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| UNITED INTERNATIONAL UNIVERSITY Department of Computer Science and Engineering (CSE) Course Syllabus | | |
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| **1** | **Course Title** | Database Management Systems |
| **2** | **Course Code** | CSE 3521/CSI 221 |
| **3** | **Trimester and Year** | Summer 2023 |
| **4** | **Pre-requisites** | NIL |
| **5** | **Credit Hours** | 3.00 |
| **6** | **Section** | A |
| **7** | **Class Hours** | Day : StartTime – EndTime  Day : StartTime – EndTime |
| **8** | **Classroom** | Room # --- |
| **9** | **Instructor’s Name** | Sadia Islam |
| **10** | **Email** | [sadia@cse.uiu.ac.bd](mailto:sadia@cse.uiu.ac.bd), 01688744226 |
| **11** | **Office** | Room-536(A) |
| **12** | **Counselling Hours** | Please see in the door of my room. |
| **13** | **Text Book** | 1. Database System Concepts (7th Edition)   by Abraham Silberschatz, Henry F. Korth and S. Sudarshan 2. Database Systems: The Complete Book   by Garcia-Molina, Ullman and Widom |
| **14** | **Reference** | <http://www.db-book.com/> |
| **15** | **Course Contents (approved by UGC)** | Concepts and methods in database system, File organization and retrieval, Data manipulation, Query formulation and language, Database models, Data description languages, database integrity and security, Data dictionary/directory systems, database administration, Database design, Survey of some existing database management systems, Some applications using commercial languages. |
| **16 Course Outcomes (COs)**   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | **COs** | **Statement** | **Bloom’s Domain** | **Program**  **outcome** | **Knowledge profile** | **Complex problem** | **Engineering activities** | Engineering activities | | CO1 | Learn the fundamentals of database systems including: data models, database architectures, database manipulations, file organization and retrieval | C | a  Engineering Knowledge | Engineering fundamentals (K3)  Specialist Knowledge  (K4) | Depth of Knowledge (P1)  Depth of Analysis (P3) | -- |  | | CO2 | Learn the theories and techniques in developing database applications, management and security | C | a  Engineering Knowledge |  | | CO3 | Demonstrate the management and administration of database systems | C | b  Problem  Analysis |  | | CO4 | Prescribe new developments and trends in databases using commercial languages on contemporary issues | C | b  Problem  Analysis |  | | | |
| **17** | **Teaching Methods** | Lecture (L), Case Study (CS), Q/A, Assignment (A), Class Test (CT), Mid, Final exam |
| **18** | **CO with Assessment Methods** | |  |  |  | | --- | --- | --- | | **CO** | **Assessment Method** | **(%)** | | - | Attendance | 5 | | - | Assignments | 5 | | - | Class Tests | 20 | | CO1, CO2 | Midterm exam | 30 | | CO3, CO4 | Final exam | 40 | |  |  |  | |
| **20** | **Lecture Outline** | |
|  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Class** | **Topics/Assignments** | **COs** | **Reading Reference** | **Lecture Outcomes/Activities** | | 1 | Introduction to database, relational database, necessity of database management systems. Different data models and administration of database. | CO1, CO2 | Sec 1.2, 1.3 | Student will know the importance of database management systems | | 2 | Entity relationship data model: attributes and constraints. | CO1 | Sec 6.2, 6.3, 6.4 | Get the idea of entity database model | | 3 | Entity relationship data model: case study to design database. | CO1, CO2 | Sec 6.5, 6.7 | Apply the knowledge of entity model to design real life database | | 4 | Introduction to schema models, definition and manipulation language, | CO1 | Sec 1.4 | Introduce with the schema concepts of database | | 5 | Relational Database: constraints, attributes, manipulations. | CO1, CO2 | Sec 3.2, 3.9 | Introduce with relational database model | | 6 | Relational Database: simple query details | CO1, CO2 | Sec 3.2, 3.3, 3.4 | Apply basic queries using enterprise language | | 7 | Relational Database: complex query details | CO1, CO2 | Sec 3.7, 3.8, 4.1 | Apply complex queries using enterprise language | | 8 | Relational Database: View concepts | CO1, CO2 | Sec 4.2 | Visualize the outcome of database queries | | 9 | Relational Algebra: Basic Operations | CO2 | Sec 2.6 | Understand the internal process of database queries | | 10 | Relational Algebra: complex Operations | CO2 | Sec 2.6 | Understand the internal process of database queries | | 11 | Relational Database: security and integrity management | CO2 | Sec 4.3, 4.4 | Impose the security and integrity in database. | | 12 | Review of mid syllabus | -- | -- |  | |  | MIDTERM EXAM |  |  |  | | 13 | Database theories: functional dependencies, impact of functional dependencies. | CO3 | Sec 7.4 | Know the theories of functional dependencies | | 14 | Database techniques: anomaly problems, normalization, different normal forms | CO3 | Sec 7.3 | Know the techniques to minimize redundancy | | 15 | Database theories and techniques: application of functional dependencies to normalize the database into different normal forms. | CO3 | Sec 7.5 | Apply the knowledge of database theories to reduce redundancy | | 16 | Application of Normalization in designing database on real life problems | CO3, CO4 | Sec 7.5 | Apply the database theory and techniques in real life. | | 17 | Indexing and Hashing: introduction, importance, types, applications | CO3 | Sec 14.1, 14.2 | Understand the database techniques to reduce the time complexity of queries | | 18 | Indexing: B+ tree structure, manipulation of B+ tree structure | CO3 | Sec 14.3 | Understand the database techniques to reduce the time complexity of queries | | 19 | Hashing: Dynamic hash structure and its manipulation | CO3 | Sec 14.5 | Understand the database techniques to reduce the time complexity of queries | | 20 | Transaction: definition, characteristics, importance, states | CO3 | Sec 17.1, 17.4 | Map the database knowledge with real tasks | | 21 | Transaction: consistency and serializability | CO3 | Sec 17.6 | Impose the important characteristics to ensure actual tasks | | 22 | Transaction: atomicity and back up system. RAID: different levels. | CO4 | Sec 12.5 | Understand the back up techniques. | | 23 | File storage management | CO4 | Sec 12.1 | Visualize the overall file systems. | | 24 | Review of final syllabus | -- | -- |  | | |

