Ethiopian TVET-System

Model Curriculum

Database Administration SERVICES

Level IV

Based on
Occupational Standard (EOS)

Preface

The reformed Ethiopian TVET-System is an outcome-based system. It utilizes the needs of the labor market and occupational requirements from the world of work as the benchmark and standard for TVET delivery. The requirements from the world of work are analyzed and documented – taking into account international benchmarking – as Occupational Standards (OS).

In the reformed Ethiopian TVET-System, Curricula and Curriculum Development play an important role with regard to quality driven TVET-Delivery. Curricula help to facilitate the learning process in a way, that trainees acquire the set of occupational competences (skills, knowledge and attitude) required at the working place and defined in the Occupational Standards (OS). Responsibility for curriculum development will be given to the Regional TVET-Authorities and TVET-Providers.

This curriculum has been developed by a group of experts from different regional TVET-Authorities based on the Occupational Standard for Information Technology Services Level IV. It has the character of a model curriculum and is an example on how to transform the occupational requirements as defined in the respective Occupational Standard into an adequate curriculum.

The curriculum development process has been actively supported and facilitated by the Ministry of Education – in line with one of its mandates to provide technical support to the regions **–** and by the TVET-Reform Component of the Engineering Capacity Building Program.

1.   TVET-Program Design

1.1   TVET-Program Title: Information Technology Services Level IV

1.2   TVET-Program Description

The Program is designed to develop the necessary knowledge, skills and attitude of the trainees to the standard required by the occupational standard. The contents of this program are in line with the Occupational Standard (OS). Trainees who successfully completed this program need to undergo national assessment and be found competent before he/she is qualified to work in the Electrotechnology sector in the field of Information Technology Services.

The prime objective of this training program is to equip the trainees with the identified competences specified in the OS. Graduates are therefore expected to be able to build internet infrastructure, determine suitability of database functionality and scalability, monitor and support data conversion, apply object-oriented programming language skills, develop website information architecture, determine maintenance strategy, contribute to the development of strategy, assist with policy development for client support, plan and organize work, establish quality standards, develop team and individuals, utilized specialized communication skills and manage and maintain SME business operations.

1.3   TVET-Program Learning Outcomes

The expected outputs of this program are the acquisition and implementation of the following units of competence –

ICT ITS4 01 0811	Plan and Organize Work
ICT ITS4 02 0811	Contribute to the Development of Strategy
ICT ITS4 03 0811	Assist with Policy Development for Client Support
ICT ITS4 04 0811	Monitor and Support Data Conversion
ICT ITS4 05 0811	Apply Object-Oriented Programming Language Skills
ICT ITS4 06 0811	Use Advanced Structural Query Language
ICT ITS4 07 0811	Determine Suitability of Database Functionality and Scalability
ICT ITS4 08 0811	Perform Database System Test
ICT ITS4 09 0811	Monitor and Administer Database
ICT ITS4 10 0811	Identify and Resolve Database Performance Problems
ICT ITS4 11 0811	Migrate to New Technology
ICT ITS4 12 0811	Establish Quality Standards
ICT ITS4 13 0811	Develop Team and Individuals
ICT ITS4 14 0811	Utilize Specialized Communication Skills

1.4.   Duration of the TVET-Program

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The Program will have duration of **1700 *hours*** including the cooperative training time and Civic Education et al.

1.5. Qualification Level and Certification

Based on the descriptors elaborated on the National TVET Qualification Framework (NTQF) the qualification of this specific TVET Program is **"Level IV"**.

The trainee can exit after successfully completing any Learning Module from this program and will be awarded the equivalent institutional certificate on the completed learning modules. Eentry point will be on next Learning Module as appropriate

1.6. Target Groups

Any citizen who meets the entry requirements under items 1.7 and capable of participating in the learning activities is entitled to take part in the Program.

1.7 Entry Requirements

The prospective participants of this program are required to possess the requirements or directives of the Ministry of Education.

Other requirements:
- ability to speak, read and understand English
- computer literate

1.8 Mode of Delivery

This TVET-Program is characterized as a formal Program on middle level technical skills. The mode of delivery is cooperative training. The TVET-institution and identified companies have forged an agreement to co-operate with regard to implementation of this program. The time spent by the trainees in the industry will give them enough exposure to the actual world of work and enable them to get hands-on experience.

The cooperative approach will be supported with lecture-discussion, simulation and actual practice. These modalities will be utilized before the trainees are exposed to the industry environment.

The *320 hours* or 16% of the program duration will be spent in cooperative training and it will only start after the trainee successfully completed all the modules in this program.

1.9.   TVET-Program Structure

Unit of Competence		Module Code & Title		Learning Outcomes	Duration (In Hours)
ICT ITS4 01 0811	Plan and Organize Work	ICT ITS4 M01 0811	Planning and Organizing Work	• Set objectives • Plan and schedule work activities • Implement work plans • Monitor work activities • Review and evaluate work plans and activities	80
ICT ITS4 02 0811	Contribute to the Development of Strategy	ICT ITS4 M02 0811	Contributing to the Development of Strategy	• Plan for strategy • Investigate the current environment • Participate in feedback session • Finalize and validate plan	80
ICT ITS4 03 0811	Assist with Policy Development for Client Support	ICT ITS4 M03 0811	Assisting with Policy Development for Client Support	• Review change requests • Modify system according to requested changes • Train on the use of modified system	80
ICT ITS4 04 0811	Monitor and Support Data Conversion	ICT ITS4 M06 0811	Monitoring and Supporting Data Conversion	• Monitor data conversion • Support data conversion	60
ICT ITS4 05 0811	Apply Object-Oriented Programming Language Skills	ICT ITS4 M04 0811	Applying Object-Oriented Programming Language Skills	• Apply basic language syntax and layout • Apply basic OO principles in the target language • Debug code	240

				• Document activities • Test code	
ICT ITS4 06 0811	Use advanced structure Query language	ICT ITS4 06 0811	Use advanced structure Query language	• Write advanced SQL statement to retrieve and sort data • LO2 Write advanced SQL statements that use functions • LO3 Write advanced SQL statements that use aggregation and filtering	240
ICT ITS4 07 0811	Determine Suitability of Database Functionality and Scalability	ICT ITS4 M05 0811	Determining Suitability of Database Functionality and Scalability	• Determine database functionality • Identify scalability and functionality requirements • Prepare report	80
ICT ITS4 08 0811	Perform Data Base system test	ICT ITS4 08 0811	Perform Data Base system test	• Prepare for Test • Conduct Test	120
ICT ITS4 09 0811	Monitor and administer database	ICT ITS4 09 0811	Monitor and administer database	• Start up a database • Manage database • Manage database access	120
ICT ITS4 010 0811	Identify and resolve database performance problems	ICT ITS4 010 0811	Identifying and resolve database performance problems	• Diagnose problems • Configure database • Tune database	200
ICT ITS4 10 0811	Migrate to New Technology	ICT ITS4 M10 0811	Migrating to New Technology	• Apply existing knowledge and techniques to technology and transfer • Apply functions of technology to	80

				• assist in solving organizational problems	
				• Evaluate new or upgraded technology performance	
ICT ITS4 11 0811	Establish Quality Standards	ICT ITS4 M11 0811	Establishing Quality Standards	• Establish quality specifications for service	120
				• Identify hazards and critical control points	
				• Assist in planning of quality assurance procedures	
				• Implement quality assurance procedures	
				• Monitor quality of work outcome	
				• Participate in maintaining and improving quality at work	
				• Report problems that affect quality	
ICT ITS4 13 0811	Develop Teams and Individuals	ICT ITS4 M13 0811	Developing Teams and Individuals	• Provide team leadership	60
				• Foster individual and organizational growth	
				• Monitor and evaluate workplace learning	
				• Develop team commitment and cooperation	
				• Facilitate accomplishment of organizational goals	
ICT ITS4 12 0811	Utilize Specialized Communication Skills	ICT ITS4 M12 0811	Utilizing Specialized Communication Skills	• Meet common and specific communication needs of clients	60

				• and colleagues	
				• Contribute to the development of communication strategies	
ICT ITS4 14 0811	Manage and Maintain Small/Medium Business Operations		Managing and Maintaining Small/ Medium Business Operations	• Identify daily work requirements • Monitor and manage work • Develop effective work habits • Interpret financial information • Evaluate work performance	80

Program Duration (Grand Total)	**1700 hrs**

1.10   Institutional Assessment

Two types of evaluation will be used in determining the extent to which learning outcomes are achieved. The specific learning outcomes are stated in the modules. In assessing them, verifiable and observable indicators and standards shall be used.

