

Course Title:	<i>Database Management Systems</i>
Course Code:	CSC – 220
Credit Hours Theory:	3
Credit Hours Lab (If Applicable):	1
Instructor Name with Qualification:	Sadia Ashraf – MS (Software Engineering)
Course Objectives:	<p>The main objective of this course is to provide students with the background to design, implement, and use database management systems. After the completion of this course students will be able to:</p> <ul style="list-style-type: none"> • Model and design Database • Write Structured Queries and optimize them • Implement Constraints and Triggers • Use and develop semi structured databases
Learning Outcomes:	<p><u>Knowledge</u></p> <p>1 Describe fundamental elements of a relational database management system</p> <p>2 Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and database language SQL</p> <p>3 Identify other data models such as object-oriented model and XML model</p> <p><u>Skill</u></p> <p>4 Design entity-relationship diagrams to represent simple database application scenarios</p> <p>5 Convert entity-relationship diagrams into relational tables, populate a relational database and formulate SQL queries on the data</p> <p>6 Criticize a database design and improve the design by normalization</p>

	<p><u>Attitude</u></p> <p>7 Develop team spirit and professional attitude towards the development of database applications</p>
<p>Contents (Catalog Description):</p>	<ol style="list-style-type: none"> 1. <u>Introduction to The Database Systems</u> <ul style="list-style-type: none"> • The Evolution of Database Systems • Overview of a Database Management System • Outline of Database-System Studies 2. <u>Entity-Relationship Data Model</u> <ul style="list-style-type: none"> • Elements of the E/R Model • Design Principles • Modeling Constraints • Weak Entity Sets 3. <u>Relational Data Model</u> <ul style="list-style-type: none"> • Basics of Relational Model • From E/R Diagrams to Relational Designs • Converting Subclass Structures to Relations • Functional Dependencies • 4. <u>Relational Data Model (contd.)</u> <ul style="list-style-type: none"> • Rules About Functional Dependencies • Normalization • Design of Relational Database Schemas • Multi-valued Dependencies 5. <u>Other Data Models</u> <ul style="list-style-type: none"> • Storage and file structure • Review of Object Oriented Concepts • The Object Relational Model 6. <u>Other Data Models (contd.)</u> <ul style="list-style-type: none"> • Semi-structured Data • XML and its Data Model 7. <u>Relational Algebra</u> <ul style="list-style-type: none"> • Example Database Schema • An Algebra for Relational Operation 8. Extended Operators for Relational Algebra <ul style="list-style-type: none"> • Constraints on Relations 9. <u>The Database Language – SQL</u> <ul style="list-style-type: none"> • Simple Queries in SQL • Queries Involving More Than One Relation

	<ul style="list-style-type: none"> • Subqueries • Full-Relation Operations <p>10. Database Modifications</p> <ul style="list-style-type: none"> • Defining a Relation Schema in SQL • DDL • View Definitions <p>11. <u>Constraints and Triggers</u></p> <ul style="list-style-type: none"> • Keys and Foreign Keys • Constraints on Attributes and Tuples <p>12. Modification of Constraints</p> <ul style="list-style-type: none"> • Schema-Level Constraints and Triggers <p>13. <u>System Aspects of SQL</u></p> <ul style="list-style-type: none"> • SQL in a Programming Environment • Procedures Stored in the Schema <p>14. The SQL Environment</p> <ul style="list-style-type: none"> • Using a Call-Level Interface <p>15. C# Database Connectivity</p> <ul style="list-style-type: none"> • Transactions in SQL • Security and User Authentication in SQL <p>16. Revision</p>
Recommended Text Books:	<ul style="list-style-type: none"> • Hector Garcia Molina, Jeffery D. Ullman, Jennifer D. Widom; “Database Systems: The Complete Book”, Prentice Hall 2001
Reference Books:	<ul style="list-style-type: none"> • Philip Greenspun, “SQL for Web Nerds”
Helping Web Sites:	None
General Instructions for students:	<p>Attendance is mandatory. Every class is important. All deadlines are hard. Under normal circumstances late work will not be accepted. Students are required to take all the tests. No makeup tests will be given under normal circumstances. Any form of cheating on exams/ assignments/quizzes is subject to serious penalty. 75% attendance is mandatory. Latecomers will be marked as absent.</p>

