



DHANALAKSHMI SRINIVASAN INSTITUTE OF TECHNOLOGY

(Approved by AICTE, New Delhi & Affiliated to Anna University)

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE PLAN

Subject code: CS8492

Branch/Year/Sem: CSE/II/IV

Subject Name: DATABASE MANAGEMENT SYSTEMS

Batch: 2018-2022

Staff Name: R.PADMAVATHI

Academic year: 2019-2020(EVEN)

COURSE OBJECTIVE

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 McGraw Hill, 2011.

T2: Ramez Elmasri, Shamkant B. Navathe, —Fundamentals of Database Systems, Sixth Edition, Pearson Education, 2011.

REFERENCES:

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

R2: Raghu Ramakrishnan, —Database Management Systems, Fourth Edition, McGraw-Hill College Publications, 2015.

R3: G.K.Gupta, "Database Management Systems, Tata McGraw Hill, 2011

WEB RESOURCES

W1: https://www.brainkart.com/subject/Database-Management-Systems_380/

W2: <https://www.slideshare.net/OECLIBOdishaElectron/database-management-system-ppt>

TEACHING METHODOLOGIES:

- BB - BLACK BOARD
- PPT - POWER POINT PRESENTATION



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CS8492 DATABASE MANAGEMENT SYSTEMS

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UNIT I RELATIONAL DATABASES 10

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 8

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 9

Transaction Concepts – ACID Properties – Schedules – Serializability – Concurrency Control – Need for Concurrency – Locking Protocols – Two Phase Locking – Deadlock – Transaction Recovery – Save Points – Isolation Levels – SQL Facilities for Concurrency and Recovery.

UNIT IV IMPLEMENTATION TECHNIQUES 9

RAID – File Organization – Organization of Records in Files – Indexing and Hashing – Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing – Query Processing Overview – Algorithms for SELECT and JOIN operations – Query optimization using Heuristics and Cost Estimation.

UNIT V ADVANCED TOPICS 9

Distributed Databases: Architecture, Data Storage, Transaction Processing – Object-based Databases: Object Database Concepts, Object-Relational features, ODMG Object Model, ODL, OQL – XML Databases: XML Hierarchical Model, DTD, XML Schema, XQuery – Information Retrieval: IR Concepts, Retrieval Models, Queries in IR systems.

TOTAL: 45 PERIODS

Topic No	Topic Name	Books For reference	Page No	Teaching Methodology	No of periods required	Cumulative periods	
UNIT I		INTRODUCTION				(10)	
1.	Purpose of Database System – Views of data	T1	3-9	BB	1	1	
2.	Data Models	T1		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/PPT	2	6	
6.	SQL fundamentals	T1/W1	57-63	BB/PPT	2	8	
7.	Advanced SQL features	T1	63-65	BB	1	9	
8.	Embedded SQL– Dynamic SQL	T1	65-72	BB	1	10	
LEARNING OUTCOME:							
At the end of unit , the students will be able to							
<ul style="list-style-type: none"> Classify the modern and futuristic database applications based on size and complexity Illustrate the features of relational databases Demonstrate SQL fundamentals 							
UNIT II		DATABASE DESIGN				(8)	
8.	Entity-Relationship model	T1	262-274	BB	1	11	
9.	E-R Diagrams	T1	274-283	BB/PPT	1	12	
10.	Enhanced-ER Model – ER-to-Relational Mapping	T1	295-304	BB	1	13	
11.	Functional Dependencies – Non-loss Decomposition	T1	338-348	BB	1	14	
12.	First, Second, Third Normal Forms	T1/W1	327-329	BB/PPT	1	15	
13.	Dependency Preservation – Boyce/Codd Normal Form	T1	329-338	BB	1	16	
14.	Multi-valued Dependencies and Fourth Normal Form	T1	355-360	BB	1	17	
15.	Join Dependencies and Fifth Normal Form	T1	355-360	BB	1	18	
LEARNING OUTCOME:							
At the end of unit , the students will be able to							
<ul style="list-style-type: none"> Map ER model to Relational model to perform database design effectively Outline SQL fundamentals Demonstrate different normal forms 							
UNIT – III		TRANSACTIONS				(9)	
16.	Transaction Concepts – ACID Properties	T1	627-629	BB	1	19	
17.	Schedules	T1	635-641	BB	1	20	