The *formative assessment* is incorporated in the learning modules and form part of the learning process. Formative evaluation provides the Trainee with feedback regarding success or failure in attaining learning outcomes. It identifies the specific learning errors that need to be corrected, and provides reinforcement for successful performance as well.   For the trainer/facilitator, formative evaluation provides information for making instruction and remedial work more effective.

Summative Evaluation the other form of evaluation is given when all the modules in the unit of competence have been accomplished. It determines the extent to which competence have been achieved. And, the result of this assessment decision shall be expressed in the term 'competent or not yet competent'.

Techniques or tools for obtaining information about trainees' achievement include oral or written test, demonstration and on-site observation.

1.11   TVET Teacher's Profile

The teachers conducting this particular TVET Program are A Level and have satisfactory practical experiences or equivalent qualifications.

Other requirements –
- have a good moral character
- physically and mentally fit
- have attended relevant training and seminars

1.12   Learning Modules (see succeeding pages)

LEARNING MODULE ONE	Logo of TVET Provider

TVET PROGRAM TITLE: **Database Administration –Level IV**

MODULE TITLE: **Planning and Organizing Works**

MODULE CODE: **ICT DBA4 01 0811**

NOMINAL DURATION: **80 hrs.**

MODULE DESCRIPTION:

This module aims to provide the trainees the knowledge, skills and attitude required in planning and organizing work. It may be applied to a small independent operation or to a section of a large organization.

LEARNING OUTCOMES:

At the end of the module the trainees will be able to:

LO1 Set objectives

LO2 Plan and schedule work activities

LO3 Implement work plans

LO4 Monitor work activities

LO5 Review and evaluate work plans and activities

MODULE CONTENTS:
LO1 Set objectives
   1.1   Introduction to management roles and functions
   1.2   Introduction to planning techniques and procedures
   1.3   Understanding organizational aims/goals, policies and standards
       1.3.1   Characteristics of objective
          1.3.1.1 Consistency
          1.3.1.2 Time frame
          1.3.1.3 Commitment of team member
          1.3.1.4 Realistic and attainability

LO2 Plan and schedule work activities
   2.1 Allocating resources
   2.2 Scheduling work activities
   2.3 Conducting Strategic Planning
   2.4 Preparing Work/Operational Plan
       2.4.1   Context, Formats and Standards
       2.4.2   Setting Goals and Objectives
       2.4.3   Identification of Work Activities
       2.4.4   Allocation of Assignments
       2.4.5   Setting Targets and Timeframes
       2.4.6   Resource Allocations
       2.4.7   Budget / Financial Requirements

LO3 Implement work plans
      3.1 Work Methods, Practices and Standards
      3.2 Implementation and Mobilization of People

LO4 Monitor work activities

    4.1 Introduction to Performance Management

        4.1.1   Monitoring work activity in accordance with set objectives

        4.1.2   Monitoring work performance

    4.2 Techniques and Procedures in Monitoring Work Activities and Performance

        4.1.3   Report and recommend deviations of work activities in accordance with set standards

        4.1.4   Compiling recommended format

        4.1.5   Observe timeliness of report

        4.1.6   Maintain and establish Files in accordance with standard operating procedures

LO5 Review and evaluate work plans and activities

    5.1 Evaluating Work Processes and Systems

        5.1.1   Review work plan activity

            5.1.1.1 Accuracy

            5.1.1.2 Relevancy

            5.1.1.3 Current information

            5.1.1.4 Comprehensive consultation with appropriate personnel

                5.1.1.4.1   Outcomes of work plans

                5.1.1.4.2   Reliable feedback.

    5.2 Review and Modification of Work Activities, Policies and Processes

        5.2.1   Providing review result

            5.2.1.1   Make Adjustments/simplifications

                5.2.1.1.1   Policies

                5.2.1.1.2   Processes

                5.2.1.1.3   Work Activities

    5.3 Implementing Performance Evaluation / Appraisal

        5.3.1   Conduct Performance appraisal

        5.3.2   Prepare and document Performance appraisal report

    5.4 Problem Solving and Decision Making Techniques

LEARNING STRATEGIES:

- Lecture-discussion
- Group assignment
- On-the-job practice / Cooperative Training

ASSESSMENT METHODS:

- Oral Questioning / Written Test
- Demonstration with Oral questioning

ASSESSMENT CRITERIA:

LO1 Set objectives

- Objectives are consistent with and linked to work activities in accordance with organizational aims

- Objectives are stated as measurable targets with clear time frames

- Support and commitment of team members are reflected in the objectives

- Realistic and attainable objectives are identified

LO2 Plan and schedule work activities

- Tasks/work activities to be completed are identified and prioritized as directed
- Tasks/work activities are broken down into steps in accordance with set time frames achievable components in accordance with set time frames
- Resources are allocated as per requirements of the activity
- Schedule of work activities is coordinated with personnel concerned

LO3 Implement work plans

- Work methods and practices are identified in consultation with personnel concerned
- Work plans are implemented in accordance with set time frames, resources and standards

LO4 Monitor work activities

- Work activities are monitored and compared with set objectives
- Work performance is monitored
- Deviations from work activities are reported and recommendations are coordinated with appropriate personnel and in accordance with set standards
- Reporting requirements are complied with in accordance with recommended format
- Observe timeliness of report
- Files are established and maintained in accordance with standard operating procedures

LO5 Review and evaluate work plans and activities

- Work plans, strategies and implementation are reviewed based on accurate, relevant and current information
- Review is based on comprehensive consultation with appropriate personnel on outcomes of work plans and reliable feedback
- Results of review are provided to concerned parties and formed as the basis for adjustments/simplifications to be made to policies, processes and activities
- Performance appraisal is conducted in accordance with organization rules and regulations
- Performance appraisal report is prepared and documented regularly as per organization requirements.
- Recommendations are prepared and presented to appropriate personnel/authorities
- Feedback mechanisms are implemented in line with organization policies

LEARNING MODULE	Logo of TVET Provider

TVET PROGRAM TITLE: **Database Administration –Level IV**

MODULE TITLE: **Contributing to the Development of Strategy**

MODULE CODE: **ICT ITS4 02 0811**

NOMINAL DURATION: **80 hrs.**

MODULE DESCRIPTION:

This module aims to provide the trainees with the knowledge, skills and right attitude required to participate in the planning process and to contribute to the development of a strategic plan.

