

MANAGE COMPUTERISED DATABASE SYSTEM

ISCED UNIT CODE: 0612 451 09A

TVET CDACC UNIT CODE: ICT/CU/SD/CR/04/5/MA

UNIT DESCRIPTION

This unit covers the competencies required to manage computerised database system. It involves designing a database system, creating a database system, manipulating a computerised database, managing database security and performing database maintenance.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT	PERFORMANCE CRITERIA
These describe the key outcomes which make up workplace functions	These are assessable statements which specify the required level of performance for each of the elements <i>(Bold and italicized terms are elaborated in the range)</i>
1. Design database system	1.1 <i>Database design approaches</i> are identified as per workplace procedures. 1.2 <i>Database design tools</i> are identified according to user requirements. 1.3 <i>Database structures</i> are determined in accordance with the database specifications. 1.4 <i>Database design architecture</i> is developed as per user requirements. 1.5 Database normalisation is carried out as per application requirements. 1.6 Database model diagrams are created according to user and application requirements. 1.7 Database design report is generated as per workplace procedures.

2. Create database system	2.1 Database management software is identified as per system requirements. 2.2 Database development environment is configured as per application requirements. 2.3 Database objects are created as per design specifications. 2.4 Data attributes are applied as per database design specifications. 2.5 Data relationships are created as per database design specifications. 2.6 Workplace safety and health practices are Observed as per OSHA 2.7 Methods of e-waste storage and disposal are identified as per OSHA 2.8 E-waste management is demonstrated as per OSHA
3. Manipulate Computerised Database	3.1 Database business rules are applied as per user needs. 3.2 Data is inserted to the database as per business rules. 3.3 Data is retrieved from the database as per application requirement. 3.4 Data is modified using queries as per application requirement. 3.5 Data deletion is performed as per user needs.

4. Manage database security	4.1 Database security risks are identified as per work procedures. 4.2 Database security control measures are identified as per work procedures. 4.3 Database security control measures are implemented as per organisation's policies. 4.4 Database security monitoring and auditing is carried out as per work procedures. 4.5 Database security documentation is performed as per work procedures. 4.6 Database users are trained as per work procedures.
5. Perform database maintenance	5.1 Database maintenance schedule is prepared as per workplace procedures. 5.2 Database performance is monitored as per database system requirements. 5.3 Database performance is optimized according to application requirements 5.4 Database maintenance report is generated as per work procedures.

RANGE

This section provides a work environment and conditions to which the performance criteria apply. It allows for a different work environment and situations that will affect performance.

Variable	Range
1. Database design approaches may include but not limited to:	• Top – down design method • Bottom – up design method • Centralized design • Decentralized design
2. Database design architecture tools may include but not limited to:	• Multi-user DBMS Architectures • Web Services and Service-Oriented Architectures • Distributed DBMSs

3. Database model may include but not limited to:	● Record-based model ○ Hierarchical models ○ Network Models ○ Relational Models ● Object-based data models ○ Entity-Relationship (ER) ○ Semantic ○ Functional ○ Object-oriented ● Physical data models ○ unifying model and ○ the frame memory
4. Database objects may include but not limited to:	● Tables ● Constraints ● Indexes ● Triggers ● Sequences ● Views ● Usage lists
5. Data relationships may include but not limited to:	● One-To-One, ● One-To-Many ● Many-To-Many
6. Database security risks may include but not limited to:	● SQL Injection Attacks ● Denial of Service (DoS/DDoS) Attacks ● Poor Permission Management ● Malware infections ● Database Backup Exposures ● Inadequate Auditing ● Unprotected Databases Due to Misconfiguration ● Credentials

	• Unencrypted data • Overloads, performance constraints and capacity issues • Physical damage to database servers • Design flaws and programming bugs in databases
7. Database security control measures	• Access control • Auditing • Authentication • Encryption • Integrity controls • Backups • Application security • Database Security applying Statistical Method
8. Database users may include but not limited to:	• End Users ○ Naive users / Parametric users ○ Sophisticated users • Application Programmer or Specialized users or Back-End Developer • System Analysts • Database Administrator (DBA) • Temporary Users or Casual Users

REQUIRED KNOWLEDGE AND SKILLS

This section describes the knowledge and skills required for this unit of competency.

Required knowledge

The individual needs to demonstrate knowledge of:

- Techniques of system analysis and design
- Documentation processes
- Computer and devices settings
- Database management system types

- Data models, attributes and relationships
- Transactions and concurrency mechanisms
- Database design and implementation methods
- Database security features
- Types of database testing
- Principles of management
- Database management system
- Cyber security threats and measures

Required skills

The individual needs to demonstrate the following skills:

- Communications (verbal and written);
- Proficient in ICT;
- Time management;
- Problem solving;
- Planning;
- Decision making;
- Report writing;

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills range.

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Created database objects as per design specifications. 1.2 Applied data attributes as per database design specifications. 1.3 Created data relationships as per database design specifications. 1.4 Developed database design architecture as per user requirements. 1.5 Created database model diagrams according to user and application requirements. 1.6 Inserted data to the database as per business rules. 1.7 Retrieved data from the database as per application requirement. 1.8 Modified data using queries as per application requirement. 1.9 Performed data deletion as per user needs. 1.10 Implemented database security control measures as per organization's policies. 1.11 Carried out database security monitoring and auditing as per work procedures.
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	1.12 Monitored database performance as per database system requirements.
2. Resource implications	The following resources should be provided: 2.1 Appropriately simulated environment where assessment can take place. 2.2 Access to relevant work environments where assessment can take place. 2.3 Resources relevant to the proposed activities or task.
3. Methods of assessment	Competency in this unit may be assessed through: 3.1 Observation 3.2 Oral assessment 3.3 Portfolio of evidence 3.4 Interviews 3.5 Third party reports 3.6 Written assessment 3.7 Practical assessment 3.8 Projects
4. Context of assessment	Competency may be assessed: 4.1 On-the-job 4.2 In a simulated work environment
5. Guidance information for assessment	5.1 Holistic assessment with other units relevant to the industry sector and workplace job role is recommended.