

UCS310: DATABASE MANAGEMENT SYSTEM

L T P Cr

3 0 2 4.0

Course Objectives: Emphasis is on the need for database systems. The main focus is on E-R diagrams, relational database, concepts of normalization and denormalization, SQL commands, and PL/SQL.

Introduction: Data, data processing requirement, desirable characteristics of an ideal data processing system, traditional file-based system, its drawbacks, 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 Denormalization 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 forms of SELECT- simple, using special operators, aggregate functions, group by clause, subquery, joins, co-related sub query, union clause, exist operator. PL/SQL - cursor, stored function and procedure, triggers, error handling.

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

Project: It will contain database design and implementation and will be given to groups of 3-4 students. While doing projects, emphasis should be more on back-end programming like using SQL, the concept of the stored procedure, function, triggers, cursors etc. The project should have a continuous evaluation and will 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 information systems as socio-technical systems and their needs and advantages as compared to traditional file-based systems.
2. Analyze and design the database using the E-R data model by identifying entities, attributes, and relationships.
3. Apply and create a Relational Database Design process with Normalization and Denormalization of data.
4. Comprehend the concepts of transaction management, concurrency control, and recovery management.
5. Demonstrate the use of SQL and PL/SQL to implement database applications.

Text Books:

1. Silverschatz A., Korth F. H. and Sudarshan S., Database System Concepts, Tata McGraw Hill (2012) 7th ed.
2. Elmasri R. and Navathe B. S., Fundamentals of Database Systems, Pearson (2016) 7th ed.

Reference Books:

1. Hoffer J., Venkataraman, R. and Topi, H., Modern Database Management, Pearson (2016) 12th ed.
2. An Introduction to Database Systems by C. J. Date, 8th Edition, Pearson Publication (2006)
3. Bayross I., SQL, PL/SQL the Programming Language of Oracle, BPB Publications (2009) 4th ed.

Evaluation Scheme:

Sr. No	Evaluation Component	Weightage	Date	Syllabus to be covered
1	Mid Sem	25-30 %	Between 11 th to 23-Mar.	Till MST
2	Sessional (Quiz-I, Lab Test and Project)	30%	Quiz-I will be held before MST, Lab test and Project will be held after MST	MST syllabus for Quiz-1, Lab test is based on Lab assignments
3	End Sem	40-45%	Between 13 th to 28 th May	Whole Syllabus