LEARNING OUTCOMES:

At the end of the module the trainees will be able to:

LO1 Plan for strategy

LO2 Investigate the current environment

LO3 Participate in feedback session

LO4 Finalize and validate plan

MODULE CONTENTS:

Plan for strategy

1.1 Defining Strategic Plan and Terminologies

1.2 Prepare planning committee

1.3 Sourcing, Collecting , Organizing and Interpreting Information

1.4 Methods, Procedures and Components of Planning Process

2   Investigate the current environment

2.1 Identifying and Assessing Current Business Practice of the Organization

    2.1.1   Mission and vision statements of the organization

2.2 Identifying Problems and Issues of the Organization

3   Participate in feedback session

3.1 Identify the most important issues facing organization using the information gathered

3.2 Application of SWOT Analysis

    3.2.1   Strengths

    3.2.2   Weaknesses

    3.2.3   Opportunities

    3.2.4   Threats

3.3 Understanding the Relationship of SWOT Analysis and Strategic Planning

3.4 Developing Strategic Plan: Context, Formats and Standards

4   Finalize and validate plan

4.1 Review and Finalization of the Strategic Plan

4.2 Feedback Mechanism

LEARNING STRATEGIES:
- Lecture-discussion
- Group assignment
- On-the-job practice / Cooperative Training

ASSESSMENT METHODS:
- Oral Questioning / Written Test
- Demonstration with Oral questioning

ASSESSMENT CRITERIA:

LO1   Plan for strategy

- A planning committee is formed and clarified the roles of people involved in the process.
- Issues are identified that the planning process should address.
- Information that must be collected is identified.

LO2:   Investigate the current environment

- Mission and vision statements of the organization are investigated.
- Current internal and external environment of the organization is investigated

LO3   Participate in feedback session

5 The most important issues facing organization is identified, using the information gathered.

6 Review session is undertaken with appropriate person(s) to confirm issues identified.

LO4   Finalize and validate plan

- Written plan is created to document the mission, vision, issues, objectives and strategies of the organization.
- Written plan submitted to appropriate person(s) for approval.
- Feedback is reviewed and alterations are made where appropriate.

LEARNING MODULE TWO	Logo of TVET Provider

TVET PROGRAM TITLE: **Database Administration –Level IV**

MODULE TITLE: **Assisting with Policy Development for Client Support**

MODULE CODE: **ICT DBA4 03 0811**

NOMINAL DURATION: **80 hrs.**

MODULE DESCRIPTION:

This module aims to provide the competence required to receive, review and carry out change requests while utilizing a change management system according to client requirements.

LEARNING OUTCOMES:

At the end of the module the trainees will be able to:

LO1   Review change requests

LO2   Modify system according to requested changes

LO3   Train on the use of modified system

MODULE CONTENTS:

LO1 Review change requests

     1.1   Procedures and Protocols in Receiving Request for Hardware and Software Changes

     1.2 Change Management System According to Organizational Help Desk Procedures

     1.3 Review and Assessing Existing System Data with the Work Team

     1.4 Gathering and Organizing System Data Relevant to the Change Requests Using Appropriate Diagnostic Tools

     1.5 Reviewing the Proposed Changes and Comparing against Current and Future Business Requirements

     1.6 Techniques and Procedures in Determining Appropriate Changes To Be Carried Out

LO2 Modify system according to requested changes

    2.1   Identify potential solution to solve problems

    2.2   Recommendation of possible solutions

       2.2.1   Develop recommendations

       2.2.2   Document and ranked recommendations

       2.2.3   Present the recommended for decision

    2.3   Planning implementation and evaluation of solutions

    2.4   Confirm Recommendation

       2.4.1   Technically document

       2.4.2   Submit technical document

LO3 Train on the use of modified system

     3.1 Prepare training for the client in using the changed system

     3.2 Delivering the training

LEARNING STRATEGIES:
- Lecture-discussion
- Group work / Individual assignment
- Practical demonstration
- On-the-job practice

ASSESSMENT METHODS:
- Oral questioning / Written test
- Demonstration with Oral Questioning

ASSESSMENT CRITERIA:

LO1   Review change requests

- Requests are received and documented for hardware and software changes, utilizing a change management system and according to organizational help desk procedures*.*
- System data are gathered and organized relevant to the change requests, using available diagnostic tools.
- The proposed changes are reviewed against current and future business requirements.
- System data are examined, with work team, in order to select appropriate changes to be carried out.
- Selected changes are discussed and e clarified with client.

LO2   Modify system according to requested changes

- Potential solution is identified to solve problems*.*
- Recommendations about possible solutions are developed, documented, ranked and presented to the appropriate person for decision.
- Implementation and evaluation of solutions are planned.
- Recommended solutions are technically documented and submitted to appropriate person for confirmation.

LO3   Train on the use of modified system

- Training is prepared to meet the needs of client in using the changed system.
- Prepared training is delivered appropriately for client

LEARNING MODULE	Logo of TVET Provider

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TVET PROGRAM TITLE: **Database Administration –Level IV**	
MODULE TITLE: **Monitoring and Supporting Data Conversion**	
MODULE CODE: **ICT DBA4 04 0811**	

NOMINAL DURATION: **60 hrs.**

MODULE DESCRIPTION:
The module aims to provide the trainees with the knowledge, skills and right attitudes in monitoring and support data conversion.

LEARNING OUTCOMES:
At the end of the module the trainees will be able to:

LO1 Monitor data conversion

LO2 Support data conversion

MODULE CONTENTS:

LO1 Monitor data conversion

    1.1 Defining concepts of data conversion and Data Terminologies

    1.2 Reading and Analyzing Existing Data Conversion Documents

    1.3 Understanding Data and Its Characteristics

        1.3.1.   What is Data?

        1.3.2.   Data Conversion Systems and Tools

        1.3.3.   Data Modeling Methodologies

        1.3.4.   Data Conditioning and cleaning

        1.3.5.   Data Transformation and integration

        1.3.6.   Sorting, updating, exporting and convert data

        1.3.7.   Ensuring Data Quality

    1.4. Collection, Organization and Analysis of Data and Information

    1.5. Validating Data Conversion Systems

        1.5.1.   Data Accuracy

        1.5.2.   Data Integrity

        1.5.3.   Back-up before Conversion

    1.6. Identifying and Confirming Data Conversion Tools

        1.6.1.   Software

        1.6.2.   Hardware

        1.6.3.   Environmental Pre-Requisites (Dust, Heat, Extreme Cold, Temperature Stability, Air Circulation and Moisture)

    1.7. Identifying and Taking Action Data Rejection

        1.7.1.   Documenting Data Rejection

        1.7.2.   Monitoring and supporting data conversion

LO2 Support data conversion

    2.1 Verifying Results and Relevant Checklist

    2.2 Verifying Presented Data

    2.3 Maintaining and Documenting Back-up Copies of Conversion Files

2.4 Developing clear and coherent technical documentation

LEARNING STRATEGIES:

- Lecture-discussion
- Practical Demonstration

ASSESSMENT METHODS:

- Demonstration/Observation
- Oral questioning / Written Test

ASSESSMENT CRITERIA:

LO1 Monitor data conversion

- Conversion supporting documentation is obtained and applied to conversion process.
- Production data is protected by taking action to ensure back-up before conversion.
- Requirements of the client are determined and impacted on business operation.
- Software, hardware or environmental pre-requisites are identified and confirmed in the conversion plan.
- Data accuracy and integrity is validated according to conversion specifications.
- Data rejected by conversion tools is identified and actions detailed in conversion plan are carried out.
- Data rejection or errant behavior of the conversion process is documented.

LO2 Support data conversion

- Results are verified based on relevant checklist.
- Verified data are presented and have them signed by appropriate persons.
- Back-up copies of conversion files are maintained and documented according to requirements
- Clear and coherent technical documentation is developed

LEARNING MODULE	Logo of TVET Provider

TVET PROGRAM TITLE: **Database Administration –Level IV**

MODULE TITLE: **Applying Object-Oriented Programming Language Skills**
MODULE CODE: **ICT DBA4 05 0811**

NOMINAL DURATION: **240 hrs.**

MODULE DESCRIPTION:

This module aims to provide the trainees with the knowledge, skills and right attitude required to undertake programming tasks using an object oriented programming language. Competence includes tool usage, documentation, debugging and testing techniques in support of the programming activity.

