**Course Objective and Outcome Form**

Department of Electrical and Computer Engineering

School of Engineering and Physical Sciences

North South University, Bashundhara, Dhaka-1229, Bangladesh

1. **Course Number and Title:** CSE 311 - Database Management Systems  
    CSE 311L - Database Management Systems Laboratory
2. **Number of Credits:** 3 + 0 = 3 Credits
3. **Type:** Core
4. **Prerequisites:** CSE 225
5. **Contact Hours:** 3 (Theory)+ 3 (Lab)
6. **Course Summary:** This course introduces students with database management systems for the first time in their undergraduate study. Drawbacks of flat file system are demonstrated and advantages of relational database systems are introduced. The course examines the logical organization of databases: the entity-relationship model; the hierarchical, network, and relational data models and their languages. Functional dependencies and normal forms are discussed. Design, implementation, and optimization of query languages; security and integrity; concurrency control, different level of indices, e.g., tree and hash based indices are introduced. Access costs are compared for different alternatives. This course has separate mandatory laboratory sessions every week in a separate course CSE 311L which has 0 credits, but the students (in group) use hands on SQL queries and as a culmination, they build a full fledged database system including a front end. The evaluation of the lab works is carried over to the theory part of the course.
7. **Course Objectives:**

The objectives of this course are

1. to make students comprehend the advantages of using database system over flat files.
2. to get students familiar with requirement analysis specially data requirements of an organization
3. To introduce the conceptual design from requirement analysis using E-R diagrams and also mapping ER diagrams into relational schema.
4. to introduce the basics and usage of relational algebra that are the foundation of SQL.
5. to transform a relational design into physical database design using popular commercialized database, e.g., Oracle, MySQL etc.
6. to demonstrate and show the evils of redundancy by introducing the concepts of functional dependencies and their types.
7. to design full-fledged physical database systems with least redundancy and most optimized manner.
8. to build their independent projects emphasizing the data requirement.
9. **Course Outcomes (COs):**

Upon Successful completion of this course, students will be able to:

|  |  |  |
| --- | --- | --- |
| Sl. | **CO Description** | **Weightage (%)** |
| 1 | **explain** conceptual model through entity, relationship diagrams (E-R diagram) and extended ER diagram. | 30% |
| 2 | **use** relational algebra in simple and complex queries based on set theory | 20% |
| 3 | **construct code** in SQL DDL (Data Definition Language) and , SQL DML (Data Manipulation Language) for table creation and query processing. | 25% |
| 4 | **build** a Web-based relational database system, using scripting languages (e.g., PHP) and an open-source database development system (e.g., MySQL). | 25% |

1. **Mapping of CO-PO:**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sl.** | **CO Description** | **Program Outcome** | | | **Bloom’s taxonomy**  **domain/level**  *(C: Cognitive*  *P: Psychomotor*  *A:* *Affective)* | **Delivery methods**  **and activities** | | | **Assessment**  **tools** |
| CO1 | **explain** conceptual model through entity, relationship diagrams (E-R diagram) and extended ER diagram.(E-R diagram), **Build** hierarchy and inheritance through specialization/ generalization (Extended ER diagram (EER)), **Translate** conceptual model **(**ER and EER diagrams ) to relational schema with different alternatives | | a | C2 | | | Lectures, Notes | Quiz, Exam | |
| CO2 | **use** relational algebra in simple and complex queries based on set theory | | a | C3 | | | Lectures, Notes | Quiz, Exam | |
| CO3 | **construct code** in SQL DDL (Data Definition Language) and , SQL DML (Data Manipulation Language) for table creation and query processing | | c | C3 | | | Lectures, Notes, Lab | Quiz, Exam | |
| CO4 | **Build** a Web-based relational database system, using scripting languages (e.g., PHP) and an open-source database development system (e.g., MySQL). | | e | C6 | | | Lectures, Notes | Report and Demonstration | |

1. **Resources**

**Text and Reference books:**

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| --- | --- | --- | --- | --- | --- | --- |
| No | Name of Author(s) | Year of Pub. | Title of Book | Edition | Publisher’s Name | ISBN |
| 1 | Abraham Silberschatz ‎ Henry F. Korth,‎ S. Sudarshan | 2019 | Database System Concepts | 7th | McGraw-Hill | ISBN-13: 978-0073523323 |
| 2 | Raghu Ramakrishnan Johannes Gehrke | 2003 | Database Management Systems | 3rd | McGraw-Hill | ISBN-13: 978-0072465631 |
| 3 | Timothy Boronczyk,‎ Elizabeth Naramore,‎ Jason Gerner *et al.* | 2009 | Beginning PHP 6, Apache, MySQL 6 Web Development | 1st. | Wiley | ISBN-13: 978-0470391143 |

1. **Weightage Distribution among Assessment Tools**

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| --- | --- |
| **Assessment Tools** | **Weightage (%)** |
| Class Performance and Attendance | 10 |
| Quizzes | 20 |
| Midterm | 20 |
| Final Exam | 30 |
| Lab Work | 10 |
| Lab Project | 10 |
| Total | 100 |

1. **Grading policy:** As per NSU grading policy available in

<http://www.northsouth.edu/academic/grading-policy.html>

1. **Tentative Lecture Schedule**

|  |  |
| --- | --- |
| **Week** | **Content** |
| 1-2 | Concepts of Database Systems, Relational Model |
| 3-7 | The Logical Organization of Databases: Entity-Relationship Model, Relational Database Design: Functional Dependencies and Normal Forms |
| 8-9 | Query Languages: Relational Algebra |
| 10-12 | Basic and Advanced SQL |
| 10-14 | Integrity Constraint, views and user management |
| 15 | Relational Database Implementation: Storage Management |
| 16-17 | Indexing and Hashing |
| 18 | Transaction, Concurrency Control |