	<p><u>Attendance</u></p> <p>75% attendance is mandatory. Latecomers will be marked as absent.</p> <p><u>Evaluation Criteria</u></p> <table border="0"> <tr> <td>Assignments/projects</td> <td>20%</td> </tr> <tr> <td>Quizzes</td> <td>10%</td> </tr> <tr> <td>Mid-Term</td> <td>20%</td> </tr> <tr> <td>Final</td> <td>50%</td> </tr> </table> <p><u>Quizzes</u></p> <table border="1"> <tr> <td>Quiz # 1</td> <td>Week # 3</td> </tr> <tr> <td>Quiz # 2</td> <td>Week # 6</td> </tr> <tr> <td>Quiz # 3</td> <td>Week # 11</td> </tr> <tr> <td>Quiz # 4</td> <td>Week # 14</td> </tr> </table> <p><u>Assignments</u></p> <table border="1"> <thead> <tr> <th>Assignment</th> <th>Delivery date</th> <th>Submission Date</th> </tr> </thead> <tbody> <tr> <td>Assignment # 1</td> <td>Week # 2</td> <td>Week # 4</td> </tr> <tr> <td>Assignment # 2</td> <td>Week # 5</td> <td>Week # 7</td> </tr> <tr> <td>Assignment # 3</td> <td>Week # 9</td> <td>Week # 11</td> </tr> <tr> <td>Assignment # 4</td> <td>Week #11</td> <td>Week #14</td> </tr> </tbody> </table>	Assignments/projects	20%	Quizzes	10%	Mid-Term	20%	Final	50%	Quiz # 1	Week # 3	Quiz # 2	Week # 6	Quiz # 3	Week # 11	Quiz # 4	Week # 14	Assignment	Delivery date	Submission Date	Assignment # 1	Week # 2	Week # 4	Assignment # 2	Week # 5	Week # 7	Assignment # 3	Week # 9	Week # 11	Assignment # 4	Week #11	Week #14
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<p>Sixteen Week Lesson Plan</p>	<p>Week # 1: <u>Introduction to the Database System</u></p> <ol style="list-style-type: none"> 1.1 The evolution of database systems 1.2 Overview of a database management system 1.3 Outline of database system studies <p>Week # 2: <u>Entity Relationship Data Model</u></p> <ol style="list-style-type: none"> 2.1 Elements of E/R model 2.2 Design principles 2.3 Modeling constraints 2.4 Weak entity sets <p>Week # 3: <u>Relational Data Model</u></p> <ol style="list-style-type: none"> 3.1 Basics of Relational model 3.2 From E/R diagrams to Relational Designs 3.3 Converting subclass structures to relations 3.4 Functional dependencies <p>Week # 4: <u>Relational Data Model (Contd.)</u></p> <ol style="list-style-type: none"> 4.1 Rules about functional dependencies 4.2 Normalization 4.3 Design of relational database schemas 4.4 Multi-valued dependencies <p>Week # 5: <u>Other Data Models</u></p>																															

- 5.1 Storage and file structure
- 5.2 Review of object oriented concepts
- 5.3 The object relational model

Week # 6: Other Data Models (Contd.)

- 6.1 Semi-structured data
- 6.2 XML and its data model

Week # 7: Relational Algebra

- 7.1 Example database schema
- 7.2 An Algebra for Relational Operation

Week # 8: Extended Operators for Relational Algebra

- 8.1 Constraints on relations

Week # 9: Mids

Week # 10: The Database Language – SQL

- 10.1 Simple queries in SQL
- 10.2 Queries involving more than one relation
- 10.3 Subqueries

Week # 11: Database modifications

- 11.1 Defining a relation schema in SQL
- 11.2 DDL
- 11.3 View definitions

Week # 12: Constraints and Triggers

- 12.1 Keys and foreign keys
- 12.2 Constraints on attributes and tuples

Week # 13: Modification of constraints

- 13.1 Schema-Level constraints and triggers

Week # 14: System Aspects of SQL

- 14.1 SQL in a programming environment
- 14.2 Procedures stored in the schema

Week # 15: The SQL Environment

- 15.1 Using a call-level interface

Week # 16: C# Database Connectivity

- 16.1 Transactions in SQL
- 16.2 Security and user authentication in SQL

Week #17: Revision

Week # 18: Final