LEARNING OUTCOMES:

At the end of the module the trainees will be able to:

LO1   Apply basic language syntax and layout

LO2   Apply basic OOP principles in the target language

LO3   Debug code

LO4   Document activities

LO5   Test code

MODULE CONTENTS:

LO1 Apply basic language syntax and layout

    1.1. Understanding Basic language syntax rules and best practices

    1.2. Understanding Data-Types, Operators and Expressions

    1.3. Using the Appropriate Language Syntax for Sequence, Selection and Iteration Constructs

    1.4. Using modular programming approach

    1.5. Using arrays and arrays of objects

    1.6. Control Statements – Selection

    1.7. Control Statements –loop

    1.8. Methods and Namespace

LO2 Apply basic OOP principles in the target language

    2.1 Introduction to class

    2.2 Class inheritance

    2.3 Implementing polymorphism

        2.3.1   Properties

        2.3.2   Indexers

        2.3.3   Structs

        2.3.4   Interfaces

    2.4 Introduction to Delegates and Events

    2.5 Introduction to Exception Handling

    2.6 Using Attributes and Overloading Operators

    2.1 Encapsulation

LO3 Debug code

3.1 Using an Integrated Development Environment

3.2 The Language Debugging Facilities

    3.2.1   Visual C++, C#,ASP.Net

    3.2.2   Visual Studio suite

3.3 Using Program Debugging Techniques to Detect and Resolve Errors.

    3.3.1   Errors handling

    3.3.2   Debugging options

    3.3.3   Procedures in debugging and editing the program

    3.3.4   Compiling the program

    3.3.5   Run the application or program

LO4 Document activities

4.1 Guidelines for Developing Maintainable Code and Adhering to a Set of Coding Standard

4.2 The Use of Internal Documentation Standards and Tools

    4.2.1 Documentation techniques

    4.2.2 Program and documentation standards

    4.2.3 Internal documentation techniques

LO5 Test code

5.1 Corrections are made to the code and the documentation as needed

5.2 Conducting Simple Tests to Confirm the Coding Process Meets Design Specifications

    5.2.1 Testing techniques

    5.2.2 User manual

    5.2.3 Printing documents of the program

5.3 Implementation of Required Corrections / Changes to the Code

LEARNING STRATEGIES:
- Lecture-discussion
- Group work / Individual assignment
- Practical Demonstration

ASSESSMENT METHODS:
- Interview / Written test
- Observation / Demonstration with Oral questioning

Reference:- http://www.csharp-station-tutorial

ASSESSMENT CRITERIA:

LO1   Apply basic language syntax and layout

- Basic language syntax rules and best practices are observed

- Language data-types, operators and expressions are used

- The appropriate language syntax for sequence, selection and iteration constructs is used.

- A modular programming approach is used

- Arrays and arrays of objects are used

LO2   Apply basic OO principles in the target language

- A class that contains primitive member/instance variables is implemented

- A class that contains multiple options for object construction is implemented

- A class uses user defined aggregation

- Inheritance is implemented to at least 2 levels of depth

- Polymorphism is used at a simple level through inheritance to enable easy code extension

LO3   Debug code

- An integrated development environment is used, particularly the language debugging facilities

- Program debugging techniques are used to detect and resolve errors.

LO4   Document activities

- Guidelines for developing maintainable code adhering to a set of coding standard is followed

- Internal documentation standards and tools are followed and used

LO5   Test code

- Simple tests are developed and conducted to confirm the coding process meets design specification

- The tests performed are documented

- Corrections are made to the code and the documentation as needed

LEARNING MODULE	Logo of TVET Provider
TVET PROGRAM TITLE: **Database Administration –Level IV**	
MODULE TITLE: **Use Advanced Structured Query Language**	
MODULE CODE: **ICT DBA4 06 0811**	
NOMINAL DURATION: **240 hrs.**	
MODULE DESCRIPTION:	

This unit defines the competency required to use advanced structured query language (SQL) to define, create and manipulate database structures and associated data in a relational database.

LEARNING OUTCOMES:

At the end of the module the trainees will be able to:

LO1 Write advanced SQL statement to retrieve and sort data

LO2 Write advanced SQL statements that use functions

LO3 Write advanced SQL statements that use aggregation and filtering

MODULE CONTENTS:

LO1 Write advanced SQL statement to retrieve and sort data

1.1 Concepts in Advanced database system

1.2 Review of SQL

1.3 SQL query keywords

    1.3.1 Basic SELECT Query

    1.3.2 WHERE Clause

    1.3.3 ORDER BY Clause

    1.3.4 INNER JOIN Clause

    1.3.5 INSERT Statement

    1.3.6 UPDATE Statement

    1.3.7 DELETE Statement

1.4 **Basic SELECT Query**

    1.4.1 Simple selects

    1.4.2 Joins/ join types

    1.4.3 Aggregate operators

    1.4.4 Aggregation by groups and groups condition

    1.4.5 Sub queries/ sub queries in FROM

    1.4.6 Union, Intersect, Except

1.5 Basics of the SELECT Statement and conditional selection

1.6 Operators in SQL

    1.6.1 Comparison operators

    1.6.2 Boolean operators in SQL

        1.6.2.1 SQL Equality Operator Query

        1.6.2.2 SQL - Mathematical Operators

        1.6.2.3 Logical operators

1.7 Join tables and join queries in SQL

LO2 Write Advanced SQL statements that use functions

1.1. Arithmetical operators in SQL

1.2. Mathematical functions in SQL

1.3. Date functions in SQL

1.4. SQL aggregate functions

LO3 Write advanced SQL statements that use aggregation and filtering

1.5. SQL - Grouping By Multiple Columns

1.5.1. SQL - Group By Aggregate

1.6. Filtering SQL: HAVING Clause

1.7. SQL: Sub-select, sorting by aggregate review data?

LEARNING STRATEGIES:

- Lecture-discussion
- Group work / Individual assignment
- Practical Demonstration

ASSESSMENT METHODS:

- Interview / Written test
- Observation / Demonstration with Oral questioning

ASSESSMENT CRITERIA:

LO1 Write ADVANCED SQL statement to retrieve and sort data

Data from a table and specific columns is retrieved using specific query and 'Order by' used to sort query output

- *Number of rows restricted is retrieved by placing specific criteria in the 'where' clause* and select statement

- **Comparison operators** in the 'where' clause is used to compare numeric, character, string, date and time data

- **Boolean operators** is used with the correct precedence

- Criteria in the 'where' clause is used to check for a range of values, to select values from a list, and to check for values that match a pattern

- SQL syntax is used to suppress duplicate values from query results and action taken to exclude null values from a query result

- Inner join syntax is employed to retrieve data from two or more tables

- 'Left outer', 'right outer' and 'full outer' syntax is used to join tables in the select statement

- Correct syntax in the 'where' clause is used to retrieve data from multiple tables

Union query that retrieves data from more than one table is written**LO2 Apply basic OO principles in the target language**

LO2 Write ADVANCED SQL statements that use functions

- **Arithmetical operations** are used with the correct precedence.

- String functions and operators is used to obtain the required query output

- **Mathematical functions** are used to obtain the required output, where required

- Date functions are used to obtain the required output

SQL aggregate functions are used to obtain the required output

LO3 Write ADVANCED SQL statements that use aggregation and filtering

- 'Group by' used to aggregate data by multiple columns

- Aggregated data is sorted in the query output

Aggregated data is filtered using the 'having' clause

LEARNING MODULE	Logo of TVET Provider
TVET PROGRAM TITLE: **Database Administration –Level IV**	
MODULE TITLE: **Determine Suitability of Database Functionality and Scalability**	

MODULE CODE: **ICT DBA4 07 0811**
NOMINAL DURATION: **80 hrs.**

MODULE DESCRIPTION:

This module aims to provide the trainees with the knowledge, skills and right attitude required to identify current and future business requirements for a database.

