OLMDS506	Database Management Systems	L	T	P	C
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Pre-requisite	**NIL**	**Syllabus version**			
		1.0			

Course Objectives

1. To explain basic database concepts, applications, data models, schemas and instances.
2. To demonstrate the use of constraints and relational algebra operations.
3. To describe the basics of SQL and construct queries using SQL.
4. To emphasize the importance of normalization in databases.
5. To facilitate students in Database programming
6. To familiarize issues of concurrency control and transaction management.

Course Outcome

At the end of the course students will be able to:

1. To List and explain the fundamental concepts of a relational database system.
2. To utilize a wide range of features available in a DBMS package.
3. To analyze database requirements and determine the entities involved in the system and their relationship to one another.
4. To develop the logical design of the database using data modeling concepts such as entity-relationship diagrams.
5. To create a relational database using a relational database package.
6. To manipulate a database using SQL.
7. To assess the quality and ease of use of data modeling and diagramming tools.

Module:1	**Basic Concepts**

Introduction to databases – Conventional file Processing – Data Modeling for a database – Three level architecture – Data Independency – Components of a Database Management System (DBMS) – Advantages and disadvantages of a DBMS – System Environment – Users of DBMS – Transaction Management.

Module:2	**Data Models**

Introduction – Conceptual data modeling – Motivation - Entities, entity types, various types of attributes, relationships, relationship types - E/R Diagram(ERD) notation - Generalization – Aggregation – Conversion of ERD into relational schema – Introduction to Network data model and Hierarchical data model.

Module:3	**Relational Data Model**

Introduction – Keys, relational algebra operators: selection, projection, cross product, various types of joins, division, examples, tuple relation calculus, domain relational calculus.

Module:4	**Relational Database Manipulation**

Structured Query Language (SQL) - Basic data retrieval – nested queries - correlated and uncorrelated - SQL Join – Views.

Module:5	**Database Design Theory**

Functional dependencies – Normal forms - Dependency theory - Functional Dependencies(FD) – Armstrong's axioms for FDs - Closure of a set of FDs, Minimal covers – 1NF, 2NF, 3NF and BCNF - Join dependencies and definition of 5NF – Examples.

Module:6	**Data Storage and Indexing**

Storage device Characteristics – Operations on file - Sequential files - Index Sequential files – Direct files – Indexing using Tree structures - SQL Query processing - Database tuning.

Module:7	**Transaction and Security Management**

Transaction Processing - Concurrency – Locking techniques for concurrency control Database Recovery - Security and Integrity threats – Access Controls and Defense mechanisms

	Total Lecture hours:	**120 hours**

Text Book(s)

1.	Elmasri R and Navathe SB, “Fundamentals of Database Systems”, Pearson Education, 2016.
2.	Silberschatz A, Korth H and Sudarshan S, “Database System Concepts”, McGraw Hill, 2013.
3.	Raghu Ramakrishnan and Johannes Gehrke, “Database Management System”, McGraw Hill, 2014.
Reference Books	
1.	Hector Garcia Molina, Jeffrey D. Ullman, Jennifer Widom, “Database Systems: The Complete Book” , Pearson Education, 2011.
2.	Thomas Connolly, Carolyn Begg, “Database Systems: A Practical Approach to Design, Implementation, and Management”, Pearson Education, 2014.
Mode of Evaluation: Quiz, Assignment, Mid-Term and FAT.	

Recommended by Board of Studies	28-10-2021		
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