REPUBLIC OF KENYA

NATIONAL OCCUPATIONAL STANDARD

FOR

COMPUTER SCIENCE TECHNICIAN

KNQF LEVEL 6

(CYCLE 3)

PROGRAMME ISCED CODE: 0613 554 A.

TVET CDACC
P.O. BOX 15745-00100
NAIROBI

MANAGE DATABASES

ISCED UNIT CODE: 0613 554 05A

UNIT CODE: ICT/OS/CS/CR/05/6/MA

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.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the **key outcomes** which make up **workplace function**.	**PERFORMANCE CRITERIA** These are **assessable** statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the range.)***
1. Apply Database fundamentals	1.1 Database is created as per design. 1.2 T***erminologies used with databases*** are applied 1.3 Benefits of using databases are applied 1.4 Relational database Model is applied 1.5 Key concepts in relational modelling are applied. 1.6 Properties of a table/relation are utilised 1.7 Relational Database Management Systems (RDBMSs) products is selected 1.8 MS SQL server is installed 1.9 MS SQL server interface is Navigated and utilized 1.10 ***Properties of MS SQL server*** database are applied 1.11 RDBMS is applied 1.12 Database security is implemented
2. Design a database	2.1 ***Phases of database design*** is applied 2.2 Entity modeling using UML notation is constructed 2.3 Database designs is normalized 2.4 ER model is validated according to the requirements
3. Use Structured Query Language	3.1 Structured Query Language (SQL) is applied 3.2 ***Data definition queries*** are applied 3.3 Created tables using the SQL CREATE TABLE statemen are created 3.4 ***CREATE TABLE statement constraints*** is applied 3.5 Table schema using the SQL ALTER statement is editted

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	3.6 Table is dropped using the SQL DROP TABLE statement 3.7 Data ***manipulation query statement*** is applied 3.8 Data is manipulated using SQL statements 3.9 SQL join is utilised 3.10 Database from validated ER model is created and queried 3.11 ***SQL joins*** are utilised
4. Design an object oriented databases	4.1 Object oriented database is applied 4.2 Applied ***Object oriented database concepts*** is applied 4.3 Object Oriented database concepts from a set of requirements is applied 4.4 ***Triggers*** and views in object oriented databases are created.
5. Index and hash	5.1 Indexing and hashing is applied 5.2 Index in databases is created 5.3 Hashing in databases is applied 5.4 Indexing and hashing in an existing database is implemented
6. Design Database applications	6.1 Decision support systems is applied 6.2 Applied Data mining is applied 6.3 Distributed databases is created 6.4 Data is warehoused 6.5 Spatial and geographical databases features are applied 6.6 Multi-media databases are utilised 6.7 Mobility and personal databases are applied 6.8 Data warehouses from a given set of requirements is designed

RANGE

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

Variable	**Range**
1. Terminologies used with databases may include but not limited to:	● Table ● Records ● Field

Variable	Range
	• DBMS
2. Properties of MS SQL server database may include but not limited to:	• Deleting a database • Deleting data or log files • Increasing database size • Shrinking database • Renaming database • Importing a database • Exporting a database
3. Phases of database design may include but not limited to:	• Conceptual design • Logical design • Physical design
4. Data definition queries may include but not limited to:	• CREATE • DROP • ALTER
5. CREATE TABLE statement constraints may include but not limited to:	• Primary key • Foreign key • UNIQUE • CHECK • NOT NULL • DEFAULT
6. Data manipulation query statements may include but not limited to:	• INSERT • SELECT • UPDATE • DELETE
7. Types of joins may include but not limited to:	• Simple Join or Inner Join • Left Join • Right Join • Outer Join
8. Object oriented database concepts may include but not limited to:	• Classes • Objects • Attributes • Inheritance
9. Views may include but not limited to:	• Create a view • Rename a view • Drop a view
10. Triggers may include but not limited to:	• Create a trigger • Alter a trigger • Drop a trigger

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

The individual needs to demonstrate the following skills:

- Communications (verbal and written);
- Time management;
- Problem solving;
- Planning;
- Decision Making;
- Research;

Required knowledge

The individual needs to demonstrate knowledge of:

- Database concepts
- Database design
- Structured Query Language
- Object oriented database design
- Applications of object oriented databases

EVIDENCE GUIDE

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

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Installed MS SQL server 1.2 demonstrated reasons for using databases 1.3 Applied relational modeling concepts 1.4 Created an entity relationship model 1.5 Normalized database tables 1.6 Validated an ER model 1.7 Created, edited and dropped tables using SQL 1.8 Retrieved, added, removed and updated records using SQL statements 1.9 Created and queried a database from a validated ER model. 1.10 Retrieved data from several tables using joins 1.11 Applied object oriented database concepts 1.12 Selected a database type based on user requirements. 1.13 Demonstrated Object Oriented Concepts 1.14 Demonstrated designing of views and triggers in object oriented databases. 1.15 Implemented Indexing and hashing

	1.16 Analyzed and documented the application's databases.
2. Resource Implications	The following resources should be provided: 2.1 Access to relevant workplace where assessment can take place 2.2 Appropriately simulated environment where assessment can take place
3. Methods of Assessment	Competency may be assessed through: 3.1 Oral questioning 3.2 Practical demonstration 3.3 Observation 3.4 Written test
4. Context of Assessment	Competency may be assessed 4.1 Off the job 4.2 on the job 4.3 During industrial attachment
5. Guidance information for assessment	5.1 Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.