

Devi Ahilya University, Indore, India Institute of Engineering & Technology				II Year B.E. (Information Technology) (Full Time)			
Subject Code & Name	Instructions Hours per Week			Credits			
ITR4C4 DATBASE MANAGEMENT SYSTEMS	L	T	P	L	T	P	Total
	3	1	2	3	1	1	5
Duration of Theory Paper: 3 Hours							

Learning Objectives:

- To understand the need of databases, its architecture and schemas.
- To familiarize students with representing domains using entity-relationship modelling.
- How to design a normalized schema in the relational data model.
- Develop skills in students to implement schema and query using SQL.
- Develop ability to develop database applications based on the requirements.

Prerequisites: Knowledge of Data Structures and Computer Programming and some topics of operating systems.

COURSE CONTENTS

Unit-I

Introduction: Database Environment: Basic Concepts, Advantages of Database approach, Comparison with Traditional file systems, DBMS Architecture, Database Users, Data Models and Schemas, Database languages and Interfaces; Database development process: Development Lifecycle, Types of Application.

Unit-II

Database Analysis & Modeling: Introduction to Data Analysis and Modeling, Modeling the rules, Entity Relationship Model, ER Model Constructs- Attributes, Relationship etc., Enhanced ER Model and Business Rules, Modeling Enhanced relationships – Specialization and Generalization, Union Types. Binary and Ternary relationship Issues.

Unit-III

Database Design: Introduction to Logical Database Design, Relational Data Model – Codd's Rules, Relational Algebra etc.; Integrity Constraints, Transforming ER diagrams into relations, Functional Dependencies, Normalization – 1NF, 2NF, 3NF, BCNF and 4NF etc..

Unit-IV

System Implementation & Transaction Processing: Introduction to SQL – Inserting , Updating, and Deleting data, Processing Single Tables, Processing Multiple Tables, PL/SQL Constructs - Views, Triggers, Cursors etc; Transaction Processing – Properties, Schedules and Serializability Issues. Concurrency Control – Introduction, Locking etc.

Unit-V

Advance Topics: File Organization and Indexes, Hashing Techniques, B-trees, B+ Trees etc; Database Recovery, Database Security, Introduction to Data Warehousing and Data Mining, Emerging Database Technologies and Applications etc., Overview of MySQL.

Learning Outcomes:

Upon completing the course, students will be able to:

- Understand the fundamentals of relational database system including: data models, database architectures and database manipulations.
- Understand the theories and techniques in developing database applications and be able to demonstrate the ability to build databases using DBMS such as MySQL.
- Be familiar with managing database systems.
- Understand new developments and trends in databases.

Books Recommended:

1. Fundamentals of Database Systems, By R. Elmasri and S. Navathe, 6th Ed. Pearson Education, 2010.
2. Database System Concepts, By A. Silberschatz, H. Korth and S. Sudarshan, 6th Ed. McGraw Hill Education, 2013.
3. A First Course in Database Systems, By J. Ullman, J. Widom, 3rd Edition, Pearson Education, 2014.
4. Database Systems, By T. Connolly and C. Begg, 4th Edition, Pearson Education, 2008.
5. Database Management Systems, R. Ramkrishnan and J. Gehrke, 3rd Edition, McGraw Hill Education, 2014.
6. MySQL : The Complete Reference, 1st Edition, McGraw Hill Education, 2004.

List of Assignments:

During the learning of course, students need to do assignments:

1. Designing an E-R model.
2. Solving basic SQL assignments.
3. Solving intermediate SQL assignments involving Nested and Join queries.
4. Using PL/SQL constructs involving procedures, triggers, views etc.
5. Exploring how transaction processing is handled by MySQL.
6. Minor Project on developing a database application.