



K. S. INSTITUTE OF TECHNOLOGY

An Autonomous Institution under VTU, Approved by AICTE
Department of Master of Computer Applications
FIRST SEMESTER SYLLABUS

Course: Database Management Systems (DBMS)		Semester	I
Course Code	25MMC103	CIE Marks	50
Teaching Hours/Week (L:P:T)	3:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	Theory		

Course Objectives (Course Skill Set)

- Analyze the basic concepts and the applications of database systems.
- Evaluate the different issues involved in the design and implementation of Database System.
- Explain the basic concepts of relational data model, entity relationship model, relational database design, relational algebra and database language SQL and Postgre SQL.
- Design and build a simple database system and demonstrate competence with the fundamental tasks involved with modelling, designing, and implementing a DBMS.

Module-1

Introduction: Purpose of Database System, Views of data, data models, database management system, three- schema architecture of DBMS, components of DBMS. E/R Model - Conceptual data modelling - motivation, entities, entity types, attributes relationships, relationship types, E/R diagram notation, examples.

Data Models: Introduction to the Relational Model - Structure - Database Schema, Keys - Schema Diagrams. Database design Other Models, ER diagrams ER Model - Entities, Attributes and Entity sets Relationships and Relationship sets - ER Design Issues - Concept Design - Conceptual Design with relevant Examples. Relational Query Languages, Relational Operations. **Number of Hours:8**

Module-2

Relational Algebra - Selection and projection set operations - renaming - Joins - Division - Examples of Algebra overviews - Relational calculus - Tuple Relational Calculus (TRC) - Domain relational calculus (DRC).

Overview of the SQL Query Language - Basic Structure of SQL Queries, Data types, Creating a database, create a table, drop the database, drop table, select table, insert a record, update record, delete a record, order by, group by, triggers, Set Operations, Aggregate Functions , Windows functions, Nested Sub queries, Views, Procedures. **Number of Hours:8**

Module-3

Normalization - Introduction, Non loss decomposition and functional dependencies, First, Second, and third normal forms - dependency preservation, Boyce/Codd normal form.

Higher Normal Forms - Introduction, Multi-valued dependencies and Fourth normal form, Join dependencies and Fifth normal form. **Number of Hours:8**

Module-4

Transaction Concept- Transaction State- Implementation of Atomicity and Durability Concurrent Executions Serializability- Recoverability – Implementation of Isolation – Testing for serializability- Lock –Based Protocols – Timestamp Based Protocols- Validation- Based Protocols Multiple Granularity.

Recovery and Atomicity Log Based Recovery, Recovery with Concurrent Transactions Check Points - Buffer Management Failure with loss of nonvolatile storage.

Number of Hours:8

Module-5

NOSQL Databases and Big Data Storage Systems: Introduction to NOSQL Systems, The CAP Theorem, Document- Based NOSQL Systems and MongoDB, NOSQL Key-Value Stores, Column-Based or Wide Column NOSQL Systems, NOSQL Graph Databases and Neo4. CRUD Operations.

Number of Hours:8

Course outcome (Course Skill Set)
 At the end of the course, the student will be able to:

CO1: Demonstrate the basic elements of a relational database management system and identify the data models for relevant problems.

CO2: Design and convert entity relationship diagrams into Schema and formulate SQL queries on the respect data.

CO3: Analyze the database design and justify the same using normalization

CO4: Apply the principles of database transaction management to real world applications.

CO5: Apply NoSQL database models to design and implement solutions for unstructured data.

Suggested Learning Resources:
Books (Name of the author/Title of the Book/Name of the publisher/Edition and Year) Text Books:

1. Fundamentals of Database Systems, Elmasri and Navathe, 7th Edition, 2011, Pearson Education, ISBN-13: 978-0136086208
2. Database System Concepts, Silberschatz, Korth, Mc Graw hill, 7th edition.
3. Database Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition.

Reference Books:

1. An Introduction to Database systems, C.J. Date, A. Kannan, S. Swami Nadhan, Pearson, Eight Edition.
2. Rob, Coronel, ‘Database Systems’, Seventh Edition, and Cengage Learning.
3. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.
4. Oracle for Professionals, the X Team, S. Shah and V. Shah, SPD.
 Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL,Shah, PHI.

Web links and Video Lectures (e-Resources):

- dev.mysql.com
- [Www. Postgressql.org](http://Www.Postgressql.org).
- https://www.w3schools.com/mysql/mysql_rdbms.asp
- <https://www.w3schools.in/dbms/intro>

Teaching-Learning Process (Innovative Delivery Methods)

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching- learning process and facilitate the achievement of course outcomes.

Lectures with theoretical concepts and principles, PowerPoint presentations, Hands-on labs, Mini-projects, Assignments and quizzes for assessment.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

1. Three Unit Tests each of 25 Marks (scale down to 25 Marks)
2. Two assignments each of 25 Marks or one Skill Development Activity of 50 marks to attain the COs and POs which will be scaled down to 25 marks.

The sum of **three**-unit tests, two assignments/Skill Development Activities (CIE), will be 50 marks.

Semester-End Examination:

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
2. The question paper consists of Part A and Part B. Part A consists of 10 questions from 5 modules, each carrying 2 marks.
3. Part B consists of 10 questions. Each full question is for 16 marks. There will be two full questions (with a maximum of three sub-questions) from each module.
4. Each full question will have a sub-question covering all the topics under a module.
5. The students will have to answer five full questions, selecting one full question from each module