FUNDAMENTALS OF DATABASE MANAGEMENT SYSTEMS

III Semester: EEE / MECH

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
ACS553	**Elective**	3	0	0	3	30	70	100
Contact Classes: 45	**Tutorial Classes: Nil**	**Practical Classes: Nil**				**Total Classes: 60**		

OBJECTIVES:

The course should enable the students to:

I.   Understand the role of database management system in an organization and learn the database concepts.
II. Design databases using data modelling and data normalization techniques.
III. Construct database queries using relational algebra and calculus.
IV. Understand the concept of a database transaction and related database facilities.
V.   Learn how to evaluate set of queries in query processing.

COURSE OUTCOMES (COs):

1. To understand the features of database management systems and Relational database.
2. Design databases using data modelling
3. To use SQL- the standard language of relational databases.
4. To understand the concept of Transaction and Query processing.
5. Learn how to evaluate time stamp based protocols and paging.

COURSE LEARNING OUTCOMES (CLOs):

1. Define the terminology, features, and characteristics of database system
2. Differentiate database systems from file systems
3. Describe Data Models, Schemes, Instances Three schema Architecture.
4. Analyze information storage problem and derive an information model expressed in the form of an entity relation diagram.
5. Model the real world database systems using Entity Relationship Diagrams(ERD).
6. Describe basics of the relational model.
7. Transform an information model into a relational database schema and implement schema using data definition language and/or utilities.
8. Formulate solutions to a broad range of query problems using relational algebra.
9. Apply relational calculus to solve broad range of query problems.
10. Illustrate the Functional Dependencies , Inference Rules, Minimal Sets of FDs
11. Understand normalization theory and improve the design by normalization.
12. Understand the properties of transaction(ACID)
13. Demonstrate serializability by taking various schedules
14. Gain knowledge on transaction processing to maintain consistency and integrity of data in database systems.
15. Describe concurrency control techniques to implement data integrity in database systems.
16. Illustrate various backup and recovery techniques for database systems..
17. Analyze transaction processing , concurrency control, Database recovery techniques.
18. Illustrate various lock based protocols.
19. Analyze various time stamp based protocols
20. Understand the concepts of update and shadow paging

UNIT-I	CONCEPTUAL MODELING

Introduction to file and database systems: Database system structure, data models, introduction to network and hierarchical models, ER model, relational model.

UNIT -II	RELATIONAL APPROACH

Relational algebra and calculus: Relational algebra, selection and projection, set operations, renaming, joins, division, examples of algebra queries, relational calculus, tuple relational calculus

UNIT -III	BASIC SQL QUERY AND NORMALIZATION

SQL data definition; Queries in SQL: updates, views, integrity and security, relational database design.
Normal Forms: 1NF, 2NF, 3NF and BCNF.

UNIT -IV	TRANSACTION MANAGEMENT

Transaction processing: Introduction, need for concurrency control, desirable properties of transaction, schedule and recoverability, serializability and schedules

UNIT -V	CONCURRENCY CONTROL

Concurrency control; Types of locks: Two phases locking, deadlock, timestamp based concurrency control, recovery techniques, concepts, immediate update, deferred update, shadow paging.

Text Books:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, "Database System Concepts", McGraw- Hill, 4th Edition, 2002.

Reference Books:

1. Ramez Elmasri, Shamkant B. Navathe, "Fundamental Database Systems", Pearson Education, 3rdEdition, 2003.
2. Raghu Ramakrishnan, "Database Management System", Tata McGraw-Hill Publishing Company, 3rd Edition, 2003.
3. Hector Garcia Molina, Jeffrey D. Ullman, Jennifer Widom, "Database System Implementation", Pearson Education, United States, 1st Edition, 2000.
4. Peter Rob, Corlos Coronel, "Database System, Design, Implementation and Management", Thompson Learning Course Technology, 5th Edition, 2003.