LEARNING OUTCOMES:

At the end of the module the trainees will be able to:

LO1 Determine database functionality

LO2 Identify scalability and functionality requirements

LO3 Prepare report

MODULE CONTENTS:

LO1 Determine database functionality

>   1.1 Review and Evaluation of the Organization Set-Up, Characteristics/Profile and Structure

>   1.2 Identify Business Requirements of the Organization

>   1.3 Defining and Confirming Database Objectives

>   1.4 Analyzing Database:

>>   1.4.1   Identify Business Rules

>>   1.4.2   Identify Entities

>>   1.4.3   Identify Relationships

>   1.5 Identifying Existing and Proposed Business Models

>   1.6 Documenting Exiting Database and Environment

>   1.7 Confirming Database Functionality:

>>   1.7.1   Internal Departments, External Organizations, Individual People and Employees

>>   1.7.2   Identifying Reserve and Long-Term Capacity Of Database

1.   Identify scalability and functionality requirements

>   2.1 Identifying Scalability of Database Component Requirements :

>>   2.1.1   System Architecture

>>   2.1.2   Data Models

>>   2.1.3   Data Structures

>>   2.1.4   Hardware and Software

>   2.2 Comparing Functionality and Scalability Database Features

>   2.3 Determining and Documenting Gap Features

2.   prepare report

>   3.1 Documenting Database Functionality and Scalability

>   3.2 Submitting the Database Functionality and Scalability Report for Review

LEARNING STRATEGIES:

- Lecture-discussion
- Group work / Individual assignment
- Practical Demonstration

ASSESSMENT METHODS:
- Oral questioning / Written test
- Observation / Demonstration

ASSESSMENT CRITERIA:

LO1 Determine database functionality

- Business requirements are defined following existing data.
- Database objectives are confirmed in-line with defined requirements.
- Database is analyzed to identify the business rules, entities and relationships.
- Existing and proposed business models are identified.
- Existing database and environment are documented according to work place procedure.
- Database functionality is confirmed with client.

LO2 Identify scalability and functionality requirements

- Reserve and long-term capacity of the database is identified.
- Implications for the system architecture, data models, data structures, and hardware and software requirements are identified for scalability.
- Functionality and scalability features of the database are compared.
- Gap between the features is determined and documented.

LO3 Prepare report

- Functionality and scalability of database are documented.
- Report on database functionality and scalability is submitted to client for review.

LEARNING MODULE	Logo of TVET Provider
TVET PROGRAM TITLE: **Database Administration Level IV**	
MODULE TITLE: **Perform Database System Test** MODULE CODE :**ICT DBA4 08 0811**	
NOMINAL DURATION: 120hrs	

MODULE DESCRIPTION:

This unit defines the competency required to ensure that the properties of the entire system are tested and proved adequate before handover to the client/user for final acceptance testing.

LEARNING OUTCOMES:

At the end of the module the trainee should be able to:

LO1 Prepare for Test

LO2 Conduct Test

MODULE CONTENTS:

LO1 Prepare for Test

   1.1 Preparing Test environment

   1.2 Determine Software life cycle is based on work principles.

   1.3 Prepare Test Plane based on Client Requirement

      1.3.1 Database Testing

         1.3.1.1 Steps of Database Testing

            1.3.1.1 Data integrity

      1.3.2 Correctness of data entered into the database

      1.3.3 Correctness and completeness of data migration

      1.3.4 Functionality and performance of user objects

      1.3.5 Database performance (query execution times, throughput etc.

      1.3.6 Data security

   1.4 Schedule Test

   1.5 Batch Testing

   1.6 Confirm Test Result Criteria based on system requirement Documentation

LO2 Conduct Test

   2.1 Run Test script and document result in line with acceptance Process

   2.3 Acceptance testing based on Required quality benchmarks

   2.4 Confirm actual results to expected results

LEARNING STRATEGIES:

- Lecture-discussion
- Group work
- Individual assignment

ASSESSMENT METHODS:

- Interview / Written Test / Oral Questioning
  - Observation / Demonstration

ASSESSMENT CRITERIA:

LO1 Prepare for Test

- **T*est environment* is prepared inline with work guideline.

- Software life cycle is determined based on work principles.

- Test plan and appropriate *test tools* are defined.

- System is recognized and separated into run able modules mirroring live scenarios.

- Logs and result sheets are gathered and prepared.

- Scheduled test are announced to ensure preparedness and understanding of implications for operations.

- Test scripts (online test) or test run (batch test) are prepared for running.

- Expected results are reviewed against acceptance criteria (walkthrough) and system requirements Documentation.

LO2 Conduct Test

- Test scripts and document results are run in line with test and acceptance processes.

- Required quality benchmarks or comparisons are performed in readiness for acceptance testing.

  - Organization/industry standards are adopted, where appropriate.

- Actual results to expected results are compared on completion of each system unit, and completed result sheets.

LEARNING MODULE	Logo of TVET Provider
TVET PROGRAM TITLE: **Database Administration –Level IV**	
MODULE TITLE: **Monitor and Administer Database**	
MODULE CODE: **ICT DBA4 09 0811**	
NOMINAL DURATION: **120 hrs.**	
MODULE DESCRIPTION: This unit defines the competency required to manage, monitor and administer a database.	

LEARNING OUTCOMES:
At the end of the module the trainees will be able to:
LO1. Start up a database
LO2. Manage database
LO3. Manage database access

MODULE CONTENTS:
LO1 Start up a database
   1.1 Concepts of database handling and requirement
   1.2 Configure database system
   1.3 Database monitoring
LO2 Manage database
2.1 compiling data dictionary and data structure
2.2 Introduction to data integrity
2.3 Introduction to integrity constraints
      2.3.1   Types of integrity constraints
         2.3.1.1 Entity integrity
         2.3.1.2 Referential integrity
         2.3.1.3 Domain integrity
         2.3.1.4 User defined integrity
      2.3.2   The mechanisms of constraints checking
      2.3.3   Deferred constraint checking
      2.3.4   Constraint states
2.4 Create and design indexes and multiple-field keys
      2.4.1   What is index?
      2.4.2   Decide which fields to be index
      2.4.3   Create an index
      2.4.4   Delete an index
      2.4.5   View and edit indexes
      2.4.6   Automatic index creation
      2.4.7   Create multiple-field keys
2.5 Locking Tables and Databases
2.6 Storing recent back-up and retrieve data
2.7 Monitor data storage space
2.8 Update data

LO3 Manage database access

   3.1 Database Administrator Security and Privileges

      3.1.1   The Database Administrator's Operating System Account

      3.1.2   Administrative User Accounts

   3.2 Network security breaches in database

      3.2.1   Backup operator

      3.2.2   Account operator

      3.2.3   Server operator

3.2.4 Domain administrator settings

3.3 Manage database system resources

LEARNING STRATEGIES:
- Lecture-discussion
- Group work / Individual assignment
- Practical Demonstration

ASSESSMENT METHODS:
- Interview / Written test
- Observation / Demonstration with Oral questioning

ASSESSMENT CRITERIA:

LO1 Start up a database

- Configure system for *database* start-up

- Monitor database start-up and operation for irregularities

LO2 Manage database

- Take action to ensure that a data dictionary has been compiled and that data structures are in place

- Maintain data integrity constraints according to *business requirements*

- Create and design indexes and multiple-field keys according to business requirements

- Monitor the locking options chosen for the database

- Confirm that recent back-ups of the database have been stored and that back-ups can be retrieved as a full working copy

- Monitor the data storage space for ongoing viability and resize as needed

- Update data according to *organizational guidelines*

LO3 Manage database access

- Allocate or remove access privileges according to user status

- Monitor network server log-in log file for illegal log-in attempts or for security breaches

- Manage system resources in the context of database administration

LEARNING MODULE	Logo of TVET Provider
TVET PROGRAM TITLE: **Database Administration Level IV**	
MODULE TITLE: Identify and Resolve Database Performance Problems	
MODULE CODE : ICT DBA4 10 0811	

NOMINAL DURATION: 200 hrs

MODULE DESCRIPTION:

This unit defines the competency required to identify and solve database problems to improve performance.

