**SYLLABUS**

**UCS310: DATABASE MANAGEMENT SYSTEM**

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**Course Objectives: Emphasis is on the need of database systems. Main focus is on E-R diagrams, relational database, concepts of normalization and de-normalization and SQL commands.**

**Introduction: Data, data processing requirement, desirable characteristics of an ideal data processing system, traditional file-based system, its drawback, concept of data dependency, Definition of database, database management system, 3-schema architecture, database terminology, benefits of DBMS.**

**Relational Database: Relational data model: Introduction to relational database theory: definition of relation, keys, relational model integrity rules.**

**Database Analysis: Conceptual data modeling using E-R data model -entities, attributes, relationships, generalization, specialization, specifying constraints, Conversion of ER Models to Tables, Practical problems based on E-R data model.**

**Database Design: Normalization- 1NF, 2NF, 3NF, BCNF, 4NF and 5NF. Concept of De-normalization and practical problems based on these forms.**

**Transaction Management and Concurrency control: Concept of Transaction, States of Transaction and its properties, Need of Concurrency control, concept of Lock, Two phase locking protocol.**

**Recovery Management: Need of Recovery Management, Concept of Stable Storage, Log Based Recovery Mechanism, Checkpoint.**

**Database Implementation: Introduction to SQL, DDL aspect of SQL, DML aspect of SQL – update, insert, delete & various form of SELECT- simple, using special operators, aggregate functions, group by clause, sub query, joins, co-related sub query, union clause, exist operator. PL/SQL - cursor, stored function, stored procedure, triggers, error handling, and package.**

**Laboratory work: Students will perform SQL commands to demonstrate the usage of DDL and DML, joining of tables, grouping of data and will implement PL/SQL constructs. They will also implement one project.**

**Project: It will contain database designing & implementation, should be given to group of 2-4 students. While doing projects emphasis should be more on back-end programming like use of SQL, concept of stored procedure, function, triggers, cursors, package etc. Project should have continuous evaluation and should be spread over different components.**

**Course Learning Outcomes (CLOs) / Course Objectives (COs):**

**On completion of this course, the students will be able to:**

**1. Analyze the Information Systems as socio-technical systems, its need and advantages as compared to traditional file-based systems.**

**2. Analyze and design database using E-R data model by identifying entities, attributes and relationships.**

**3. Apply and create Relational Database Design process with Normalization and Denormalization of data.**

**4. Comprehend the concepts of transaction management, concurrence control and recovery management.**

**5. Demonstrate use of SQL and PL/SQL to implementation database applications.**

**Text Books:**

**1. Silverschatz A., Korth F. H. and Sudarshan S., Database System Concepts, Tata McGraw Hill (2010) 6th ed.**

**2. Elmasri R. and Navathe B. S., Fundamentals of Database Systems, Pearson (2016) 7th ed.**

**Reference Books: 1. Bayross I., SQL, PL/SQL the Programming Language of Oracle, BPB Publications (2009) 4th ed.**

**2. Hoffer J., Venkataraman, R. and Topi, H., Modern Database Management, Pearson (2016) 12th ed.**

**3. Parteek Bhatia and Gurvinder Singh, Simplified Approach to DBMS.**