**Course Information (Theory)**

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| **Course Title: DATABASE MANAGEMENT SYSTEM** | | **Code:** **CE320** |
| **Program:** Bachelor of Electrical Engineering | **Semester:** 5 | **Credit Hours: 3+1**  **Lecture: 48**  **Practical:** **16** |
| **Knowledge Area** (as per HEC curriculum template) | Electrical Engg. Depth | |

1. **Course description and objectives:**

Students should be able to understand basic database concepts, including the structure and operation of the relational data model, construct simple and moderately advanced database queries using Structured Query Language (SQL), understand and successfully apply logical database design principles, including E-R diagrams and database normalization, understand the concept of a database transaction and related database facilities, including concurrency control, journaling, backup and recovery, and data object locking and protocols. Describe and discuss selected advanced database topics, such as data warehouse and data mining and also understand the role of the database administrator.

1. **Course Learning Outcomes (CLOs):**

*(You can add the CLOs as per the course requirement)*

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| --- | --- | --- | --- | --- |
| **CLO No.** | **CLO Description** | **Domain and Taxonomy level** | **PLO mapped**  **(i to xii)** | **Level of emphasis of the PLO**  **(1=High; 2=Medium; 3=Low)** |
| I | Student should be able to demonstrate proficiency in database concepts, data modeling, SQL query writing, and logical database design principles including ERD and Normalization | **C3** | **iii** | **1** |
| II | Student should be able to analyze database transaction, and its facilities like concurrency control, query optimization, backup and recovery and data warehousing and data mining | **C4** | **iv** | **2** |
| III | Student should be able to demonstrate proficiency in database implementation, SQL query execution. | **P 4** | **v** | **1** |

***\*Note:***

* *C 🡪 Cognitive, P 🡪 Psychomotor, A 🡪 Affective domains and ‘n’ is the taxonomy level.*
* *It is strongly suggested that one CLO should be mapped to one PLO and one domain only.*

**Teaching Plan**

1. **Weekly Lecture Breakdown**

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| **Week #** | **Topic(s) to be covered** | **Remarks (if any)** |
| **1** | **Introduction to Database System** |  |
| **2** | **Database Environment** |  |
| **3** | **Relational Algebra and Calculus** |  |
| **4** | **Data Manipulation** |  |
| **5** | **Joins in SQL** |  |
| **6** | **Further DDL and DML** |  |
| **7** | **Integrity concept** |  |
| **8** | **Views , subqueries , constraints** |  |
| **Midterm Examination** | | |
| **9** | **Normalization** |  |
| **10** | **Normalization continued** |  |
| **11** | **Entity-Relationship Model** |  |
| **12** | **Database Security** |  |
| **13** | **Transaction Management** |  |
| **14** | **Concurrency Control** |  |
| **15** | **Data warehousing** |  |
| **16** | **Data Mining** |  |

**Lab-work Plan (if applicable)**

1. **Experiment/Practical Breakdown**

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| --- | --- | --- | --- |
| **Experiment #** | **Experiment Title** | **CLO Mapped** | **Remarks** |
| **1** | **Overview of the features of SQL and**  **SQL\*Plus.** | **III** |  |
| **2** | **Further exploring SELECT statement** | **III** |  |
| **3** | **Single-row and multiple-row**  **functions in SQL** | **III** |  |
| **4** | **Data retrieval operations in SQL using join**  **operations** | **III** |  |
| **5** | **Creating and managing tables** | **III** |  |
| **6** | **Data Manipulation Language** | **III** |  |
| **7** | **Subqueries and Compound Queries in SQL** | **III** |  |
| **8** | **Open ended lab I** | **III** |  |
| **Midterm Examination** | | | |
| **9** | **Working on views** | **III** |  |
| **10** | **Creating sequences, indexes and synonyms** | **III** |  |
| **11** | **Database Triggers** | **III** |  |
| **12** | **Stored procedure** | **III** |  |
| **13** | **Open ended lab II** | **III** |  |
| **14** | **Order Management System (Putting All**  **together)** | **III** |  |
| **15** | **Revision** | **-** |  |
| **16** | **Lab Exam** | **-** |  |

1. **Syllabus and Books:**

**Course Outline:**

**Basic Concepts**

User interface, data independence, user view, three data models (relational, hierarchical, network, object oriented)

**Database Design**

Conceptual, logical and physical database design and evaluation, normalization, query languages, query optimization, security, integrity and concurrency protocols

**SQL and its application to RDBMS**

Database design, model building, data table, forms & reports. Database administration. Transaction Management Recovery and Concurrency Control.

**Database Administration**

Security and Operation - Reliability, Protection and Integrity; Decision Support Systems, Data Warehousing and Data Mining.

**Text Book(s):**

1. Thomas Connolly and Carolyn Begg, Database Systems, A Practical

Approach to Design, Implementation and Management, Fourth Edition

**Reference Book(s):**

1. C. J. Date, "Database Systems", Addison Wesley, 2004.
2. Ramakrishanan, Ghrke. “Database Management Systems”, Third Edition
3. **Percentage of theoretical background, problems analysis and solution design**

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| --- | --- |
| **Elements covered in the course** | **Percentage of full course coverage** |
| Theoretical background | 50 |
| Problem analysis | 30 |
| Solution design | 20 |

1. **Teaching and learning methods:**

**(You may add/delete as suitable for the course)**

* 1. Lecture
  2. Class discussion/ Videos
  3. Presentation
  4. Activities
  5. Homework

1. **Student assessment methods:**

**(You may add/delete as suitable for the course)**

* 1. Quiz
  2. Assignment
  3. Exams (Theory)
  4. Presentation
  5. Project
  6. Activities etc.

1. **Assessment schedule:**
   1. Quiz throughout the semester
   2. Assignment throughout the semester
   3. Exams

Midterm exam Week 9

Final theory exam Week 18

* 1. Activities throughout the semester

1. **Weighting of assessments:**

**Theory:**

1. Quizzes/Activities 10 Marks
2. Assignments 10 Marks
3. Midterm examination 20 Marks
4. Final term examination 60 Marks

Total 100 Marks

1. **Facilities required for teaching and learning**
2. Computer Usage
3. Youtube

**Course group leader name: Engr. Salman Jafri**

**Signature:**

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| **S. No.** | **Course group member (if any)** | **Theory/Lab** | **Signature** |
| 1 | **Engr. Salman Jafri** | **Theory** |  |
| 2 | **Engr. Adiba Jaffar** | **Lab** |  |