LEARNING OUTCOMES:

At the end of the module the trainee should be able to:

LO1 Diagnose problems

LO2 Configure database

LO3 Tune database

MODULE CONTENTS:

LO1 Diagnose problems

    1.1 Identify Diagnose Tool based on organizational *database* requirements
      1.1.1 Obtain Diagnose Tool
      1.1.2 run diagnostic tools

          1.1.2.1 Identify latch contentions and

          1.1.2.2 Identify events causing waits and record   outcomes

    1.4   Fixing The Database based on diagnostic results

LO2 Configure database

    2.1 Database Architecture

    2.2 Configuring a database

      2.2.1 Use Database Configuration Assistance (DBCA)

    2.3 Database back-up procedures
      2.3.1   Backup Option/Tool
          2.3.1.1 Recovery Manager (RMAN)
          2.3.1.2 Secure Backup
          2.3.1.3 A user Managed Backup
      2.3.2   Backup type
          2.3.2.1 Full Backup
          2.3.2.2 Incremental Backup
      2.3.3   Backup Mode
          2.3.3.1 Offline
          2.3.3.2 Online
    2.4 Configure rollback segments
    2.5 Configure and tests database performance

LO3 Tune database

    3.1 Know the design of the database
    3.2 Check the SQL query optimization
    3.3 Tune memory
      3.3.1   shared pool
      3.3.2   blocks
      3.3.3   buffers
    3.4 Tune I/O
    3.5 Reconfigure the database

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LEARNING STRATEGIES:
- Lecture-discussion
- Group work
- Individual assignment

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ASSESSMENT METHODS:
   • Interview/Written Test
   • Demonstration/Observation with Oral Questioning

ASSESSMENT CRITERIA:

LO1 Diagnose problems
- Appropriate database performance *diagnostic tool* to use based on organizational *database* requirements and vendor recommendations are determined.
- *Diagnostic tool* is run to identify latch contentions and events causing waits and record outcomes.
- Inappropriate use of database and temporary table spaces occurs are determined and recorded.
- Appropriate fixes are carried out based on diagnostic results

LO2 Configure database
- Distributed files *architecture* is adopted to minimize I/O (input/output) contention.
- Database back-up procedures are ensured to be appropriate for method of data storage.
- Rollback segments are reconfigured.
- Database is configured and tests its *performance.*

LO3 Tune database
- Module performance is tracked according to specifications.
- Efficiency of *structured query language* is monitored and tuned as required.
- Performance of shared pool, blocks and buffers are monitored and measured.
- Contentions are detected, identified and resolved that may arise in the real-time operation of the database.
- Database is reconfigured according to specifications

LEARNING MODULE FOUR	Logo of TVET Provider
TVET PROGRAM TITLE: **Database Administration –Level IV**	
MODULE TITLE: **Migrating to New Technology**	
MODULE CODE: **ICT DBA4 11 0811**	
NOMINAL DURATION: **80 hrs.**	
MODULE DESCRIPTION: This module aims to provide the trainees with the knowledge, skills and right attitude required to using new or upgraded technology.	

LEARNING OUTCOMES:

At the end of the module the trainees will be able to:

LO1 Apply existing knowledge and techniques to technology and transfer

LO2 Apply functions of technology to assist in solving organizational problems

LO3 Evaluate new or upgraded technology performance

MODULE CONTENTS:

LO1 Apply existing knowledge and techniques to technology and transfer

    1.1   Statements of technology and transfer

        1.1.1   Establishing network and linkages

        1.1.2   Documentation and Reporting

        1.1.3   Collecting, organizing and analyzing data and information

        1.1.4   Use of e-technology

    1.2 Process and techniques in determining new technology

        1.2.1   Determining cost effectiveness of new/upgraded equipment /technology

        1.2.2   Determining cost of migrating to new process/systems/procedures

    1.3 Utilization of Value Chain in Discovering New Technology

    1.4 Identifying Situations where Existing Knowledge can be used as the Basis for Developing New Skills

LO2 Apply functions of technology to assist in solving organizational problems

    2.1 Acquiring New or Upgraded Technology Skills and used to Enhance Learning

    2.2 Identifying New or Upgraded Equipment and Technology

    2.3 Classifying and Using New or Upgraded Equipment and Technology for the Benefit of the Organization

    2.4 Conducting Testing of New or Upgraded Equipment and Technology According to the Specification Manual.

    2.5 Appling Features of New or Upgraded Equipment and Software within the Organization Framework

    2.6 Using Features and Functions of New or Upgraded Equipment and Technology for Solving System / Process and Procedure Problems

    2.7 Accessing and Using Sources of Information Relating to New or Upgraded Equipment

        2.7.1   Documents

        2.7.2   Test Pages

        2.7.3   Web Pages

        2.7.4   Appliances Software

        2.7.5   Technical Connections Guidance And Other

LO3 Evaluate new or upgraded technology performance

    3.1 Evaluating New or Upgraded Equipment for Performance, Usability and Effectiveness of Improvement in Process and Procedures, and Against OHS Standards

    3.2 Determining Environmental Considerations from New or Upgraded Equipment/Technology

3.3 Seeking Feedback from Users and Beneficiaries of New Technology / Equipment

LEARNING STRATEGIES:
- Lecture-discussion
- Group work / Individual assignment
- Practical Demonstration

ASSESSMENT METHODS:
- Oral questioning / Written test
- Demonstration / Observation

ASSESSMENT CRITERIA:

LO1   Apply existing knowledge and techniques to technology and transfer

- Situations are identified where existing knowledge can be used as the basis for developing new skills.
- New or upgraded technology skills are acquired and used to enhance learning.
- New or upgraded equipment are identified, classified and used where appropriate, for the benefit of the organization

LO2   Apply functions of technology to assist in solving organizational problems

- Testing of new or upgraded equipment is conducted according to the specification manual.
- Features of new or upgraded equipment are and software applied within the organization
- Features and functions of new or upgraded equipment is used for solving organizational problems
- Sources of information is accessed and used relating to new or upgraded equipment

LO3   Evaluate new or upgraded technology performance

- New or upgraded equipment *is* evaluated for performance, usability and against OHS standard
- Environmental considerations are determined from new or upgraded equipment.
- Feedback is sought from users where appropriate.

LEARNING MODULE	Logo of TVET Provider
TVET PROGRAM TITLE: **Database Administration –Level IV**	
MODULE TITLE: **Establishing Quality Standards**	
MODULE CODE: **ICT DBA4 12 0811**	
NOMINAL DURATION: 120 **Hours**	

MODULE DESCRIPTION:

The module aims to provide the knowledge, attitudes and skills required to establish quality standards, monitor implementation of quality, record information, study causes of quality deviations and documentation process are applied in the workplace.

