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| |  |  |  |  | | --- | --- | --- | --- | | **1. Topics to be covered:** | | | | | **List of Topics in Theory** | No. of Weeks | **List of Topics in Practical** | | | Chapter 1  Introduction, Characteristics of Database Approach, Files Vs. Databases, Characteristics of Database approach, Advantages of using DBMS, When not to use DBMS,  Chapter 2  Data Model, Schema and Instance, three schema architecture and data independence, classification of DBMS, database languages & Interfaces, Database systems environment.  Chapter 5  Relational Model Concepts, Relational Model Constraints | **2** | **Lab-01:** Introduction & History of Database  Systems, Introduction of SQL  **Lab-02:** Basic SQL Schema and Statements, Arithmetic operators, Column Alias, Concatenation Operator, Where Clause, Comparison Operators & Conditions, Logical Conditions (AND, OR, NOT), Functions (count, max, min, Dates),Operators (Like, Rownum, In, Between), Order by clause | | | Chapter 5  Relational Database Schemas, Update Operations, Transactions, and Dealing with Constraint Violations  Chapter 6  SQL Data Definition and Data Types, Specifying Constraints in SQL, Basic Retrieval Queries in SQL, INSERT, DELETE, and UPDATE Statements in SQL, Additional Features of SQL | **2** | **Lab-03:** DDL(create, alter, drop, truncate, rename), Defining constraints on table, types of constraints, deferred constraint checking(chicken egg problem) and DML (Create, insert, update, delete)  **Lab-04:** Sub queries ( Single Row, Multiple Rows and correlated),Groups of Data(Group by ,Having) | | | Chapter 7  More Complex SQL Retrieval Queries, Views (Virtual Tables) in SQL, Schema Change Statements in SQL | **1** | **Lab-05:** Joins, Types of Joins (Equality Joins, Non Equality Joins, Outer Joins and Self Joins), Set Operators (union, union all, intersection, minus). | | | *WEEK 6========== MID 1 ========== There will be no Lab* | | | | | Chapter 3  Using High-Level Conceptual Data Models for Database Design, A Sample Database Application. Entity Types, Entity Sets, Attributes, and Keys, Relationship Types, Relationship Sets, Roles, and Structural Constraints, Weak Entity Types, Refining the ER Design for the COMPANY Database, ER Diagrams, Naming Conventions, and Design Issues, Relationship Types of Degree Higher than Two | **1.5** | **Lab-06:** Connectivity: PHP with MYSQL, JAVA with MYSQL, C# with SQL Server  **Lab-07:** Relational Modeling **(ER modeling software)**  **WEEK 9 : LAB MID EXAM** | | | Chapter 14  Informal Design Guidelines for Relation Schemas  Functional Dependencies/Normal Forms Based on Primary Keys  General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form  Multivalued Dependency and Fourth Normal Form  Join Dependencies and Fifth Normal Form | **2.5** | **Lab-08:** PL/SQL: Block Structure, Variable & types, Conditional Logic, Cursors, Views, Procedures &Functions) | | | *WEEK 11 ========== MID 2 ========== there will be no Lab* | | | | | Chapter 8  Unary Relational Operations: SELECT and PROJECT  Relational Algebra Operations from Set Theory  Binary Relational Operations: JOIN and DIVISION  Examples of Queries in Relational Algebra | **1** | **Lab-09:** Triggers | | | Chapter 20  Introduction to Transaction Processing  Transaction and System Concepts  Desirable Properties of Transactions  Characterizing Schedules Based on Recoverability  Characterizing Schedules Based on Serializability  Transaction Support in SQL,  Chapter 21  Two-Phase Locking Techniques for Concurrency Control  Concurrency Control Based on Timestamp Ordering  Multiversion Concurrency Control Techniques  Validation (Optimistic) Concurrency Control Techniques  Granularity of Data Items and Multiple Granularity Locking | **2** | **Lab-10:** Transaction  **Lab 11:** Mongo DB (Installation & Basics, Projections & Functions) | | | Chapter 22  Recovery Concepts  NO-UNDO/REDO Recovery Based on Deferred Update  Recovery Techniques Based on Immediate Update  Chapter 24  Introduction to NOSQL Systems  Document-Based NOSQL Systems and MongoDB  NOSQL Key-Value Stores  Column-Based or Wide Column NOSQL Systems | **1.5** | **Lab 12:** Transaction Experiments [commit, rollback, savepoint, multi-user experiment]  **Revision & Final Lab Exam** | | | Review | **0.5** | **1.5** | **1,2,3** | | Total | **16** | **45** |  | |