



INTRODUCTION TO MICROSOFT SQL SERVER

Database Design and Implementation: Level 1

Nature of the Course: Theory + Practical

Total Hours per Day: 2 Hours

Course Duration: 4 Weeks

Course Summary

The DWC - Database Design and Implementation – Level 1 course is designed for beginners who want to learn how to develop meaningful pieces of codes in Database design and implementation, as well as how to read other people's Database design and implementation codes. The course is 40 hours long and includes both lecture and lab work. Laboratory exercises are required, have a set date, and are graded. Because software programming can only be learned effectively by explicitly putting the principles that have been taught into practice, the course places a strong emphasis on lab exercises. Exercises that are submitted after the deadline are penalized in terms of overall points. Instructors may supply students with pertinent lecture/lab notes as (and when) needed, either in the form of printed handouts or by email. Students may be required to take an optional exam at the end of the course to assess their knowledge of the material covered. This exam, which may be practical or theoretical, is required for every student desiring to advance to the next level. In order of significance, students are graded on their attendance, lab activities, and final test.

Completion Criteria

After fulfilling all of the following criteria, the student will be deemed to have finished the Module:

- Has attended 90% of all classes held
- Has received an average grade of 80% on all assignments
- Has received an average of 60% in assessments
- The tutor believes the student has grasped all of the concepts and is ready to go on to the second module.

Required Textbooks

- Walter Shields, “SQL QuickStart Guide”, ClydeBank Media.
- Allen G. Taylor, “SQL All-in-One for Dummies”, Wiley.

Prerequisites

- Basic knowledge about programming, bits/bytes, procedures, classes, computer architecture, etc. If you just have theoretical knowledge that is perfectly okay but you should have strong convictions on what programming is, and what you hope to achieve from this class.
- Willing and eager to spend at least 10-20 hours (varying from student-to-student) per week outside of the training class to read/write codes in JavaScript (self-study and practice).
- There is no prior educational level requirement for this course. Anyone from 10+2 student to someone who is doing her PHD in Genetic Engineering is welcome to take this course.
- If you are only interested in theory and have no interest/patience in spending at least 10 hours every week throughout the duration of the course, then this course might not be for you.
- If you have absolutely no idea about programming or do not see yourself doing programming in the next six - odd months, then this class may not be for you.

Course Details

Week I

Relational Database Fundamentals

- Overview of Relational Database Concepts
- Relational Databases and Relational Database Management Systems
- Data Normalization

Conceptual Data Modeling

- Problems with File-based System
- Concept of Data Model
- 3-Tier Architecture
- Data Mapping
- Data Model and its Types
- The Relational Data Model
- Data Modeling Using ERD

- Problems of Using ERDs and Solutions

Eerd And Chen Notation

- Relational Database Model Terminologies and their Implementation
- Database Relations and their Characteristics
- Relational Keys and Integrity Constraints

Week II

Relational Database Design

- Database Design Methodologies,
- Conceptual, Logical and Physical Database Designs,
- Mapping ERD into Relational Schema

Creating A Database

- Database Development Methodology Overview
- Building a Logical Data Model
- Identifying Entities and Attributes
- Isolating Keys
- Relationships between Entities
- Creating Entity-Relationship Diagrams
- Transforming to Physical Design
- Migrating Entities to Tables
- Selecting Primary Keys
- Defining Columns
- Enforcing Relationships with Foreign Keys
- Constructing the Database Using DDL
- Creating Tables, Indexes, Constraints and Views
- Dropping Tables, Indexes, Constraints and Views
- Modifying Tables, Indexes, Constraints and Views

Week III

Writing Basic Sql Queries

- Displaying Table Structures
- Retrieving Column Data from a Table or View
- Selecting Unique Values
- Filtering Rows Using the WHERE Clause
- Sorting Results Using ORDER BY

- Joining Multiple Tables
- Using Column and Table Aliases

Manipulating Query Results

- Using Row Functions
- Character
- Numeric
- Date and Time
- Data Conversion

Using The Case Function

- Handling Null Values

Labs

Lab assignments will focus on the practice and mastery of contents covered in the lectures, and introduce critical and fundamental problem – solving techniques to the students.

Learning Outcomes

- Ability to understand the concept of computer-based databases.
- Increased familiarity with SQL
- How to write basic SQL Queries
- How to manipulate data and work with views.