

BANGALORE UNIVERSITY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING, UVCE, BENGALURU
B.Tech. PROGRAMME IN COMPUTER SCIENCE AND ENGINEERING

Course Code	18CIPC503					
Category	Engineering Science Courses : Professional Core					
Course title	DATABASE MANAGEMENT SYSTEMS – THEORY					
Scheme and Credits	No. of Hours/Week					Semester - V CSE/ISE
	L	T	P	SS	Credits	
	4	0	0	0	4	
CIE Marks: 50	SEE Marks: 50		Total Max. Marks: 100		Duration of SEE: 03 Hours	
Prerequisites (if any): NIL						

COURSE OBJECTIVES:

The course will enable students to

1. Understand fundamental concepts, terminology and application of databases.
2. Discuss design concepts and creation of relational databases.
3. Acquire basic and advanced SQL commands.
4. Design overview of database programming and procedural languages.
5. Design transaction management, database recovery and security.

UNIT I: INTRODUCTION

10 Hours

Introduction, Characteristics of Database approach, Advantages of using DBMS approach, when not to use a DBMS. Database System Concepts and Architecture: Data models, Schemas and instances, Three schema architecture and data independence, Database languages and interfaces, database system environment. Data Modelling using the Entity-Relationship(ER) model: Using High-Level conceptual Data Models for Database Design, A sample Database Application, Entity types, Entity Sets, Attributes and Keys, Relationship Types, Relationship Sets, Roles and Structural Constraints, Weak Entity types, Refining the ER Design, ER Diagrams, Naming Conventions and Design Issues, Relationship Types of Degree Higher than Two, Database Design using ER-to Relational Mapping.

UNIT II: RELATIONAL DBMS

09 Hours

Relational Model Concepts, Relational Model Constraints and Relational Database Schemas, Update Operations, Transactions and Dealing with Constraint Violations. Relational Algebra: Unary Relational Operations, SELECT and PROJECT, Relational Algebra Operations from Set Theory, Binary Relational Operations: JOIN and DIVISION, Additional Relational Operations.

UNIT III: SQL

09 Hours

SQL Data Definition and Data Types specifying basic constraints in SQL, Basic retrieval queries in SQL, Insert, Delete and Update statements in SQL, Additional features of SQL, More complex SQL Queries, Specifying Constraints as Assertion and Trigger, Views.

UNIT IV: DATABASE DESIGN THEORY AND NORMALIZATION

10 Hours

Informal Design Guidelines for Relation Schemas, Functional Dependencies, Normal Forms Based on Primary Keys, General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form, Multi-valued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form.

UNIT V: TRANSACTION PROCESSING, ERROR RECOVERY, DATA STORAGE AND INDEXES

10 Hours

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. Data Storage and Indexes - file organizations, primary, secondary index structures, various index structures - hash-based, dynamic hashing techniques, multi-level indexes, B+ trees.

TEXT BOOKS:

1. Fundamental of Database Systems by Ramez Elmasri and Shamkant B Navathe, Sixth Edition, Addison Wesley, 2011.
2. Database System Concepts, Sixth Edition, Abraham Silberschatz, Henry F. Korth, S. Sudarshan : Tata McGraw-Hill, 2010.

REFERENCE BOOKS:

1. An Introduction to Database Systems by C.J. Date, A. Kannan, S. Swamynathan, 8th Edition, Pearson Education, 2006.
2. Database Systems: The Complete Book, Second Edition, Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom, Pearson Education, 2001.

e-BOOKS/ONLINE RESOURCES:

1. Introduction to structured Query Language (SQL).
2. <https://cs.uwaterloo.ca/~tozsu/courses/CS338/lectures/4%20Basic%20SQL.pdf>.
3. An Introduction to Relational Database:
www.cis.gsu.edu/dmcdonald/cis3730/SQL.pdf.
4. DBMS by Raghu Ramakrishnan: https://www.academia.edu/.../Ramakrishnan_Raghu.

MOOCs:

1. http://nptel.ac.in/courses/IIT-MADRAS/Intro_to_Database_Systems_Design.
2. <http://www.iitg.ernet.in/awekar/teaching/cs344fall11/>.
3. www.w3schools.com/sql/.

COURSE OUTCOMES:

The students at the end of the course, will be able to

CO1: Understand basic concepts of Database Management System.

CO2: Design ER-Diagram for real world applications using database concepts.

CO3: Formulate relational algebraic expressions using relational model concepts and Implement SQL queries using relational model concepts.

CO4: Analyse and apply normalization concept for relational schema.

CO5: Analyse transaction processing and concurrency control techniques.

SCHEME OF EXAMINATION:

CIE – 50 Marks	Test I (Any Three Units) - 20 Marks	Quiz I – 5 Marks	25 Marks	Total: 50 Marks
	Test II (Remaining Two Units) - 20 Marks	Quiz II – 5 Marks	25 Marks	
SEE – 100 Marks	Q1 (Compulsory): MCQs or Short answer type questions for 15 Marks covering entire syllabus.		15 Marks	Total: 100 Marks
	Q2 & Q3 from Units which have 09 Hours are compulsory.		17 * 2 = 34 Marks	
	Q4 or Q5, Q6 or Q7 and Q8 or Q9 from Units which have 10 Hours shall have Internal Choice.		17 * 3 = 51 Marks	

Note: SEE shall be conducted for 100 Marks and the Marks obtained is scaled down to 50 Marks.
