

**BQA NCQF Qualification Template**

DNCQF.FDMD.GD04

Issue No.: 01

| QUALIFICATION SPECIFICATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |                                           |                  |                                  |                  |  |                         | SECTION A        |   |
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| <b>QUALIFICATION DEVELOPER</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |                                           | Botho University |                                  |                  |  |                         |                  |   |
| <b>TITLE</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  | Certificate IV in Database Administration |                  |                                  |                  |  | <b>NCQF LEVEL</b>       |                  | 4 |
| <b>FIELD</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  | Information and Communication Technology  |                  |                                  | <b>SUB-FIELD</b> |  | Database Administration |                  |   |
| New qualification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  | X                                         |                  | Review of existing qualification |                  |  |                         |                  |   |
| <b>SUB-FRAMEWORK</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  | General Education                         |                  |                                  | <b>TVET</b>      |  | X                       | Higher Education |   |
| <b>QUALIFICATION TYPE</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | <b>Certificate</b>                        |                  | X                                | Diploma          |  |                         | Bachelor         |   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  | Bachelor Honours                          |                  |                                  | Master           |  |                         | Doctor           |   |
| <b>CREDIT VALUE</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |                                           |                  |                                  |                  |  | 60                      |                  |   |
| RATIONALE AND PURPOSE OF THE QUALIFICATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |                                           |                  |                                  |                  |  |                         |                  |   |
| <p><b>Rationale:</b></p> <p>This qualification is designed in line with Botswana Vision 2036, HRDC 2016, List of Occupations in demand, and the market survey conducted.</p> <p>ICT is seen as important tool to enable and support the move from traditional 'teacher-centric' teaching styles to more 'learner-centric' methods. Research consensus holds that the most effective uses of ICT are those in which the teacher, aided by ICTs, can challenge pupils' understanding and thinking, either through whole-class discussions and individual/small group work using ICTs.</p> <p>Database administration has evolved from being regarded as specialized computer domain to being regarded as pivotal components of the business domain. The use of databases and database technologies is now embedded in most areas of business and extends to other fields such as engineering, medicine, law, and education, to name just a few hence the study of database systems has become an essential component to support business and computing domains. The complexity of database systems has increased, the demand for educated professionals with specialist knowledge across all aspects of database development and management has grown. This provides opportunities for well qualified professionals who can resolve current business problems.</p> <p>The qualification is distinct and focuses on particular skills requirements of business and industry that are associated with database technologies, taking into account the need to balance theory with practical</p> |  |                                           |                  |                                  |                  |  |                         |                  |   |

aspects. Specific modules consider areas that are directly related to the specialization, such as Database fundamentals and Database Management. Other modules included in the curriculum provide a broader perspective of topics in computing domain and provide knowledge and skills in the use of underpinning technologies.

Due to the considerable growth in regional businesses, e-government, and other industries, as well as an increase in the general use of information systems, a specialist qualification of this nature is of value locally and internationally. This database administration qualification will equip the students with practical development and management skills that will enable them to seek entry-level to advanced employment as database developers, database administrators, and help desk technician in any organization which makes use of databases and information systems.

**Purpose:**

The purpose of this qualification is to produce Computer Database developer & Administrator for the IT industry. This certificate is designed for individuals interested in acquiring knowledge and advanced technical skills to develop and maintain databases. Students gain skills in creating database, tables and writing queries. Students will also acquire knowledge in writing queries for creating tables, inserting values, altering values and other tasks related to database technology.

**ENTRY REQUIREMENTS (including access and inclusion)**

Entry into this qualification is through any one of the following requirements:

- The normal admission requirement is a Certificate III (NCQF Level 3), or equivalent.
- Applicants that do not meet the above criteria but possess relevant industry experience will be considered through Recognition of Prior Learning (RPL).

