Course Design Document

Course Code	
Course Name	Programming Fundamentals

Duration (in days)	6	Proficiency Level	Fundamentals
Pre-requisites	None	Target Audience	Campus Hires

Learning Outcome

At the end of the program, participants will be able to learn:

- Define Software Engineering and its role in software development.
- Understanding Flowchart & Pseudocode.
- Database, DBMS, and RDBMS concepts
- DBMS Architecture
- Data Models
- Relation Database concepts
- Normalization Process and different Normal forms
- ER Diagram
- Key concepts of the Git source control system
- Use Structured Query Language (SQL) to build your database.
- Understanding data types and their constraints.
- Querying datasets and perform data manipulation using SQL commands.
- Implementing join and set operations.
- Implementing SQL subqueries.
- Grouping & Aggregation Operations.
- Understanding Views and Stored Procedures
- Using Triggers

Day-wise Session Plan

Day	Unit	Objective(s)	Hours
1	Software Engineering & SDLC Phases	• Evolution of Software • Life Cycle Phases • Planning Analysis • Requirements Analysis • Design and Prototyping • Development of the Application • Testing and Deployment • Project Management	4
1	Flow Chart and Pseudocode	• Pre-code planning • Pseudocode • Verify Algorithm • Flowchart	4

2	Architecture and Normalization Concepts	• Describe a DBMS, its components, and advantages for users. • Describe the features and characteristics of flat-file, hierarchical, and XML database models. • Levels of a DBMS architecture • Types of constraints • Describe normalization in relation to designing a database. • Perform first normal form when designing a database. • Perform second normal form when designing a database. • Perform third normal form when designing a database. • Perform BCNF when designing a database.	6
2+3	ER Diagram	• Describe entity-relationship modeling for a RDBMS • Define Entities, Attributes, Relationships • Degree of relationships • Cardinality of relationships • Relational Database Model • Create an ERD for a database based on a Scenario.	4
3	Git Essentials	• What is Git? • How to Install Git on Windows? • What is GitHub? • Git commands. • Git vs. GitHub. • What is GitLab? • Git Clone Commands. • Git Push Commands. • Git Pull Commands. • Git History • Branching and Merging • Resolve Merge Conflicts in Git	6
4	Introduction to SQL	• What is a Database? • What is SQL? • What is Sql Server? • SQL Commands	1
4	Basic T-SQL	• SQL Server Management Studio • Database Schema • Data Types and Null, Not Null options, Identity Columns • Working with Data	1
4	DDL Commands	• DDL Commands • Add table to Database • Describe Table • Alter Table • Modify and Drop Clause • Data manipulation • Constraints	2
4	Query Clauses	• Database schema • Import Data • Query Clauses • Column Alias	2

		• Table Alias	
4+5	Query Multiple Tables	• Introduction to joins • Types of joins • Inner Join • Left Outer Join • Right Outer Join • Full outer Join • ANSI Join Syntax • Self-Join • Equi and non-equi Join • Set Operations	4
5	Functions in SQL	• String Functions • Numeric Functions • Date Functions • Aggregate Functions • Generate Groups	2
5	SQL Subqueries	• SQL subqueries • Correlated subqueries • Non-correlated subqueries	4
6	Views	• Views • Creating altering view-Restrictions and features, With options • Simple and Complex views	1.5
, 6	Procedures & Functions	• Stored procedures - System and User Defined • Stored procedure with input and output params, optional params • Creating Functions in Sql Server • User defined function: Scalar valued and Table Valued • Inline Table Valued and Multi statement Table Valued • Introduction to CTE and Recursive CTE	3
6	Triggers	• Concept of Triggers • Types of Triggers: For/After Triggers and Instead of triggers • DDL and DML Triggers • Magic Tables: Deleted and Inserted Tables • Implementing User Defined Integrity with Triggers • Cascading changes and automating updates with Triggers Enable/Disable triggers, Trigger execution order • Recursion and nesting limits of triggers • Triggers on views: Making Complex views updatable with triggers	3.5