)
Assignment 1 & 2	Assignment 3 & 4	Assignment 5

Google Class Code Details : A Section – ugooiyr, B Section - pzvkkep

Google Classroom Name : U20IT304 DBMS

PLAN OF ASSESSMENT TEST –DISTRIBUTION OF MARKS:

TEST	CO- MARK WISE DISTRIBUTION						BLOOM'S LEVEL MARK WISE DISTRIBUTION					
AT-1	CO1	CO2	CO3	CO4	CO5	CO6	BTL1	BTL2	BTL3	BTL4	BTL5	BTL6
	30	30	--	--	--	--	21	22	17	--	--	--
AT-2	CO1	CO2	CO3	CO4	CO5	CO6	BTL1	BTL2	BTL3	BTL4	BTL5	BTL6
MODEL	CO1	CO2	CO3	CO4	CO5	CO6	BTL1	BTL2	BTL3	BTL4	BTL5	BTL6

Prepared By

Verified By

Approved By