LEARNING OUTCOMES:

At the end of the module the trainee will be able to:

LO1 Establish quality standards

LO2 Monitor implementation of quality

LO3 Record information

LO4 Study causes of quality deviations

LO5 Complete documentation

MODULE CONTENTS:

LO1 Establish quality standards

1.1 Introduction to Quality Assurance System (QAS)

1.2 Introduction to Quality Management System (QMS)

1.3 Introduction to ISO and Its Relationship to QMS

1.4 Establishing Organization's Quality Standards and System

    1.4.1 Creating and Capacitating Quality Teams

    1.4.2 Understanding record management

    1.4.3 Identifying and reporting non performance input, process, product or service

    1.4.4 Documenting quality specification, standards and procedures

    1.4.5 Develop procedures and quality manuals

    1.4.6 Giving orientation on quality assurance system

    1.4.7 Orient staff on organizations standards quality

LO2 Monitor implementation of quality

2.1 Maintenance of Quality Standards, System and Performance

2.2 Monitoring and Adjusting Work Process to Meet Quality Standards

2.3 Leveling of Responsibility to Maintain Quality Standards

2.4 Capacitating Staff to Meet Quality Standards Requirements

2.5 Monitoring Implementation of Quality Standards and Specifications

LO3 Record Information

3.1 Ensuring basic information on the quality performance is to be recorded in accordance with organization procedures

3.2 Ensuring records of work quality are to be maintained according to the requirements of the organization

LO4 Study causes of quality deviations

4.1 Determining Quality Deviations and Its Causes

4.2 Addressing Quality Issues

LO5 Complete documentation

5.1 Negotiation Techniques and Procedures

5.2 Problem Solving and Decision Making Techniques

5.3 Managing Quality Process and System

LEARNING STRATEGIES:

- Lecture-discussion
- Group assignment

	• Practical Demonstration

ASSESSMENT METHODS:
- Oral questioning /Written test
- Demonstration with Oral questioning

ASSESSMENT CRITERIA:

LO1 Establish quality standards

- Quality standard procedures for servicing works are developed and agreed upon.
- Quality standard procedures are documented in accordance with the organization policy.
- Standard procedures are introduced to organizational staff / personnel.
- Standard procedures are revised / updated when necessary

LO2 Monitor implementation of quality

- Services delivered are insured to be checked against organization quality standards and specifications
- Service delivered are insured to be evaluated using the appropriate evaluation parameters and in accordance with organization standards
- Causes of any identified faults are ensured to be identified and corrective actions are taken in accordance with organization policies and procedures

LO3 Record Information

- Basic information on the quality performance is ensured to be recorded in accordance with organization procedures
- Records of work quality are ensured to be maintained according to the requirements of the organization

LO4 Study causes of quality deviations

- Causes of deviations from final outputs or services are ensured to be investigated and reported in accordance with organization procedures
- Suitable preventive action is recommended based on organization quality standards and identified causes of deviation from specified quality standards of final service or output

LO5 Complete documentation

- Information on quality and other indicators of service performance is ensured to be recorded.
- All service processes and outcomes are ensured to be recorded.

ICT ITS4 M11 0811 Establishing Quality Standards				
Item No.	**Category/Item**	**Description/ Specifications**	**Quantity**	**Recommended Ratio (Item: Trainee)**
A.	**Learning Materials**			
1.	Service manual, schematic diagram/parts list	Manuals	25	1:1
2.	Operating instructions/User's/Owner's manual		25	1:1
B.	**Learning Facilities & Infrastructure**			

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1	Lecture Room	8x12m equipped with the equipment and internet		1:25
2	Shelves	Wooden/metal	5	
3	Locker	Wooden /metal	2	
4	Cabinet	metal	1	
C.	*Consumable Materials*			
1.	Blank disk	CD-R/CD-RW and DVD-R/DVD-RW	5	1:5
2.	Stationery	White board marker, printing paper & ink		
D.	*Tools and Equipment*			
1.	Applications	• Commercial application software • Organization specific software • Office package • Graphic • Database • Communication packages		
2.	Operating system	Linux, Mac Os, windows XP or above		
3.	Asp ISP	• DSL • ADSL • T1&T2 • PSTN for dialup modems • CDMA 1x • Private lines • VPN • Data and voice • Current internet technologies		
4.	UPS	750volt meter		
5.	Divider	American socket supporter		
6.	Desktop computer Including its peripherals	w/15 inch flat screen monitor and 120 hard disk RAM size 1GB,3ghz ,& above		
7.	Multimedia projector	LCD		
8.	Printer	Capability of printing A3and color printing capability (DeskJet)		
9.	Network toolkit	Set/case		
10.	Maintenance toolkit	Set/case		
11.	Scanner	HP 2055		
12.	Webcam	8 and Above pixel		
13.	Flash disk	Scan disk16GB		

LEARNING MODULE	Logo of TVET Provider
TVET PROGRAM TITLE: **Database Administration –Level IV**	
MODULE TITLE: **Developing Individuals and Teams** MODULE CODE: **ICT DBA4 13 0811**	
NOMINAL DURATION: **60 Hours**	
MODULE DESCRIPTION: The module aims to provide the necessary skills, knowledge and attitudes required to determine and address individual and team development needs.	
LEARNING OUTCOMES: At the end of the module the trainee will be able to: LO1 Provide team leadership LO2 Foster individual and organizational growth	

LO3 Monitor and evaluate workplace learning

LO4 Develop team commitment and cooperation

LO5 Facilitate accomplishment of organizational goals

MODULE CONTENTS:

LO1 Provide team leadership

      1.1 Introduction to Human Resource Management

      1.2 Understanding management Tools in Performance Management

      1.3 Conducting Training Needs Analysis and Competence Requirements

      1.4 Developing Training Programs to Address Training Needs of Employees

      1.5 Facilitating Staff Development
      1.6 Providing Coaching and Mentoring Assistance to Achieve Competence

LO2 Foster individual and organizational growth

      2.1 Identify learning and developing specific goals and objectives for programs

      2.2 identify Learning delivery methods, equipment and resource

      2.3 Provide workplace learning opportunities and coaching assistance
      2.4 identified and approved resources and timelines

LO3 Monitor and evaluate workplace learning

    3.1   Feedback from individuals or teams for future learning arrangements

    3.2   Assessing Individual and Teams Performance and Outcomes

    3.3 Negotiation efficiency and effectiveness of Modifications to learning plans
    3.4 Maintain records and reports

LO4 Develop team commitment and cooperation

    4.1   Open communication processes to obtain and share information

    4.2   Decide on team agreement
    4.3   Develop Mutual concern and camaraderie in the team

LO5 Facilitate accomplishment of organizational goals

    5.1   Participate members in team activities and communication processes

    5.2   Develop individual and joint responsibility for their actions

    5.3   How to collaborative efforts which sustained to attain organizational goals?

LEARNING STRATEGIES:
- Lecture-discussion
- Group assignment
- Role play

ASSESSMENT METHODS:
- Oral questioning
- Written test

ASSESSMENT CRITERIA:

LO1   Provide team leadership
- Learning and development needs are systematically identified and implemented in line with organizational requirements
- Learning plan to meet individual and group training and developmental needs is collaboratively developed and implemented
- Individuals are encouraged to self-evaluate performance and identify areas for improvement

- Feedback on performance of team members is collected from relevant sources and compared with established team learning process

LO2   Foster individual and organizational growth

- Learning and development program goals and objectives are identified to match the specific knowledge and skills requirements of Competence standards

- Learning delivery methods are appropriate to the learning goals, the learning style of participants and availability of equipment and resources

- Workplace learning opportunities and coaching/ mentoring assistance are provided to facilitate individual and team achievement of competencies

- Resources and timelines required for learning activities are identified and approved in accordance with organizational requirements

LO3   Monitor and evaluate workplace learning

- Feedback from individuals or teams is used to identify and implement improvements in future learning arrangements

- Outcomes and performance of individuals/teams are assessed and recorded to determine the effectiveness of development programs and the extent of additional support

- Modifications to learning plans are negotiated to improve the efficiency and effectiveness of learning

- Records and reports of ccompetence are maintained within organizational requirement

LO4   Develop team commitment and cooperation

- Open communication processes to obtain and share information is used by team
- Decisions are reached by the team in accordance with its agreed roles and responsibilities
- Mutual concern and camaraderie are developed in the team

LO5   Facilitate accomplishment of organizational goals

- Team members actively participated in team activities and communication processes

- Teams members developed individual and joint responsibility for their actions

- Collaborative efforts are sustained to attain organizational goals

LEARNING MODULE	Logo of TVET Provider

TVET PROGRAM TITLE **Database Administration –Level IV**

MODULE TITLE: **Utilizing Specialized Communication Skills**

MODULE CODE: : **ICT DBA4 14 0811**

NOMINAL DURATION 60 **Hours**

MODULE DESCRIPTION:

The module aims to provide the knowledge, skills and attitudes required in using specialized communication skills to meet specific needs of internal and external clients, conduct interviews, facilitate group discussions, and contribute to the development of communication strategies.