| QUALIFICATION SPECIFICATION                                                                                                                                                   |  | SECTION B                                                                                          |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------------------|--|
| GRADUATE PROFILE (LEARNING OUTCOMES)<br>At the end of this qualification, learner will be able to:                                                                            |  | ASSESSMENT CRITERIA                                                                                |  |
| 1. Discuss basic concepts of computers including fundamental concepts of a database such as database components, normalization, tuning relationships and relational diagrams. |  | 1.1 Create simple animations and presentations Using PowerPoint 2010                               |  |
|                                                                                                                                                                               |  | 1.2 Work with the internet to send electronic e-mails using MS-Outlook 2010                        |  |
|                                                                                                                                                                               |  | 1.3 Create and capture data into a Database using MS Access 2010                                   |  |
|                                                                                                                                                                               |  | 1.4 Perform statistical calculations on data using Excel 2010                                      |  |
|                                                                                                                                                                               |  | 1.5 Create text formatting, tables, charts & using MS-Word 2010                                    |  |
|                                                                                                                                                                               |  | 1.6 Represent data in a relational diagram.                                                        |  |
| 2. Create, configure and delete a database, using client and administrative tools in Oracle 12c.                                                                              |  | 2.1 Create a Database along with passwords and create a database using a Template.                 |  |
|                                                                                                                                                                               |  | 2.2 Configure Database and understand the concept of Shared server mode and dedicated server mode. |  |
|                                                                                                                                                                               |  | 2.3 Delete a database, using client and administrative tools in Oracle 12c.                        |  |
| 3. Create tables and manipulate them.                                                                                                                                         |  | 3.1 Create tables.                                                                                 |  |
|                                                                                                                                                                               |  | 3.2 Insert data into a database table.                                                             |  |
|                                                                                                                                                                               |  | 3.3 Extract data using select keyword from an existing table in a database                         |  |
|                                                                                                                                                                               |  | 3.4 Extract data from a table based on a particular condition.                                     |  |
| 4. Use PL/SQL to manipulate tables                                                                                                                                            |  | 4.1 Explore PL/SQL commands                                                                        |  |
|                                                                                                                                                                               |  | 4.2 Manipulate a table using PL/SQL                                                                |  |
| 5. Managing the database instance.                                                                                                                                            |  | 5.1 Configure database layout                                                                      |  |
|                                                                                                                                                                               |  | 5.2 Configure database storage                                                                     |  |
| 6. Examine Oracle net services and perform the server-side, client-side and shared server configuration.                                                                      |  | 6.1 Explore features provided by Oracle Net Services                                               |  |
|                                                                                                                                                                               |  | 6.2 Perform basic Oracle net services and perform the server-side configuration.                   |  |
|                                                                                                                                                                               |  | 6.3 Perform basic Oracle net services and perform the client-side configuration.                   |  |
|                                                                                                                                                                               |  | 6.4 Perform operations on creating and administrating the listener.                                |  |
|                                                                                                                                                                               |  | 6.5 Configure and understand the concept of Name Resolutions.                                      |  |
| 7. Create table spaces with Datafiles and the spaces to be created under each table spaces, using Oracle 12 C.                                                                |  | 7.1 Create and administer tablespaces                                                              |  |
|                                                                                                                                                                               |  | 7.2 Explore tablespace information                                                                 |  |
|                                                                                                                                                                               |  | 7.3 Resize and drop datafiles associated with tablespaces.                                         |  |
|                                                                                                                                                                               |  | 7.4 Configure Oracle Managed Files and Automatic Storage Management.                               |  |
| 8. Create Tables and indexes. View the Indexes using Oracle 12 C                                                                                                              |  | 8.1 Gather and analyze table Information                                                           |  |
|                                                                                                                                                                               |  | 8.2 Create table Indexes.                                                                          |  |

|                                                                                                          |                                                                                                                                                                                 |
|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Platform.                                                                                                | 8.3 Implement Integrity Constraint.<br>8.4 Maintain Integrity Constraint.                                                                                                       |
| 9. Implement Loading and Unloading of data from an external-source using SQL Developer in Oracle 12 C.   | 9.1 Perform Data export using the Data Pump.<br>9.2 Load data by moving table spaces.<br>9.3 Load data using SQL * Loader<br>9.4 Create and Access external Tables.             |
| 10. Create and secure users, Roles and Privileges under a particular Database profile using Oracle 12 C. | 10.1 Create and administrate Users<br>10.2 Assign privileges and roles<br>10.3 Administer password and resource limits<br>10.4 Explore the information on Audit database usage. |

