

CS6302 DATABASE MANAGEMENT SYSTEMS

SUBJECT DESCRIPTION AND OBJECTIVES

DESCRIPTION:

This course is intended to provide you with an understanding of the current theory and practice of database management systems. To help you more fully appreciate their nature, the course provides a solid technical overview of database management systems, using a current database product as a case study. In addition to technical concerns, more general issues are emphasized. These include data independence, integrity, security, recovery, performance, database design principles, and database administration.

OBJECTIVES :

- To Understand the role of a database management system in an organization.
- To Understand basic database concepts, including the structure and operation of the relational data model.
- To Construct simple and moderately advanced database queries using Structured Query Language (SQL).
- To Understand and successfully apply logical database design principles, including E-R diagrams and database normalization.
- To Design and implement a small database project using Microsoft Access.
- To Understand the concept of a database transaction and related database facilities, including concurrency control, journaling, backup and recovery, and data object locking and protocols.
- To Describe and discuss selected advanced database topics, such as distributed database systems and the data warehouse.
- To Understand the role of the database administrator.

UNIT I INTRODUCTION TO DBMS**10**

File Systems Organization - Sequential, Pointer, Indexed, Direct - Purpose of Database System- Database System Terminologies-Database characteristics- Data models – Types of data models – Components of DBMS- Relational Algebra. LOGICAL DATABASE DESIGN: Relational DBMS -Codd's Rule - Entity-Relationship model - Extended ER Normalization – Functional Dependencies,Anomaly- 1NF to 5NF- Domain Key Normal Form – Denormalization.

UNIT II SQL & QUERY OPTIMIZATION**8**

SQL Standards - Data types - Database Objects- DDL-DML-DCL-TCL-Embedded SQL-Static Vs Dynamic SQL - QUERY OPTIMIZATION:Query Processing and Optimization - Heuristics and Cost Estimates in Query Optimization.

UNIT III TRANSACTION PROCESSING AND CONCURRENCY CONTROL**8**

Introduction-Properties of Transaction- Serializability- Concurrency Control – Locking Mechanisms-Two Phase Commit Protocol-Dead lock.

UNIT IV TRENDS IN DATABASE TECHNOLOGY**10**

Overview of Physical Storage Media – Magnetic Disks – RAID – Tertiary storage – File Organization –Organization of Records in Files – Indexing and Hashing –Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing - Introduction to Distributed Databases- Client server technology- Multidimensional and Parallel databases- Spatial and multimedia databases-Mobile and web databases- Data Warehouse-Mining- Data marts.

UNIT V ADVANCED TOPICS**9**

DATABASE SECURITY: Data Classification-Threats and risks – Database access Control – Types of Privileges –Cryptography- Statistical Databases.- Distributed Databases-Architecture-Transaction Processing-Data Warehousing and Mining-Classification-Association rules-Clustering-Information Retrieval- Relevance ranking-Crawling and Indexing the Web- Object Oriented Databases-XML Databases.

TOTAL: 45 PERIODS**OUTCOMES:****At the end of the course, the student should be able to:**

Design Databases for applications.

Use the Relational model, ER diagrams.

Apply concurrency control and recovery mechanisms for practical problems.

Design the Query Processor and Transaction Processor.

Apply security concepts to databases.

TEXT BOOK:

1. Ramez Elmasri and Shamkant B. Navathe, “Fundamentals of Database Systems”, Fifth Edition, Pearson Education, 2008.

REFERENCES:

1. Abraham Silberschatz, Henry F. Korth and S. Sudharshan, “Database System Concepts”, Sixth Edition, Tata Mc Graw Hill, 2011.
2. C.J.Date, A.Kannan and S.Swamynathan, “An Introduction to Database Systems”, Eighth Edition, Pearson Education, 2006.
3. Atul Kahate, “Introduction to Database Management Systems”, Pearson Education, New Delhi, 2006.
4. Alexis Leon and Mathews Leon, “Database Management Systems”, Vikas Publishing House Private Limited, New Delhi, 2003.
5. Raghu Ramakrishnan, “Database Management Systems”, Fourth Edition, Tata Mc Graw Hill, 2010.
6. G.K.Gupta, “Database Management Systems”, Tata Mc Graw Hill, 2011.
7. Rob Cornell, “Database Systems Design and Implementation”, Cengage Learning, 2011.

MICRO LESSON PLAN

WEEK	HOURS	LECTURE TOPICS	BOOKS
UNIT I INTRODUCTION TO DBMS			
I	1	File Systems Organization - Sequential, Pointer, Indexed	R4
	2	Direct - Purpose of Database System	R4
	3	Database System Terminologies (AV Class)	R4
II	4	Database characteristics- Data models	R1
	5	Types of data models- Components of DBMS- Relational Algebra	R1
	6	LOGICAL DATABASE DESIGN: Relational DBMS	R4
	7	Codd's Rule- Entity-Relationship model	R4
III	8	Extended ER Normalization-Functional Dependencies	R4
	9	Anomaly- 1NF to 5NF (AV Class)	R4
	10	Domain Key Normal Form – Denormalization.	R4
UNIT II SQL & QUERY OPTIMIZATION			
III	11	SQL Standards	R4
	12	Data types	R4
IV	13	Database Objects- DDL	R4
	14	DML-DCL- TCL (AV Class)	R4
	15	Embedded SQL-Static Vs Dynamic SQL	R4
	16	QUERY OPTIMIZATION	R4
V	17	Query Processing and Optimization (AV Class)	R4
	18	Heuristics and Cost Estimates in Query Optimization.	R4
UNIT III TRANSACTION PROCESSING AND CONCURRENCY CONTROL			
V	19	Introduction	R1
	20	Properties of Transaction	R1
	21	Serializability	R1
VI	22	Concurrency Control (AV Class)	R1
	23	Locking Mechanisms	R1
	24,25	Two Phase Commit Protocol (AV Class)	R1
	26	Dead lock.	R1
UNIT IV TRENDS IN DATABASE TECHNOLOGY			
VII	27	Overview of Physical Storage Media	R1
	28	Magnetic Disks – RAID – Tertiary storage (AV Class)	R4
	29	File Organization –Organization of Records in Files	R1
	30	Indexing and Hashing –Ordered Indices	R4
VIII	31	B+ tree Index Files – B tree Index Files (AV Class)	R4

VIII	32	Static Hashing – Dynamic Hashing	R4
	33	Introduction to Distributed Databases- Client server technology	R4
	34	Multidimensional and Parallel databases- Spatial and multimedia databases, Mobile and web databases	R4
IX	35,36	Data Warehouse-Mining- Data marts.	R4
UNIT V ADVANCED TOPICS			
IX	37	DATABASE SECURITY: Data Classification- Threats and risks	T1
	38	Database access Control – Types of Privileges	T1
	39	Cryptography- Statistical Databases.	T1
	40	Distributed Databases-Architecture-Transaction Processing	T1
X	41	Data Warehousing and Mining (AV Class)	T1
	42	Classification-Association rules	T1
	43	Clustering-Information Retrieval- Relevance ranking	T1
	44	Crawling and Indexing the Web (AV Class)	T1
	45	Object Oriented Databases-XML Databases.	T1

Prepared By,

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