18.	Serializability	T1/W2	641-646	BB/PPT	2	22
19.	Concurrency Control – Need for Concurrency	T1	661-674	BB	1	23
20.	Locking Protocols – Two Phase Locking	T1	620-625	BB	1	24
21.	Deadlock – Transaction Recovery	T1/W2	679-682	BB/PPT	1	25
22.	Save Points – Isolation Levels	T1	682-685	BB	1	26
23.	SQL Facilities for Concurrency and Recovery.	T1	685-691	BB	1	27

LEARNING OUTCOME:

At the end of unit , the students will be able to

- Write queries using normalization criteria and optimize queries
- Demonstrate the uses of schedule and serializability.
- Explain about deadlock transaction

UNIT IV IMPLEMENTATION TECHNIQUES (9)

24.	RAID	T1	441-449	BB	1	28
25.	File Organization – Organization of Records in Files	T1	451-457	BB	1	29
26.	Indexing and Hashing –Ordered Indices	T1	475-476	BB	1	30
27.	B+ tree Index Files	T1/W1	485-500	BB/PPT	2	32
28.	B tree Index Files	T1	500-506	BB	1	33
29.	Static Hashing – Dynamic Hashing	T1	509-518	BB	1	34
30.	Query Processing Overview – Algorithms for SELECT and JOIN	T1	537-541	BB	1	35
31.	Query optimization using Heuristics and Cost Estimation.	T1	541-542	BB	1	36

LEARNING OUTCOME:

At the end of unit , the students will be able to

- Compare and contrast various indexing strategies in different database systems
- Outline the concepts of B+ tree and B-Tree index files

UNIT V ADVANCED TOPIC

32.	Distributed Databases: Architecture	T1	825-826	BB	1	37
33.	Data Storage, Transaction Processing	T1	826-830	BB	1	38
34.	Object-based Databases: Object Database Concepts	T1/W1	946-949	BB/PPT	1	39
35.	Object-Relational features, ODMG Object Model	T1	963-964	BB	1	40
36.	ODL, OQL	T1	964-973	BB	1	41
37.	XML Databases: XML Hierarchical Model, DTD	T1	981-990	BB	1	42
38.	XML Schema, XQuery	T1/W2	998-1008	BB/PPT	1	43

39.	Information Retrieval: IR Concepts, Retrieval Models, Queries in IR systems.	T1	915-927	BB	2	45
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LEARNING OUTCOME:

At the end of unit , the students will be able to

- Appraise how advanced databases differ from traditional databases.
- Design Object-based Databases -ODL,OQL
- Demonstrate XML database with XML query.

COURSE OUTCOME

At the end of the course, the student should be able to:

- Classify the modern and futuristic database applications based on size and complexity
- Map ER model to Relational model to perform database design effectively
- Write queries using normalization criteria and optimize queries
- Compare and contrast various indexing strategies in different database systems
- Appraise how advanced databases differ from traditional databases

. CONTENT BEYOND THE SYLLABUS

JDBC connectivity using databases.

CONTINUES INTERNAL ASSESSMENT DETAILS

ASSEMENT NUMBER	I	II	MODEL
TOPIC NO.(UNIT)	1-15 (1 st & 2 nd units)	16-31(3 rd & 4 th units)	1-39 (units 1-5)

ASSIGNMENT DETAILS

ASSIGNMENT NUMBER	I	II	III
TOPIC NUMBER FOR REFERENCE	1-15 (1 st & 2 nd units)	16-31(3 rd & 4 th units)	1-39 (units 1-5)
DEAD LINE			

ASSIGNMENT NUMBER	BATCH	DESCRIPTIVE QUESTIONS/TOPIC (Minimum of 8 Pages)
I	81511710001-815117104302	<ol style="list-style-type: none"> 1. Explain in detail about Database system architecture. 2. Discuss in detail about SQL commands. 3. Illustrate the E-R model with an example
II	81511710001-815117104302	<ol style="list-style-type: none"> 1. Discuss in detail about the Serializability. 2. Explain in detail about the deadlock transactions. 3. Outline the process of RAID levels.
III	81511710001-815117104302	<ol style="list-style-type: none"> 1. Explain in detail about B-Tree 2. Explain in detail about distributed system architecture.

PREPARED BY

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PRINCIPAL