| QUALIFICATION STRUCTURE                                                                                                                                                                                                                                                                                                                                                          |                           |       |         |                   |            |                 |    |                 |    |                        |    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-------|---------|-------------------|------------|-----------------|----|-----------------|----|------------------------|----|
| SECTION C                                                                                                                                                                                                                                                                                                                                                                        |                           |       |         |                   |            |                 |    |                 |    |                        |    |
| FUNDAMENTAL COMPONENT<br>Subjects / Units / Modules /Courses                                                                                                                                                                                                                                                                                                                     | Title                     | Level | Credits |                   |            |                 |    |                 |    |                        |    |
|                                                                                                                                                                                                                                                                                                                                                                                  | N/A                       |       |         |                   |            |                 |    |                 |    |                        |    |
|                                                                                                                                                                                                                                                                                                                                                                                  |                           |       |         |                   |            |                 |    |                 |    |                        |    |
| CORE COMPONENT<br>Subjects / Units / Modules /Courses                                                                                                                                                                                                                                                                                                                            | Essentials of Computers   | 4     | 10      |                   |            |                 |    |                 |    |                        |    |
|                                                                                                                                                                                                                                                                                                                                                                                  | Database Fundamentals     | 4     | 10      |                   |            |                 |    |                 |    |                        |    |
|                                                                                                                                                                                                                                                                                                                                                                                  | Database Administration 1 | 4     | 20      |                   |            |                 |    |                 |    |                        |    |
|                                                                                                                                                                                                                                                                                                                                                                                  | Database Administration 2 | 5     | 20      |                   |            |                 |    |                 |    |                        |    |
| ELECTIVE COMPONENT<br>Subjects / Units / Modules /Courses                                                                                                                                                                                                                                                                                                                        | N/A                       |       |         |                   |            |                 |    |                 |    |                        |    |
| Rules of combinations, Credit distribution (where applicable):                                                                                                                                                                                                                                                                                                                   |                           |       |         |                   |            |                 |    |                 |    |                        |    |
| Certificate in Database Administration qualification will have at least 60 credits and take 6 months to complete, under the normal full-time mode of study.                                                                                                                                                                                                                      |                           |       |         |                   |            |                 |    |                 |    |                        |    |
| Credit distribution                                                                                                                                                                                                                                                                                                                                                              |                           |       |         |                   |            |                 |    |                 |    |                        |    |
| <table><tr><th>Level and Credits</th><th>Compulsory</th></tr><tr><td>Level 4 Credits</td><td>40</td></tr><tr><td>Level 5 Credits</td><td>20</td></tr><tr><td>Minimum credits total:</td><td>60</td></tr></table>                                                                                                                                                                 |                           |       |         | Level and Credits | Compulsory | Level 4 Credits | 40 | Level 5 Credits | 20 | Minimum credits total: | 60 |
| Level and Credits                                                                                                                                                                                                                                                                                                                                                                | Compulsory                |       |         |                   |            |                 |    |                 |    |                        |    |
| Level 4 Credits                                                                                                                                                                                                                                                                                                                                                                  | 40                        |       |         |                   |            |                 |    |                 |    |                        |    |
| Level 5 Credits                                                                                                                                                                                                                                                                                                                                                                  | 20                        |       |         |                   |            |                 |    |                 |    |                        |    |
| Minimum credits total:                                                                                                                                                                                                                                                                                                                                                           | 60                        |       |         |                   |            |                 |    |                 |    |                        |    |
| ASSESSMENT AND MODERATION ARRANGEMENTS                                                                                                                                                                                                                                                                                                                                           |                           |       |         |                   |            |                 |    |                 |    |                        |    |
| This qualification is assessed and moderated as follows:                                                                                                                                                                                                                                                                                                                         |                           |       |         |                   |            |                 |    |                 |    |                        |    |
| ASSESSMENT ARRANGEMENTS                                                                                                                                                                                                                                                                                                                                                          |                           |       |         |                   |            |                 |    |                 |    |                        |    |
| Integrated Assessment:                                                                                                                                                                                                                                                                                                                                                           |                           |       |         |                   |            |                 |    |                 |    |                        |    |
| Because assessment practices must be open, transparent, fair, valid, reliable and ensure that no learner is disadvantaged in any way whatsoever, an integrated assessment approach is incorporated into the qualification. Both formative and summative assessment processes are monitored during the qualification and to determine competence at the end of the qualification. |                           |       |         |                   |            |                 |    |                 |    |                        |    |

Learners are continuously assessed through:

- Practical test
- Class assignments
- Presentations
- Informal class tests
- Formal modular tests

**Pass requirements:**

A learner passes a module if he/she obtains a final mark of 50% or more in the module. Learners will qualify if he/she obtains a final mark from the following components, 5% is from attendance and 95% from formative assessments. The final mark for the qualification is calculated by averaging the marks obtained in the various modules.

