

Database Systems

Code	Credit Hours
CS 220	3+1

Course Description

This course provides comprehensive training on database management systems, focusing on the design, implementation, and effective use of databases. It is designed for students aiming to gain a solid foundation in database concepts, which are essential for managing data in various applications. The course covers a wide range of topics including database modeling, structured query language (SQL), database constraints, triggers, and semi-structured databases. The course will be delivered through a combination of lectures, hands-on lab sessions, and projects. Students will engage in practical exercises to apply the theoretical knowledge gained in class. Assessments will include assignments, quizzes, and a final project focusing on real-world database management scenarios.

Text Book:

1. R. Elmasri, S.B. Navathe (2021): Fundamentals of Database Systems, 7/E, Addison-Wesley
2. Carlos Colonel, Steven Morris (2022): Database Systems, Design, Implementation, & management, 14h edition

Reference Book:

1. Hoffer, Prescott, and McFadden (2008): Modern Database Management 9/E,
2. Prentice Hall. Ramakrishnan and Gehrke (2003): Database Management Systems 3/E, McGraw-Hill
3. Silberschatz, Korth and Sudarshan (2010): Database System Concepts (DSC) 6/E, McGraw-Hill

Prerequisites

CS 212 (Object Oriented Programming)

ASSESSMENT SYSTEM FOR THEORY

Quizzes	10%
Assignments	10%
Mid Terms	30%
ESE	50%

ASSESSMENT SYSTEM FOR LAB

Lab Work and Report	70-80%
Project	20-30%

Teaching Plan

Week No	Topics	Learning Outcomes
1	Introduction	Information Systems, Database, Types of Database
2		Database System and Concepts and Architectures
3		DBMS Concepts and Architectures
4	ERD	Entity Relationship Modeling
5		Entity Relationship Modeling
6		Enhanced Entity Relationship Modeling
7	Relational Algebra	The Relational Algebra and Relational Calculus
8		ER model into Relational Model
9	Mid Term	
10	Normalization	Database Anomalies and Functional dependencies
11		Normalization
12	DDL	Data Definition Language : Create , Alter Drop
13	DML	SQL queries (DML): Insert Update Delete
14		SQL queries (DML): Sub queries, Correlated Sub Queries
15		No SQL
16		Project Viva
17	ESE	

Practical:

Experiment No	Description
1	MySQL and Workbench environment
2	Working with Sakila using command line & working with relational algebra operations
3	Retrieving data with SELECT queries
4	DDL and Constraints
5	Functions in SQL (Part 1-Single row functions)
6	Functions in SQL (Part 2-Multiple row functions)
7	Join Operations

8	Correlated and non-correlated sub-queries
9	Authorization in SQL
10	Practicing the DDL & DML Commands
11	Introduction to PHP+My SQL
12	User registration system building using PHP+MySQL
13	Open ended lab
14	Normalization
15	Visual database design (ER-Modeling)
16	Introduction to BigQuery & Google Cloud platform or Jason/ XML