**Weekly Plan**

**15CSE302 - Database Management Systems**

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| **WeekNo** | **Theory**  **/ Lab** | **Topic** | **Term Project** | |
| **Week 1** | **Theory 1** | 1) Database System Applications  2) Purpose of Database Systems  3) View of Data  3.1) Data Abstraction  3.2) Instances and Schemas  3.3) Data Models  4) Database Languages  4.1) Data Manipulation Language  4.2) Data Definition Language | Group Formation.  Project Allocation.  Handing over the abstract. | |
| **Theory 2** | 1))Overview of Relational Databases,  Database Design & Transactions  2) Database Architecture  3) Database User and Administrators |
| **Lab 1** | 1. Overview of the SQL Query Language   2) SQL Data Definition  2.1) Basic Types  2.2) Basic Schema Definition |
| **Week 2** | **Theory 3** | 1) Structure of Relational Databases  2) Database Schema 3) Keys | Understanding the abstract and revising.  (The project group can revise the abstract)  **Submission of revised abstract**. | |
| **Theory 4** | Schema Diagrams  Relational Query Languages |
| **Lab 2** | 1) Basic Structure of SQL Queries  1.1) Queries on a Single Relation  1.2) Queries on Multiple Relations  1.3) The Natural Join |
| **Week 3** | **Theory 5** | Relational Operations | Identification of schemas.  **Submission Schema Diagram** | |
| **Theory 6** | 1) Overview of the design process  1.1) Design phases  1.2) Design Alternatives  2)The E-R Models  2.1) Entity Sets  2.2) Relationship Sets  2.3) Attributes |
| **Lab 3** | 1)Additional Basic Operations  1.1) The Rename Operation  1.2) String Operations  1.3)Attribute Specification in Select Clause  1.4) Ordering the Display of Tubles.  1.5) Where Clause Predicates |
| **Week 4** | **Theory 7** | 1)Constraints  1.1) Mapping Cardinalities  1.2) Participation Constraints  1.3) Keys | Database design using ER Model.  Identifying Entity sets, Relationship sets. | |
| **Theory 8** | 1) Removing Redundant Attributes in Entity Sets  2)E-R Diagrams  2.1) Basic Structure  2.2) Mapping Cardinalities  2.3) Complex Attributes. |
| **Lab 4** | 1)Set Operations  1.1) The Union Operation  1.2) The Intersect Operation  1.3) The Except Operation  2) Handling Null Values |
| **Week 5** | **Theory 9** | 1)E-R Diagrams  1.1) Roles  1.2)Nonbinary Relationship Sets  1.3)Weak Entity Sets  1.4) E-R diagram for University Enterprise | **Submission of ER diagram.**  **Presenting the design of database with ER diagram.** | |
| **Theory 10** | 1) Reduction to Relational Schemas  1.1) Representation of Strong Entity Sets with Simple Attributes.  1.2) Representation of Strong Entity Sets with Complex Attributes.  1.3) Representation of Weak Entity Sets.  1.4) Representation of Relationship Sets |
| **Lab 5** | 1)Aggregate Functions  1.1) Basic Aggregation  1.2) Aggregation with Grouping  1.3) The Having Clause  1.4) Aggregation With Null and Boolean Values |
| **Week 6** | **Theory 11** | 1)Entity Relationship Design Issues  1.1) Use of Entity Sets versus Attributes.  1.2) Use of Entity Sets versus Relationship Sets.  1.3) Binary versus n-ary Relationship Sets.  1.4) Placement of Relationship Attributes. | | **Extending the ER diagram with Extended E-R features.** | |
| **Theory 12** | 1) Extended E-R Features  1.1) Specialization  1.2) Generalization  1.3) Attribute Inheritance  1.4) Constraints on Generalization | |
| **Lab 6** | 1. Nested Subqueries   1.1) Set Membership  1.2) Set Comparison  1.3) Test for Empty Relations  1.4) Test for the Absence of Duplicate Tuples  1.5) Subqueries in the From Clause  1.6) The with Clause  1.7) Scalar Subqueries | |
| **Week 7** | **Theory 13** | 1) Extended E-R Features  1.1) Aggregation  1.2) Reduction to Relational Schema  1.2.1) Representation of Generalization  1.2.2) Representation of Aggregation | | **Submission of Revised ER diagram with Extended Features.** | |
