National University of Computer and Emerging Sciences

FAST School of Computing

CL2005-Database System Lab

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Office Hours: Tue/Wed 10:00-11:30 & Fri 10:00-12:30 **Office Location:** F-029 (1st Floor, New Block)

Course Information

Program: BS (CS)
Credit Hours: 1
Type: Core
Pre-requisites (if any): CS2001 - Data Structures

Course Description/Objectives/Goals:

This course is an introduction to relational databases management Systems. The course will cover fundamental concepts of databases with an emphasis on modeling, designing and implementation of database systems. The theory will be augmented with hands-on exercises on database systems. A project will be conducted in the database system lab that runs in parallel with the course. In the project, the students will develop a data-centric application with a complete set of business transactions and appropriate user interface using a popular programming language and a popular database management system.

Course Learning Outcomes (CLOs):	PLOs
1. Implement a normalized relational design to remove anomalies in a set of relations	(4)
2. Implement the database schema developed against the designed conceptual model	(4)
3. Write queries using relational algebra and SQL	(5)

Lab Weekly Schedule

Lab	Topics	Project Deliverable	Practice/ CLO #
Lab 1	**Introduction** - Overview of the Outline - Introduction to SQL Server Management studio, Installation & Configuration	**Project Proposal Announcement**	**2**

	- Introduction to HTML & CSS Functionality - Practice using Visual Studio Website project		
Lab 2	**SQL DDL/DML** - Table creation/Insertion / Deletion / Updating Query -Selection Query - Applying Foreign Key/Null/Auto increment constraint Through designer and Query - In Lab Exercise	**(i) Project Project Proposal Submission** **(ii) Deliverable-I Schema Design Announcement**	**2**
Lab 3	**SQL Data Retrieval Queries** - Select From Where -Ordering/Arithmetic/Operations/Substring/Comparison - Set Operations	**Deliverable-I Queries/Discussion**	**3**
Lab 4	**SQL Joins & Aggregation** **-** Aggregation. Group By, Order By - Joins & types (inner, outer, cross) - Node JS Intro & Db Connection	**(i) Deliverable-I Submission** **(ii) Deliverable II (Queries For Features) Announcement**	**3**
Lab 5	**SQL Nested Queries** - Advanced SQL (**Nested** and Subquery) - Node JS Practice	**Deliverable II Queries/Discussion**	**3**
Lab 6	**Stored Procedures & Views, UI** - Stored Procedures - Views (Virtual Tables) - Practice with HTML, CSS	**Deliverable II Queries/Discussion**	**3**
Lab 7	**CRUD Operations from UI** - Basic UI Page with any JS frontend: ReactJS or VueJS or Angular JS - Login Form and CRUD Operations on a Table	**(i) Deliverable II Submission** **(ii) Deliverable III: Minimal UI Announcement**	
Lab 08	**Mid Term**	**—----------**	**2,3**
Lab 09	**Triggers and Types of Triggers** **-** Practice with Triggers - Schema Normalization Exercises	**(i) Deliverable III: Minimal UI Submission** **(ii) Deliverable IV: Schema**	**3**

		Normalization & UI Update	
Lab 10	**Introduction to ERWIN & DB Connectivity** - Creating Relational model using ERWIN	**Deliverable IV Queries/Discussion**	**2**
Lab 11	**Transactions & Advance Concepts**	**Deliverable IV Submission**	**3**
Lab 12	**Complete Project Evaluation**	**Viva**	

Tentative Grading Criteria:

1. In Lab + Post Labs (25%)
2. Mid Term (20%)
3. Project (15%)
    a. Deliverable I: Schema Design 3%
    b. Deliverable II: Queries For Features 4%
    c. Deliverable III: Features with Minimal UI 4%
    d. Deliverable IV: Normalized Schema and UI Update 4%
4. Final (40%)

Lab Policies:

1. The lab outline is tentative.
2. At least **80% attendance** is compulsory.
3. **Absolute Grading** will be followed and the minimum requirement to pass this lab is to obtain **at least 50% marks**.
4. University's rules about code of conduct apply in the lab as well.
5. **Seating Plan is mandatory to be followed and can be shared for any assessment/session** i.e. labs, exams, quizzes etc
6. **Plagiarism in any work** (Labs, Quiz, Assignment, Midterms, and Final Exam) from any source (Internet or a Student) **will result in an F grade.**

Note: Lab manuals will be available through Google Classroom or Xeon.