Principles of Database Management Systems

Course Code	23IT2601	**Year**	III	**Semester**	II
Course Category	OE-II	**Branch**	IT	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Pre requisites**	--
Continuous Internal Evaluation	30	**Semester End Evaluation**	70	**Total Marks**	100

Course Outcomes		
Upon successful completion of the course, the student will be able to		**BL**
CO1	Understand the basic concepts of database management systems	**L2**
CO2	Apply ER model, Relational Algebra and SQL operations to find solutions for a given application	**L3**
CO3	Apply normalization techniques to improve database design	**L3**
CO4	Analyze a real time scenario to use Conceptual and Relational data models for designing the database	**L4**

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength ofCorrelations (3:High, 2:Medium, 1:Low)

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	2												
CO2	3												
CO3	2	1	1										
CO4	1	2	2						1		1		
Avg.	2	2	2						1		1		

Syllabus		
Unit No.	**Contents**	**Mapped CO**
1	**Introduction:** Database system, Characteristics (Database Vs File System), Database Users, Advantages of Database systems, Database applications. Brief introduction of different Data Models; Concepts of Schema, Instance and data independence; Three tier schema architecture for data independence; Database system environment, Centralized and Client Server architecture for the databases.	**CO1**
2	**Conceptual Data Modeling:** High-Level Conceptual Data Models for Database Design, A Sample Database Application, Entity Types, Entity Sets, Attributes and Keys, Relationship Types, Relationship Sets, Roles, and Structural Constraints,Weak Entity Types, Refining the ER Design, ER Diagrams, Naming Conventions and Design Issues, Relationship Types of Degree Higher Than Two. Relational Database Design Using ER-to-Relational Mapping.	**CO1,CO2, CO4**

3	**Relational Model:** Introduction to relational model, concepts of domain, attribute, tuple, relation, importance of null values, constraints (Domain, Key constraints, integrity constraints) and their importance, Relational Algebra **Basic SQL:** Simple Database schema, data types, table definitions (create, alter), different DML operations (insert, delete, update). SQL querying using where clause, arithmetic & logical operations, SQL functions (Date and Time, Numeric, String). Creating tables with relationship, implementation of key and integrity constraints, nested queries, sub queries, grouping, aggregation, ordering, implementation of different types of joins, views, relational set operations.	**CO1, CO2, CO4**
4	**Database Design Theory and Normalization:** Functional Dependencies, Normal forms based on Primary Keys, General definitions of Second and Third Normal Forms, Boyce-Codd Normal Form, Multi valued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form, Denormalization	**CO1, CO3**
5	**Transaction Processing:** Introduction, Transaction and System Concepts, Desirable Properties of Transactions, Characterizing Schedules Based on Recoverability & Serializability, Transaction Support in SQL. **Introduction to Concurrency Control:** Two-Phase Locking Techniques for concurrency control: Types of Locks and System Lock Tables, Guaranteeing Serializability by Two-Phase Locking. **Introduction to Recovery Protocols:** Recovery Concepts, No-UNDO/REDO Recovery Based on Deferred Update, Recovery Techniques Based on Immediate Update, Shadow Paging.	**CO1**

Learning Resources
Text Books
1. Ramez Elmasri, Shamkant B. Navathe, Fundamentals of Database Systems, 7thEd., Pearson.
Reference Books
1. C J Date, Introduction to Database Systems, 8th Ed., Pearson. 2. Abraham Silberschatz, Henry F Korth, S. Sudarshan, Data base System Concepts, 5th Ed., McGraw Hill. 3. Raghurama Krishnan, Johannes Gehrke, Data base Management Systems, 3rd Ed.,TMH 4. Corlos Coronel, Steven Morris, Peter Robb, Database Principles Fundamentals of Design Implementation and Management, 10th Ed.,Cengage Learning, 2014.
E-Resources & other digital material
1. https://nptel.ac.in/courses/106/105/106105175/ 2. https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01275806667282022456_shared/overview 3. https://onlinecourses.nptel.ac.in/noc21_cs04/ 4. https://nptel.ac.in/courses/106/106/106106093/