**University of Asia Pacific (UAP)**

**Department of Computer Science and Engineering (CSE)**

**Course Outline: CSE 211 – Database Systems**

**Program:** Computer Science and Engineering (CSE)

**Course Title:** Database Systems

**Course Code:** CSE 211

**Semester:** Spring 2018

**Level:** 4th Semester (2nd Year 2nd Semester)

**Credit Hour:** 3.0

**Name & Designation of Teacher:** Molla Rashied Hussein, Assistant Professor

**Office/Room: 701 (B),** 7th Floor, Teachers’ Area

**Class Hours:** Tuesday: 03:30-04:50 p.m. & Thursday: 09:30-10:50 a.m. (Section A)

Sunday: 02:00-03:20 p.m. & Wednesday: 11:00-12:20 p.m. (Section B)

**Consultation Hours:** Monday: 02:00-03:20 p.m. (Section A)

Tuesday: 12:20-01:50 p.m. (Section B)

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**Rationale:** The Database Systems course prepares students for activities involving the design, development, and testing of database solutions to a broad variety of issues in Science, Engineering, Business and other discipline. It also prepares students for System Analysis and Design course as well as Visual and Web Programming course as a pre-requisite course.

**Pre-requisite** (if any)**:** Nil

**Course Synopsis:** Introduction, Purpose of DBMS (Database Management System), ER (Entity-Relationship) Model, Relational Model, Integrity Constraints: Referential Integrity, Functional Dependency, Relational Database Design: Decomposition and Normalization, Storage and File Structure: Database Backup and Recovery in Disaster, Indexing and Hashing, SQL (Structured Query Language), PL (Procedural Language), SP (Stored Procedures), Trigger, Cursor, Function, Transactions, Job Scheduling, Concurrency Control, Database Architecture: Parallel and Distributed Databases, Security System, Database Servers Configuration, DTS (Data Transmission Services), Performance Tuning and Optimization.

**Course Objectives (CO):** The objectives of this course are:

1. To **provide** knowledge and understanding on principles of database management system, database technology and applications.
2. To **introduce** how to represent data in a database and how to manage for an organization.
3. To **Learn** conceptual database modeling, professional relational database design and database language SQL.
4. To **enable** the students to acquire skills in solving business problem using the fundamentals of database modeling, enterprise analysis and design.
5. To **emphasize** on efficient database modeling, quality enhancement of database transaction, concurrency control and security.

**Learning Outcomes (LO):** Upon completion of the course, the students will be able to:

1. **Describe** the objective of DBMS, database concept, structure and Applications.
2. **Explain** terms related to database design and management.
3. **Understand** and **apply** normalized concept of data modeling and database development process knowledge.
4. **Use** different DBMS and the database language SQL for managing database of institutions/companies.
5. **Analyze** and enhance database design performance.
6. **Design and develop** different types of logical database design for business process.

**Teaching-learning and Assessment Strategy:** Lectures, Quizzes, Exams

**Linkage of LO with Assessment Methods & their Weights:**

|  |  |  |
| --- | --- | --- |
| **LO** | **Assessment Method** | **(%)** |
| 1 – 4 | Quiz | 20 |
| 1 – 6 | Class attendance | 10 |
| 1– 4 | Midterm Exam | 20 |
| 1 – 6 | Final Exam | 50 |

**Minimum attendance:** 70% class attendance is mandatory for a student in order to appear at the final examination.

**Mapping of Course LO and Generic Skills:**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Learning Outcome (LO) of the Course** | **Generic Skills\* (Appendix-1)** | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| **Describe** the objective of Graphic System, GUI and Applications. | √ |  |  |  |  |  |  |  |  |  |  |  |
| **Explain** terms related to Computer Graphics System**.** | √ |  |  |  |  |  |  |  |  |  |  |  |
| **Understand and apply** computer graphics related concept of Object modeling and representation development process knowledge**.** |  | √ | √ | √ |  |  |  |  |  |  |  |  |
| **Use** different techniques and modeling of object for different application area |  | √ | √ |  | √ |  |  |  |  |  |  |  |
| **Analyze** and enhance GUI design performance. |  | √ |  | √ | √ |  |  |  |  |  |  |  |
| **Design** and develop different types of computer graphics related works |  |  | √ | √ | √ |  |  |  | √ | √ |  |  |

