DATABASE MANAGEMENT SKILLS

UNIT CODE: ICT/CU/CS/CR/05/6/B

Relationship to Occupational Standards
This unit addresses the unit of competency: Understand Database Management Skills

Duration of Unit: 160 hours

Unit Description:
This unit covers the competencies required to demonstrate database management skills. It involves understanding database fundamentals, designing a database, using Structured Query Language, understanding design of object oriented databases, understanding indexing and hashing and understanding database applications.

Summary of Learning Outcomes:
By the end of the unit, the trainee should be able to:

1. Understand Database fundamentals
2. Design a database
3. Use Structured Query Language
4. Understand the design of object oriented databases
5. Understand indexing and hashing
6. Understand database applications

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods

1. Understand database fundamentals	• Definition of database
	• Database terminologies
	  • Table
	  • Database engine
	  • Records
	  • Field
	• Reasons of using databases
	• Definition of relational model
	• Relational Modelling Concepts
	  • Relations/tables
	  • Attributes/Columns
	  • Domain
	  • Tuples/Rows
		• Oral tests
		• Written tests
		• Practical tests

	• Primary Key • Foreign Key • Properties of a relation/table • Comparison of RDBMS products • Oracle • MS SQL server • My SQL • Ms Access • Installation of MS SQL server • MS SQL server interface • Properties of MS SQL server Database • Prescribe RDBMS product for a simulated environment • Database security • Definition • Access control • Authentication • Integrity control • Backup	
2. Design a database	• Phases of database Design • Conceptual database design (ERM Modeling) • Logical database design • Physical database design • Entity modelling ✓ Components ✓ Designing Entity Model using UML (Unified Modelling Language) • Normalisation • Definition • Demonstration of normalisation • Validating model according to the requirements / specified transactions (CRUD matrix)	• Oral tests • Written tests • Practical tests
3. Use Structured Query Language (SQL)	• SQL • Definition	• Practical tests • Oral tests

	• Characteristics • Components • Data definition queries • CREATE • DROP • ALTER • Demonstration of CREATE TABLE statement • Demonstration of CREATE TABLE constraints: • PRIMARY KEY • FOREIGN KEY • NOT NULL • CHECK • UNIQUE • DEFAULT • Editing table schema using SQL ALTER statement • Adding an attribute • Dropping an attribute • Modifying attribute domain • Dropping table using SQL DROP TABLE statement • Data manipulation query statements • INSERT • SELECT • UPDATE • DELETE • Data Manipulation Query Statements • Retrieving records using SELECT statement • Insertion of records using INSERT INTO statements • Deleting records using DELETE statement • Updating records using UPDATE. SET statement	• Written tests

	• SQL Joins
	  • Definition of a join
	  • Types of joins
	• Create and query a database from a validated ER model.
	• Creating a simple join	

4. Understand design of object oriented databases	• Object oriented database
	  • Definition
	  • Comparison with other types of databases
	• Object oriented database concepts
	  • Classes
	  • Objects
	  • Attributes
	  • Inheritance
	• Implementation of Object Oriented Database Concepts from a set of requirements
	• Creation of views and triggers.
		• Practical tests
		• Oral
		• Written tests

5. Understand indexing and hashing	• Indexing and hashing
	  • Definition of indexing and hashing
	  • Types of indexing
	  • Types of hashing
	• Demonstration of indexing
	  • Dense index
	  • Sparse index
	• Demonstration of hashing
	  • Static hashing
	  • Dynamic hashing
	• Implementation of indexing and hashing in an existing database
		• Practical tests
		• Oral
		• Written tests

6. Understand database applications	• Decision support system • Data mining • Features of Distributed Databases • Features of Data warehouses • Features of Spatial and geographical databases	• Practical tests • Oral • Written tests

	• Features of Multi-media databases • Mobility and personal databases • Design and implementation of data warehouses	

Suggested Methods of Instruction

- Presentations and practical demonstrations by trainer;
- Guided learner activities and research to develop underpinning knowledge;
- Supervised practical database design and SQL projects
- Visiting expert from the ICT sector;
- Industrial visits

Recommended Resources

Tools

- Microsoft Office with MS Visio Modelling tool

MS SQL server software

Equipment

- Computers

Materials and supplies

- Instructional material
- Stationery

Reference materials

- Trainer – recommended resources including web resources
- SQL Server technical documentation