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
- Install and configure the MySQL server and clients.
- 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

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 MySQL? • SQL Commands	1
4	Database Connection	• Launch MySQL Workbench • Connect to MySQL Server • Creating a new Database • Data Types • CAST or CONVERT • Keys in SQL • Constraints	1
4	DDL Commands	• DDL Commands • Add table to Database • Describe Table • Alter Table • Modify and Drop Clause • Data manipulation	3
4	Query Clauses	• Database schema • Import Data • Query Clauses • Column Alias	1

		• 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	6
5	Functions in SQL	• String Functions • Numeric Functions • Date Functions • Aggregate Functions • Generate Groups	4
6	SQL Subqueries	• SQL subqueries • Correlated subqueries • Non-correlated subqueries	4
6	Advanced Queries	• Views • Index • Transaction Control Commands • Stored procedures • Difference between Procedure and Function • Creating a Procedure • Creating a Function	4