**MODERATION ARRANGEMENTS**

Moderation of assessments focuses on:

- a) Ensuring the assessment is aligned to the module objectives and the learning outcomes.
- b) Ensuring assessment is consistent on all levels within the institution and does not show any bias or academic disregard and that it is immune to all forms of prejudice.
- c) Ensuring the level of assessment appropriately matches to students' level of study. This ensures that the assessments remain viable, relevant and provide an accurate judgement of a student's achievements and level of knowledge.
- d) Maintaining consistency in the marking process.

**Pre-assessment Moderation:**

This moderation is carried before assessment tasks are given to students. All submitted sets of question papers & marking keys are shared with the moderators. Each assessment pack should be moderated by two Moderators where possible. The question paper moderation report should be filled in for each question paper. Moderator report will be shared with question paper setter so that moderator feedback will be taken into account when finalizing the question paper.

**Post-assessment moderation or moderation of marking**

Moderation of completed assessment tasks is categorized as post-assessment moderation. It is carried out after assessment tasks have been marked. The set of answer scripts and marking keys are shared

with the moderators. At least 10% of the answer scripts in a module should be moderated during post assessment moderation.

Both internal and external moderation will be done in-line with the Moderation policy of the ETP offering the qualification.

### **RECOGNITION OF PRIOR LEARNING (if applicable)**

A clear framework through which students can accumulate learning credits and transfer such credits toward appropriate qualifications helps to validate and recognize learning gained through formal and informal means, provides flexibility to students, and allows students to progress relatively seamlessly through their lifelong learning journey.

Candidates may apply for recognition of prior learning whether such learning has been gained through formal study, through workplace learning, or through any other formal or informal means. Any candidate applying for recognition of prior learning (RPL) or Credit Accumulation and Transfer (CAT) will be expected to provide evidence of such learning that must be relevant, sufficient, valid, verifiable, and authentic. In addition, the candidate may be interviewed by a member of staff or have to take a formal test, which may include a live demonstration of skills and competencies, to assess competence.

### **PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)**

#### **Learning Pathway:**

A Certificate IV provides for articulation with and progression to a Certificate V or to a Diploma provided that the qualification includes at least 20 credits at level 5.

#### **Employment Pathway:**

The graduates of this qualification will be competent enough to find employment in both public and private sector as database administrator and Database developer.

### **QUALIFICATION AWARD AND CERTIFICATION**

The learner will be awarded '**Level 4 Certificate in Database Administration**', after attaining 60 credit value as specified in the rules of combination and credit distribution.

### **REGIONAL AND INTERNATIONAL COMPARABILITY**

The qualification was benchmarked against similar qualifications at national and international institutions,

notably DBA University- Chicago – USA.

Comparison with other certificate Qualifications:

| Parameter          | Proposed Qualification                 | Stanford University                                                                                                                                                        | University of West Florida                                                                                     | eduCBA – South Africa                                                                                                               |
|--------------------|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| Duration           | 6 Months                               | 3 months                                                                                                                                                                   | 5 Months                                                                                                       | 181 Hours                                                                                                                           |
| Delivery Mode      | Full Time On - Campus                  | Online                                                                                                                                                                     | Online or on campus                                                                                            | Online                                                                                                                              |
| Total Credits      | 60                                     | No Information on Credits                                                                                                                                                  | 3 credits                                                                                                      | -                                                                                                                                   |
| Qualification Name | Certificate in Database Administration | Databases Graduate Certificate                                                                                                                                             | Certificate in Database Systems                                                                                | Certificate of completion                                                                                                           |
| Modules/ Courses   | 4 Modules                              | Generalized                                                                                                                                                                | One Module with 14 units                                                                                       | One module with 17 units                                                                                                            |
| Target Population  | Completed at least Form 3 & Above      | No pre-request module is required however a strong computer science foundation is relevant. Basic knowledge of programming and basic computer science theory is mandatory. | Students who have done database systems and enrolled for a degree program in computing or information systems. | SQL, PLSQL, RMAN, Data Aggregation, DML Operations, Block Type and Scalar Data, Oracle Server, Explicit Cursors, Database Triggers. |
| Assessments        | Continuous Practical Assessment        | Quizzes and exercises                                                                                                                                                      | Homework, quizzes, Mid-term final and projects                                                                 | Practical exercises                                                                                                                 |

### Summary of Similarities

Content across the three compared institutions concentrate on the fundamental concepts of database development and the proposed qualification has benefited from such in the development of this certificate qualification. In terms of assessments, quizzes and exercise are common in the compared qualification. In addition to this, the proposed qualification has continuous assessment throughout the qualification duration.

### REVIEW PERIOD

5 Years