**Lecture Schedule**

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| --- | --- |
| Lecture No.: | Topics |
| Lec # 1,2 | Introduction to DBMS, File System vs. DBMS, Database Applications |
| Lec # 3,4 | Instance, Schema, Data Abstraction, DBMS Components, Language, User and Administrators |
| Lec # 5,6 | Data Model, Database Design and ER Model |
|  | Class Test 1 |
| Lec # 7,8 | ER Schema to Table, Relational Models, Relational Algebra |
| Lec #9-12 | SQL |
|  | Class Test 2 |
| Lec # 13,14 | Advanced SQL, Integrity Constraints, Embedded SQL |
|  | Mid-Term Examination |
| Lec # 15,16 | Functional Dependency, Normalization |
| Lec # 17-19 | Application Design and Development |
|  | Class Test 3 |
| Lec # 20, 21 | Storage and File Structure, Index and Hashing |
| Lec # 22- 24 | Transaction, Concurrency Control |
|  | Class Test 4 |
| Lec # 25- 27 | View, Trigger, Distributed Database |
| Lec # 28 | Review |
|  | Final Examination |

**Required References:** Database System Concept (6th Edition)

* Silberschatz, Korth and Sudarshan

**Recommended References:** Database Management System (4th Edition)

* Raghu Ramakrishna, Johannes Gehrke

**Grading System:** As per the approved grading scale of University of Asia Pacific (Appendix-2).

**Student’s responsibilities:** Students must come to the class prepared for the course material covered in the previous class(es).

There will be no make-up quizzes.

**Appendix-1: Generic Skills**

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| --- | --- |
| **No.** | **Generic Skills** |
| 1. | **Engineering Knowledge** |
| 2. | **Problem Analysis** |
| 3. | **Design/Development of Solutions** |
| 4. | **Investigation** |
| 5. | **Modern Tool Usage** |
| 6. | **The Engineer and Society** |
| 7. | **Environment and Sustainability** |
| 8. | **Ethics** |
| 9. | **Communication** |
| 10. | **Individual and Team Work** |
| 11. | **Life Long Learning** |
| 12. | **Project Management and Finance** |

**Generic Skills (Detailed):**

1. **Engineering Knowledge (T)** -Apply knowledge of mathematics, sciences, engineering fundamentals and manufacturing engineering to the solution of complex engineering problems;
2. **Problem Analysis (T)** – Identify, formulate, research relevant literature and analyze complex engineering problems, and reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences;
3. **Design/Development of Solutions (A)** –Design solutions, exhibiting innovativeness, for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, economical, ethical, environmental and sustainability issues.
4. **Investigation (D)** Conduct investigation into complex problems, displaying creativeness, using research-based knowledge, and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions;
5. **Modern Tool Usage (A & D)** -Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering activities, with an understanding of the limitations;
6. **The Engineer and Society (ESSE)** -Apply reasoning based on contextual knowledge to assess societal, health, safety, legal, cultural, contemporary issues, and the consequent responsibilities relevant to professional engineering practices.
7. **Environment and Sustainability (ESSE)** -Understand the impact of professional engineering solutions in societal, global, and environmental contexts and demonstrate knowledge of and need for sustainable development;
8. **Ethics (ESSE)** –Apply professional ethics with Islamic values and commit to responsibilities and norms of professional engineering code of practices.
9. **Communication (S)** -Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions;
10. **Individual and Team Work (S)** -Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.
11. **Life Long Learning (S)** -Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
12. **Project Management and Finance (S)** -Demonstrate knowledge and understanding of engineering management and financial principles and apply these to one’s own work, as a member and/or leader in a team, to manage projects in multidisciplinary settings, and identify opportunities of entrepreneurship.

**Appendix-2: Grading Policy**

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| **Numeric Grade** | **Letter Grade** | **Grade Point** |
| 80% and above | A+ | 4.00 |
| 75% to less than 80% | A | 3.75 |
| 70% to less than 75% | A- | 3.50 |
| 65% to less than 70% | B+ | 3.25 |
| 60% to less than 65% | B | 3.00 |
| 55% to less than 60% | B- | 2.75 |
| 50% to less than 55% | C+ | 2.50 |
| 45% to less than 50% | C | 2.25 |
| 40% to less than 45% | D | 2.00 |
| Less than 40% | F | 0.00 |

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| **Prepared by:**  **Molla Rashied Hussein**  **----------------------------------** | **Checked by:**  **-----------------------------** | **Approved by: (Head of the Dept.)**  **-----------------------------** |