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|  | **Daffodil International University**  **Department of Computer Science and Engineering (CSE)**  **Course Outline** | | |  |
| **Course Code:** | CSE 311 | | | |
| **Course Title:** | Database Management System | | | |
| **Program:** | B.Sc. in CSE | | | |
| **Faculty:** | Faculty of Science and Information Technology (FSIT) | | | |
| **Semester:** | Fall | **Year:** | 2020 | |
| **Credit:** | 3 | **Contact Hour:** | 3 | |
| **Course Level:** | L3 T1 | **Prerequisite:** | CSE 131, CSE 214 | |
| **Course Category:** | Core Engineering | | | |
|  |  | | | |
| **Instructor Name:** | Noor Kibria Sabuz | | | |
| **Designation:** | Lecturer | | | |
| **Email:** | kibria4329@diu.edu.bd | | | |

1. **Course Rationale**

Database Management Systems (DBMS) are vital components of modern information systems. Database applications are pervasive and range in size from small in-memory databases to terra bytes or even larger in various applications domains. The course focuses on the fundamentals of knowledgebase and relational database management systems, and the current developments in database theory and their practice.

* 1. **Course Objective**

Upon successful completion of this course, students should be able to:

* Describe the fundamental elements of relational database management systems.
* Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL.
* Design ER-models to represent simple database application scenarios
* Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data.
* Improve the database design by normalization.
* Familiar with basic database storage structures and access techniques: file and page organizations, indexing methods including B tree, and hashing.
  1. **Course Outcomes (CO’s)**

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| **CO1** | To be able to apply analytical skills to map out the conceptual design for a real-life problems and write database documentation, including data standards, procedures and definitions for the data dictionary. |
| **CO2** | To be able to draw the model of Relational Database using Entity Relationship (ER) model and explain the fundamental elements of Database management System. |
| **CO3** | To be ableto evaluate the logical design to translate into a specific data model and physical design to meet system storage requirements. |
| **CO4** | To be able to evaluate MSSQL/MySQL/Oracle features and MSSQL/MySQL/Oracle related productsfor maintaining the integrity and performance of enterprise databases. |

* 1. **Program Outcomes (PO’s)**

Program Outcomes are reported in Appendix-I.

* 1. **CO-PO Mapping**

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| PO’s  CO’s | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | 2 | 3 | 3 |  |  |  |  |  |  |  |  |  |
| CO2 |  |  | 3 |  |  |  |  |  |  |  |  |  |
| CO3 |  |  | 3 | 2 |  |  |  |  |  |  |  |  |
| CO4 |  |  |  |  | 3 |  |  |  |  |  |  |  |

* 1. **CO Assessment Scheme**

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| **Assessment Task** | **CO’s** | | | | **Mark**  **(Total=100)** |
| **CO1** | **CO2** | **CO3** | **CO4** |
| Attendance | -- | -- | -- | -- | 7 |
| Class Test (CT1, CT2, CT3) | -- | -- | -- | -- | 15 |
| Assignment | -- | -- | -- | -- | 5 |
| Presentation | -- | -- | -- | -- | 8 |
| Midterm Examination | 7 | 9 | 9 | -- | 25 |
| Semester Final Examination | 5 | 10 | 12 | 13 | 40 |
| Total Mark | 12 | 19 | 21 | 13 | 100 |

# **Strategies and approaches to learning**

# **Teaching and Learning Activities (TLA)**

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| **TLA1** | Lectures twice a week using multimedia of different topics. |
| **TLA2** | Active discussion in class regarding efficient solving of the logical and mathematical problems. |
| **TLA3** | Group discussion and presentation regarding diverse problems and corresponding lectures. |
| **TLA4** | Evaluation of class performances to reach each student in a class for every topic. |

1. **Course Schedule and Structure**
   1. **Textbook**
2. Database System Concept, Silbertz, Korth and Sudarshan (6th Ed. Or higher)
   1. **Reference Books**
3. Oracle Database 10g: The Complete Reference, Author: KavinLoney
4. Fundamentals of Relational Database Management Systems, Author: S. Sumathi and S. Esakkirajan.
   1. **Course Plan/Lesson Plan**