| **Theory 14** | **Relational Database Design**  1) Features of Good Relational Designs  1.1)Design Alternative : Larger Schemas  1.2) Design Alternative : Smaller Schemas  1.3) Atomic Domains and 1NF | |
| **Lab 7** | 1. Modification of the Databases   1.1) Deletion  1.2) Insertion  1.3) Updates | |
| **Week 8** | **Theory 15** | **Relational Database Design**  1) Decomposition using Functional Dependencies  1.1) Keys and Functional Dependencies | | Identifying the functional dependencies.  Start the Normalization . | |
| **Theory 16** | **Relational Database Design**  1) BCNF  1.1) BCNF and Dependency Preservation | |
| **Lab 8** | 1) Join Expressions  1.1) Join Conditions  1.2) Outer Joins  1.3) Join Types and Conditions | |
| **Week 9** | **Theory 17** | **Relational Database Design**  1) 3NF  2) Higher Normal Forms | | Completing normalization.  Creating Database. | |
| **Theory 18** | **Relational Database Design**  1)Functional Dependency Theory  1.1) Closure of a Set of Functional dependencies  1.2) Closure of Attribute Sets | |
| **Lab 9** | 1) Views  1.1) View Definition  1.2) Using Views in SQL | |
| **Week 10** | **Theory 19** | **Relational Database Design**  1)Functional Dependency Theory  1.1) Canonical Cover | | Completion of creation of database and insertion of records.  (Group Presentation – Presenting 60% completion of the Implementation )  **Presenting database implementation, normalization done and incorporating various complicated queries.** | |
| **Theory 20** | **Relational Database Design**  1)Functional Dependency Theory  1.2) Lossless Decomposition  1.3) Dependency Preservation | |
| **Lab 10** | 1) Overview of Additional SQL and user defined data types  2) Authorization (Only Theory)  2.1) Granting and Revoking of Privileges  2.2) Roles  2.3) Authorization on Views  2.4) Authorization on Schema  2.5) Transfer of Privileges  2.6) Revoking of Privileges | |
| **Week 11** | **Theory 21** | **Relational Database Design**  1) Algorithm for Decomposition using Functional Dependencies  1.1)BCNF Decomposition | | **Submission of a report based on the Normalization done on the database design.**  Adding Front to the database. | |
| **Theory 22** | **Relational Database Design**  1)Algorithm for Decomposition using Functional Dependencies  1.1)3NF Decomposition | |
| **Lab 11** | Advanced SQL   1. Overview of accessing SQL from a Programming Language. | |
| **Week 12** | **Theory 23** | Overview of Multivalued Dependencies and Higher normal forms. | | Completing connecting front end with back end for all the database operations. | |
| **Theory 24** | **Transaction Management**   1. Transaction Concept 2. A Simple Transaction Model   Storage Structure | |
| **Lab 12** | Advanced SQL  Functions and Procedures - PL/SQL I | |
| **Week 13** | **Theory 25** | **Transaction Management**   1. Transaction Atomicity and Durability 2. Transaction Isolation | | **Demonstration.** | |
| **Theory 26** | **Transaction Management**  1) Serializability | |
| **Lab 13** | Advanced SQL  Functions and Procedures - PL/SQL II | |
| **Week 14** | **Theory 27** | **Dead Lock**  Lock-Based Protocols   1. Locks 2. Granting of Locks   The Two-Phase Locking Protocol | | Adding PL/SQL functions, cursors and triggers | |
| **Theory 28** | **Dead Lock**   1. Implementation of Locking 2. Graph-Based Protocols | |
| **Lab 14** | Advanced SQL- Cursors, Exceptions | |
| **Week 15** | **Theory 29** | **Dead Lock Handling**   1. Deadlock Prevention | |
| **Theory 30** | **Dead Lock Handling**   1. Deadlock Detection and Recovery | |
| **Lab 15** | Advanced SQL - Triggers | |
| **Final Review for Term Project and**  **End Semester Examination** | | | | **Final Demonstration.** | |