**Appendix 2: Grading Policy**

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| **Letter Grade** | **Marks %** | **Grade Point** | **Letter Grade** | **Marks%** | **Grade Point** |
| A (Plain) | 90-100 | 4.00 | C+ (Plus) | 70-73 | 2.33 |
| A- (Minus) | 86-89 | 3.67 | C (Plain) | 66-69 | 2.00 |
| B+ (Plus) | 82-85 | 3.33 | C- (Minus) | 62-65 | 1.67 |
| B (Plain) | 78-81 | 3.00 | D+ (Plus) | 58-61 | 1.33 |
| B- (Minus) | 74-77 | 2.67 | D (Plain) | 55-57 | 1.00 |
|  |  |  | F (Fail) | <55 | 0.00 |

**Appendix-3: Program outcomes**

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| **POs** | **Program Outcomes** |
| **PO1** | An ability to apply knowledge of mathematics, science, and engineering |
| **PO2** | An ability to identify, formulate, and solve complex engineering problems |
| **PO3** | An ability to design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations |
| **PO4** | An ability to investigate complex problems using research-based knowledge and research methods design and conduct experiments, as well as to analyze and interpret data |
| **PO5** | An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice |
| **PO6** | The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context |
| **PO7** | Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts |
| **PO8** | An understanding of professional and ethical responsibility |
| **PO9** | An ability function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings |
| **PO10** | An ability to communicate effectively |
| **PO11** | Project management and finance |
| **PO12** | A recognition of the need for, and an ability to engage in life-long learning |