

SECURE DATABASES

ISCED UNIT CODE: 0612554 04A

TVET CDACC UNIT CODE: SEC/CU/CS/CR/04/5/MA

Relationship to Occupational Standards

This unit addresses the unit of competency: Perform Secure databases

Duration of Unit: 120 hours

Unit Description

This unit covers the competencies required to secure databases. It involves identifying types of databases, identifying database threats and vulnerabilities, installing database patches, installing security management systems for database, monitoring database security, monitoring access control and managing database backups.

Summary of Learning Outcomes

Learning Outcomes	Durations (Hours)
1. Identify database management system	18
2. Design a database	22
3. Create a database	30
4. Implement database security measures	14
5. Monitor database security	20
6. Manage database backups	16
Total Hours	120

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Identify database management	1.1 Meaning of terms 1.2 Types of databases	▪ Written tests ▪ Oral questioning

systems	1.3 Classification of databases 1.4 Database organization approaches 1.4.1 Hierarchical Database Approach 1.4.2 Network Database Approach 1.4.3 Relational Database Approach (RDBMS) 1.4.4 Object-Oriented Database Approach (OODBMS) 1.4.5 NoSQL Database Approach 1.5 Database design cycle	▪ Observation ▪ Practical tests
2. Design a database	2.1 Design a relational database. 2.2 Create entity relationship 2.2.1 Connotations of entity relationship 2.2.2 Drawing ERDS 2.3 Perform Normalisation	▪ Written tests ▪ Oral questioning ▪ Observation ▪ Practical tests
3. Create a database	3.1 Querying a database using MySQL 3.1.1 Identify categories of SQL statements. 3.1.2 Design SQL statements. 3.1.3 Design SQL Queries. 3.1.4 Use SQL statements to query a database.	▪ Written tests ▪ Oral questioning ▪ Observation ▪ Practical tests
4. Implement database security measures.	4.1 Identify database authorization techniques. 4.1.1 Role-Based Access Control (RBAC). 4.1.2 Attribute-Based Access Control (ABAC). 4.1.3 Least Privilege principle. 4.1.4 Multi factor authentication for database access. 4.2 Identify Concurrency Control	▪ Observation ▪ Oral questioning ▪ Practical tests ▪ Written tests

	techniques 4.2.1 Locking mechanisms (e.g., exclusive locks, shared locks) 4.2.2 Two-phase locking. 4.2.3 Timestamp ordering. 4.2.4 Optimistic Concurrency Control.	
5. Monitor the database performance.	5.1 Identify database monitoring techniques 5.1.1 Transaction Auditing 5.1.2 Privileged User Auditing 5.1.3 Log-Based Auditing 5.1.4 Trigger-Based Auditing 5.2 Use tools to monitor database activities 5.3 Conduct Security Mitigation. 5.3.1 Review & Strengthen Access Controls 5.3.2 Contain and Neutralize Threats 5.3.3 Apply Security Patches & Updates	▪ Observation ▪ Oral questioning ▪ Practical tests ▪ Written tests
6. Manage database backups.	6.1 Understanding Backup Fundamentals 6.1.1 Backup types 6.1.2 Backup storage solutions 6.2 Conducting back up strategies 6.2.1 Backup frequency and retention policies. 6.2.2 Implement the backup rule 6.3 Configuring and Managing Backup Systems	▪ Written tests ▪ Oral questioning ▪ Observation ▪ Practical tests

Suggested Methods of instructions

- Instructor led facilitation of theory
- Demonstration by trainer
- Practical work by trainee
- Viewing of related videos

- Group discussions

Recommended Resources for 25 trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Trainee: Item)
A	Learning Materials			
1.	Textbooks		5 pcs	5:1
2.	PowerPoint presentations	For trainer's use		
3.	Assorted colour of whiteboard markers	For trainer's use		
4.	e-Didactics	For trainer's use		
5.	Flashcards			
6.	Flip charts			
7.	Whiteboard			
B	Learning Facilities & infrastructure			
8.	Lecture/theory room		1	25:1
9.	Consumable materials			
10.	Printing Papers		1 ream	1:20
12.	Toners		2 pcs	13:1
13.	Internet			
D	Tools and Equipment			
14.	Projectors		1	25:1
15.	Printers		4	6:1
16.	Computers.		25 pcs	1:1
17.	MySQL Database		25 pcs	1:1
	MySQL Workbench Community Edition		25 pcs	1:1