

BVM ENGINEERING COLLEGE [AN AUTONOMOUS INSTITUTION]**2CP01: DATABASE MANAGEMENT SYSTEMS****CREDITS - 4 (LTP:3,0,1)****Course Objective:**

To impart knowledge of database design concepts and formulation of queries to access a database

Teaching and Assessment Scheme:

Teaching Scheme (Hours per week)			Credits	Assessment Scheme				
L	T	P		C	Theory		Practical	
			ESE		CE	ESE	CE	
3	0	2	4	60	40	20	30	150

Course Contents:

Unit No.	Topics	Teaching Hours
1	Introduction: Database system applications; Purpose of Database Systems, View of Data, Data models, Approaches to building a database, Database management system(DBMS), Three levels of the architecture, Challenges in building a DBMS, Various components of a DBMS architecture, systems development life cycle (SDLC)	05
2	Database Models: ER-Model: Basic concepts, Design process, constraints, Keys, Design issues, E-R diagrams, weak entity sets, extended E-R features – generalization, specialization, aggregation, reduction to E-R database schema. Relational Data Model: Concept of relations, Schema-instance distinction. Structure of relational databases, Domains, Relations, Relational algebra – fundamental operators and syntax; All set Operators.	08
3	Dependencies and Normal Forms: Importance of a good schema design, Problems encountered with bad schema designs, Motivation for normal forms, dependency theory - functional dependencies, Armstrong's axioms for FD's, Closure of a set of FD's, Minimal covers, Definitions of 1NF, 2NF, 3NF and BCNF, Decompositions and desirable properties of them, Algorithms for 3NF and BCNF normalization, Multi-valued dependencies and 4NF, Join dependencies and definition of 5NF.	08
4	Relational algebra & SQL query: Selection, Projection, Cross product, Various types of joins, Division, Example queries, Tuple relation calculus, Domain relational calculus,	10

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Unit No.	Topics	Teaching Hours
	Converting the database specification in E/R notation to the relational schema, Appropriate tool for DBMS, Basics of SQL, DDL, DML, DCL, structure creation, alteration, defining constraints, Primary key, foreign key, unique, not null, check, IN operator, Functions - aggregate functions, Built-in functions numeric, date, string functions, set operations, sub-queries, correlated sub-queries, Use of group by, having, order by, join and its types, Exist, Any, All , view and its types. Transaction control commands, Commit, Rollback, Save point. Embedded SQL, PL SQL Concepts, Cursors, Stored Procedures, Stored Function, Database Triggers.	
5	Transaction Processing and Error Recovery: Concepts of transaction processing, ACID properties, Concurrency control, Locking based protocols for CC, Error recovery and logging, Undo, Redo, Undo-redo logging and recovery methods; Backup Methods, Serializability	08
6	Query Processing & Query Optimization: Overview, measures of query cost, selection operation, sorting, join, evaluation of expressions, transformation of relational expressions, estimating statistics of expression results, evaluation plans, and materialized views.	04
7	Security: Discretionary and Mandatory Access Control; Audit Trails; Multi-Level Security; Statistical Databases; Data Encryption.	02
	Total	45

List of References:

1. A Silberschatz, H F Korth and S Sudarshan, "*Database System Concepts*", McGRAW Hill. (E-book available on the BVM intranet).
2. C. J. Date, A. Kennan, and S. Swamynathan, "*An Introduction to Database Systems*", Person Education
3. Ramez Elmasri and Shamkant B Navathe, "*Fundamentals of Database Systems*", Pearson Education
4. Ivan Bayross, "*SQL, PL/SQL the Programming Language of Oracle*", BPB Publication.
5. Ramkrishnan, Raghu, "*Database Management Systems*", Mc-Graw Hill
6. J. D. Ullman, "*Principles of Database and Knowledge – Base Systems*", Vol 1, Computer Science Press.
7. Serge Abiteboul, Richard Hull, Victor Vianu, "*Foundations of Databases*", Reprint by, Addison-Wesley

Course Outcomes (COs):

After successful completion of the course, the student will be able to...

1. Understand concepts of database and database management systems
2. Construct an Entity-Relationship (E-R) model from specifications and transform in to relational data model

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3. Design normalized database
4. Install and configure a relational database management system and formulate queries to access the database
5. Understand principles of database transaction management, database recovery, and security
6. Develop a database management system application

A database management system (DBMS) is a software package with computer programs that control the creation, maintenance, and the use of a database. It allows organizations to conveniently develop databases for various applications by database.

2.1 1960s Navigational DBMS. 2.2 1970s relational DBMS. 2.3 Late-1970s SQL DBMS. 2.4 1980s object-oriented databases. 2.5 21st century NoSQL databases. 2.6 Current trends.

3 Components. database management systems solutions manual third edition raghu ramakrishnan university of wisconsin madison, wi, usa johannes gehrke cornell university ithaca.

iii. Database Management Systems Solutions Manual Third Edition. <http://www.cs.wisc.edu/~dbbook>. This page is frequently updated and contains information about the book, past and current users, and the software. This page also contains a link to all known errors in the book, the accompanying slides, and the software. Since the solutions manual is distributed electronically, all known errors are immediately fixed and no list of errors is maintained. Instructors are advised to visit this site periodically; they can also register at this site to be notified of important changes by email.

2 Chapter Problem 1CP from Chapter 11: What is a database management system (DBMS)? Get solutions. Looking for the textbook? We have solutions for your book! Chapter: CH1 CH2 CH3 CH4 CH5 CH6 CH7 CH8 CH9 CH10 CH11. Problem: 1AW 1CP 1MC 1PP 1SA 1TF 2AW 2CP 2MC 2PP 2SA 2TF 3AW 3CP 3MC 3PP 3SA 3TF 4AW 4CP 4MC 4PP 4SA 4TF 5AW 5CP 5MC 5PP 5SA 5TF 6AW. 6CP 6MC 6PP 6SA 6TF 7AW 7CP 7MC 7SA 7TF 8AW 8CP 8MC 8SA 8TF 9CP 9MC 9SA 9TF 10CP 10MC 10SA 10TF 11CP 11MC 11SA 11TF 12CP 12MC 13CP 13MC. 14CP 14MC 15CP 15MC 16CP 16MC 17CP 17MC 18CP 18MC 19CP 19MC 20CP 20MC 21CP 21MC 22CP 22MC 23CP 23MC 24CP 25CP 26CP 27CP 28CP