| **Week** | **Lesson.** | **Topic** | **Teaching and Learning Activities (TLAi)** | **Textbook& Video Reference** | **Related CO’s** |
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| 1 | Les. 1 | Database Introduction, Database History, Flat File Database, Data and Information, Database Applications Problems in Conventional File Processing System, Difficulty in accessing data, Integrity problems, Atomicity problems, Security problems | TLA1 | Silberschatz, Ch.1 | CO1 |
| Les. 2 | Relational Model?  Relational Model Concept, Relational Integrity Constraints, Operation in Relational Model | TLA1, TLA2 | Silberschatz, Ch.1 and Online Resources | CO1 |
| 2 | Les. 3 | Level of Abstraction, Data Models, Database Languages File, Two Tier Architecture, Three Tier Architecture, all types of keys in relational DB Model. | TLA1, TLA2 | SilberschatzCh.1 | CO1, CO3 |
| Les. 4 | Entity, Entity Type and Entity Set, Learn how to make ER model using symbol | TLA1, TLA4 | Silbertz, Ch.7 | CO2, CO3 |
| 3 |  | (Class Test – 1, Assignment – 1) | | |  |
| Les. 5 | [Entity Relationship to Schema Mapping File](https://elearn.daffodil.university/mod/resource/view.php?id=69371) | TLA1 | Silbertz, Ch.7 and Online Resources | CO2, CO3 |
| Les. 6 | Relational Algebra, Projection, selection, Join, Cartesian products | TLA1, TLA3 | Silbertz, Ch.1 and Ch.17 | CO1, CO2 |
| 4 | Les. 7 | CRUD (Create, Read, Update, Delete) operation  •Where and Order By Clause  •Group By Clause | TLA1 | Silbertz, Ch. 7 | CO2 |
| Les. 8 | The Basic Parts of Speech in SQL, Grouping thing together (GROUP BY, Having)  Changing Data (Insert, Update, Merge & Delete ) | TLA3 | Silbertz, Ch.1, Ch. 3 and online resources | CO4 |
| 5 |  | (Class Test – 2) | | |  |
| Les. 9 | [Join Operation in DBMS File](https://elearn.daffodil.university/mod/resource/view.php?id=58086), INNER Join, Outer Join | TLA1, TLA2 | Silbertz, Ch.3 | CO4 |
|  | Les. 10 | SQL Join Operation Query | TLA1, TLA2 | Silbertz, Ch. 3 and Ch.6 | CO3 |
| 6 | Les. 11 | SQL Queries: Between and In, Exist and not exists, Like Operator, Group by with having clause | TLA1 | Silbertz, Ch.6 | CO2, CO3 |
| Les. 12 | Rename Operation, Order By, Set Operations, Nested Query Using Set Operation | TLA1, TLA2 | Silbertz, Ch.6 and online resources | CO2, CO3 |
| 7 | Les. 13 | Numeric Functions,  Date & Time Functions | TLA1, TLA3 | Silbertz, Ch.4 | CO2, CO3 |
| Les. 14 | Basic SQL queries: update and delete operation | TLA1, TLA3 | Silbertz, Ch.3 and online resources | CO2, CO3 |
| 8 | Les. 15 | Introduction to Nested Queries | TLA1 | Silbertz, Ch.14 | CO4 |
| Les. 16 | Introduction to Nested Queries | TLA1 | Silbertz, Ch.14 | CO4 |
| (MID–TERM EXAM) | | | | | |
| 10 | Les. 17 | Stored Procedure and Views | TLA1 | Silbertz, Ch.8 | CO4, CO3 |
| Les. 18 | Stored Procedure and Views | TLA1 | Silbertz, Ch.8 | CO4, CO3 |
| 10 |  | (Class Test-3, Assignment – 2) | | |  |
| Les. 19 | First Normalization; Second Normal Form Relation; Third Normal Form; | TLA1 | Silbertz, Ch.8 | CO3 |
| Les. 20 | First Normalization; Second Normal Form Relation; Third Normal Form; | TLA1, TLA2 | Silbertz, Ch.15 | CO3 |
| 11 | Les. 21 | Introduction to Database Transaction | TLA1 | Silbertz, Ch.15 and Ch.10 | CO5 |
| Les. 22 | SQL Transaction | TLA1 | Silbertz, Ch.5 | CO4 |
| 12 | Les. 23 | Trigger in Database | TLA1 | Silbertz, Ch.11 | CO5 |
| Les. 24 | SQL injection | TLA1 | Silbertz, Ch.19 and online resources | -- |
| (FINAL EXAM) | | | | | |

1. **Assessment Methods**
   1. **Grading System**

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| **Numerical Grade** | **Letter Grade** | **Grade Point** |
| 80-100 | A+ | 4.00 |
| 75-79 | A | 3.75 |
| 70-74 | A- | 3.50 |
| 65-69 | B+ | 3.25 |
| 60-64 | B | 3.00 |
| 55-59 | B- | 2.75 |
| 50-54 | C+ | 2.50 |
| 45-49 | C | 2.25 |
| 40-44 | D | 2.00 |
| Less than 40 | F | 0.00 |

1. **Additional Support for Students**

* Student Portal:

<http://studentportal.diu.edu.bd/>

* Academic Guidelines

<https://daffodilvarsity.edu.bd/article/academic-guidelines>

* Rules and Regulations of DIU

<https://daffodilvarsity.edu.bd/article/rules-and-regulation>

* Career Development Center:

<https://cdc.daffodilvarsity.edu.bd/>

* For general queries:

<http://daffodilvarsity.edu.bd/>

1. **Program Outcomes and Assessment (PO)**

Program Outcomes (POs) are narrower statements that describe what students are expected to know and be able to do by the time of graduation. These relate to the knowledge, skills and attitudes that students acquire while progressing through the program. The program must demonstrate that by the time of graduation, students have attained a certain set of knowledge, skills and behavioral traits to some acceptable minimum level. The BAETE specifically requires that students acquire the following graduate attributes.

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| **PO1: Engineering knowledge** | Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems. |
| **PO2: Problem analysis:** | Identify, formulate, research the literature and analyze complex engineering problems and reach substantiated conclusions using first principles of mathematics, the natural sciences and the engineering sciences. |
| **PO3: Design/development of solutions**: | Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety as well as cultural, societal and environmental concerns. |
| **PO4: Investigation:** | Conduct investigations of complex problems, considering design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions. |
| **PO5: Modern tool usage:** | Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. |
| **PO6: The engineer and society:** | Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice. |
| **PO7:Environment and sustainability:** | Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development. |
| **PO8: Ethics:** | Apply ethical principles and commit to professional ethics, responsibilities and the norms of the engineering practice. |
| **PO9: Individual work and teamwork:** | Function effectively as an individual and as a member or leader of diverse teams as well as in multidisciplinary settings. |
| **PO10: Communication:** | Communicate effectively about complex engineering activities with the engineering community and with society at large. Be able to comprehend and write effective reports, design documentation, make effective presentations and give and receive clear instructions. |
| **PO11: Project management and finance:** | Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work as a member or a leader of a team to manage projects in multidisciplinary environments. |
| **PO12: Life-long learning:** | Recognize the need for and have the preparation and ability to engage in independent, life-long learning in the broadest context of technological change. |