

DATABASE MANAGEMENT SYSTEM

COURSE CREDITS: 03

NO. OF HOURS: 45

COURSE OUTCOMES (COS):

CO1: Understand and recognize fundamental elements of relational database management systems

CO2: Design and apply ER-models to represent database application scenarios and explain the basic concepts of file organization and storage

CO3: To design and apply relational model and populate relational database, optimize the database design by normalization and formulate SQL.

CO4: To gain Knowledge about advanced database concepts.

UNIT I

10 Hours

Databases and Database Users: Introduction, An example, Characteristics of the Database Approach, Advantages of Using DBMS Approach, Database System Concepts and Architecture: Data Models, Schemas, and Instances, Three-schema Architecture and Data Independence, Database Languages and Interfaces, The Database System Environment.

UNIT II

12 Hours

Data Modeling Using Entity-Relationship Model: Entity Types, Entity Sets, Attributes and Keys, Relationship Types, Relationship Sets, Roles and Structural Constraints, Weak Entity Types, Refining the ER Design Company Database Diagrams, File organization and storage, secondary storage devices, type of single level ordered index, multi-level indexes, indexes on multiple keys, other types of indexes.

UNIT III

12 Hours

Relational Model and Relational Algebra: Relational Model Concepts, Relational Model Constraints and Relational Database Schemas, Update Operations, Unary Relational Operations: SELECT and PROJECT, Relational Algebra Operations from SET Theory, **Binary Relational Operations:** JOIN and DIVISION, Additional Relational Operations, Examples of Queries in Relational Algebra. **Relational Database Design:** Anomalies in a database, functional dependency, normal forms, lossless join and dependency, BCNF, normalization through synthesis, higher order normal forms.

SQL: SQL Data Definition and Data Types, Specifying Constraints in SQL, Schema Change Statements in SQL, Basic Queries in SQL, More Complex SQL Queries, Insert, Delete and Update Statements in SQL, Specifying Constraints as Assertion and Trigger, Views (Virtual Tables) in SQL, Embedded SQL, Dynamic SQL.

UNIT – 1V

11 Hours

Data warehousing: Overview of data warehousing and OLAP- Introduction, Definitions and Terminology-Characteristics of data Warehouse-Datamining-Introduction-Goals of knowledge discovery and datamining.

Graph Databases-Introduction-Power of Graph Databases-Options for storing connected data.

NoSQL-Introduction- NoSQL-It's about making intelligent choices - NoSQL concepts— Database Patterns.

Text Books:

1. Elmasri and Navathe, *Fundamentals of Database Systems*, 7th ed., India: Pearson, 2016.
2. Silberschatz, Korth and Sudharshan, *Data Base System Concepts*, 7th ed., Tata McGraw Hill, 2019.

Reference Books:

1. C.J. Date, A. Kannan, S. Swamynatham, *An Introduction to Database Systems*, 8thed., Pearson ed., 2009.
2. Raghu Ramakrishna and Johannes Gehrke, *Database Management Systems* 3rded., McGraw- Hill, 2003.
3. Robinson, Ian (2015-06-10), *Graph Databases, New Opportunities for Connected Data*. O' Reilly Media, Inc. p. 4. ISBN 9781491930861.
4. Dan McCreary and Ann Kelly, *Making Sense of NoSQL*, 1st ed., Manning publications and co, 2014.