LEARNING OUTCOMES:

At the end of the module the trainee will be able to:

LO1   Meet common and specific communication needs of clients and colleagues

LO2	Contribute to the development of communication strategies
LO3	Represent the organization
LO4	Facilitate group discussion
LO5	Conduct interview

MODULE CONTENTS:

LO1 Meet common and specific communication needs of clients and colleagues

    1.1 Identifying Communication Needs of Clients and Colleagues

        1.1.1   The Communication Process and Network

        1.1.2   Introduction to Good English Communication

        1.1.3   Ethics of Communication

    1.2 Utilization of Appropriate Communication Methods and Approaches

        1.2.1   Techniques in Effective Group Interaction

        1.2.2   Techniques in Facilitating Group Discussion

        1.2.3   Establishing Communication Channels

        1.2.4   Communication Strategies in the Workplace

        1.2.5   Communicating in Teams

    1.3 Conflict Management and Communication

LO2 Contribute to the development of communication strategies

    2.1 Interpreting and Disseminating Information

    2.2 Review of communication channels

    2.3 Coaching In Effective Communication

    2.4 Negotiation Techniques and Application

    2.5 conflict resolution strategies

    2.6 Communication with clients and colleagues

        2.6.1   Conducting Interview and Eliciting Information

        2.6.2   Techniques in Good Questioning and Listening

        2.6.3   Non Verbal Communication Techniques

        2.6.4   Body Language and Communication

    2.7 Maintaining work related network and relationship

LO3 Represent the organization

    3.1 Developing a Presentation

    3.2 Presentation Using Multi-Media

    3.3 Evaluation of presentation feedback

    3.4 Evaluation of Group Communication Strategies

LO4 Facilitate group discussion

    4.1 Mechanisms for effective group interaction

    4.2 Strategies which encourage group members

    4.3 Set objectives and agenda for meetings and discussions

    4.4 Provide relevant information to group members

    4.5 evaluation of group communication strategies

4.6 Identify specific communication needs of individuals

LO5 Conduct interview

5.1 Prepare for interview

5.2 Arrange appropriate communication strategies for interview

5.3 Record interviews

LEARNING STRATEGIES:
- Lecture-discussion
- Group assignment
- Role play

ASSESSMENT METHODS:
- Oral questioning
- Written test

ASSESSMENT CRITERIA:

LO1   Meet common and specific communication needs of clients and colleagues
- Specific communication needs of clients and colleagues are identified and met
- Different approaches are used to meet communication needs of clients and colleagues
- Conflict is addressed promptly and in a timely way and in a manner which does not compromise the standing of the organization

LO2   Contribute to the development of communication strategies
- Strategies for internal and external dissemination of information are developed, promoted, implemented and reviewed as required
- Channels of communication are established and reviewed regularly
- Coaching in effective communication is provided
- Work related network and relationship are maintained as necessary
- Negotiation and conflict resolution strategies are used where required
- Communication with clients and colleagues is appropriate to individual needs and organizational objectives

LO3   Represent the organization
- When participating in internal or external forums, presentation is relevant, appropriately researched and presented in a manner to promote the organization
- Presentation is clear and sequential and delivered within a predetermined time
- Utilize appropriate media to enhance presentation
- Differences in views are respected
- Written communication is consistent with organizational standards
- Inquiries are responded in a manner consistent with organizational standard

LO4   Facilitate group discussion
- Mechanisms which enhance effective group interaction is defined and implemented
- Strategies which encourage all group members to participate are used routinely
- Objectives and agenda for meetings and discussions are routinely set and followed

- Relevant information is provided to group to facilitate outcomes
- Evaluation of group communication strategies is undertaken to promote participation of all parties
- Specific communication needs of individuals are identified and addressed

LO5   Conduct interview

- A range of appropriate communication strategies are employed in interview situations
- Records of interviews are made and maintained in accordance with organizational procedures
- Effective questioning, listening and nonverbal communication techniques are used to ensure that required message is communicated

LEARNING MODULE - 14	Logo of TVET Provider

TVET PROGRAM TITLE: **Database Administration –Level IV**

MODULE TITLE: **Managing and Maintaining Small/Medium Business Operations**
MODULE CODE: **ICT DBA4 15 0811**

NOMINAL DURATION: **80 Hours**

MODULE DESCRIPTION: This unit covers the operation of day-to-day business activities in a micro or small business. The strategies involve developing, monitoring and managing work activities and financial information, developing effective work habits, and adjusting work schedules as needed.

LEARNING OUTCOMES:

At the end of the module the trainee will be able to:

LO1 Identify daily work requirements

LO2 Monitor and manage work

LO3 Develop effective work habits

LO4 Interpret financial information

LO5 Evaluate work performance

MODULE CONTENTS:

LO1 Identify daily work requirements(9hrs)

1.1 Identifying work requirements for a given time in line with available resources and constraints

1.2 Setting priorities for tasks and meeting deadlines

1.3 Assignment of duties and responsibilities

1.4 Managing through delegation

LO2 Monitor and manage work(11 hrs)

2.1 Coordination for attaining maximum results

2.2 communication

- Report Writing
- Computer-Based Data Record Management
- Handling Meeting and Dialogues
- Giving Instructions and Assignments
- Establishing Network and Linkage
- Presentation Techniques
- Contract and Obligations

2.3 Problem solving and Decision Making Techniques meanings, process and techniques

LO3 Develop effective work habits(13 hrs)

3.1 Time management principles, advantages and strategies

3.2 Information seeking

- Federal/Local Government Legislation
- Obligation and Contract
- Tax
- Materials: Uses and Specification
- Handling and Storage of Workshop Manuals (Service, Operation, Maintenance)

- Handling of Legal Documents

LO4 Interpret financial information(35 hrs)

4.1 Financial statements analysis

4.2 Trade and Business Theories, Systems and Operations

- Reviewing and Assessing Business Operations and Profitability
- Re-planning and Reprogramming Business Operations
- Reevaluating Approach to Business

4.3 Improving Marketing Strategies and Business Promotion

4.4 Improving Sales, Income and Financial Stability

4.5 Financial Management and Resource Utilization

4.6 Purchasing and Supply Management

4.7 Establishing Customer and Community Social Relations

4.8 Monitoring and Evaluating Work Activities and Performance

- Improving Work Performance and Work Habits
- Improving Work Processes and Quality
- Improving Capacity of Staff and Commitment
- Interpreting and Analyzing Financial Information

4.9 Taxation and Other Legal Responsibility

4.10 Utilization of Management Tools and Practices

- Performance Management
- Reevaluating Viability of Business Practice

4.11 Trade Mathematics

- Business Mathematics
- Basic Accounting

LO5 Evaluate work performance(12 hrs)

5.1 Office Equipment: Use, Operations and Maintenance

5.2 Occupational Health and Safety

5.3 Work ethics

5.4 Achievement of business goals

5.5 Resources in an organization and their utilization

5.6 ISO standards

5.7 Kaizen

ASSESSMENT CRITERIA:

LO1 Identify daily work requirements

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- Work requirements for a given time period are identified taking into consideration resources and constraints
- Work activities are prioritized based on business needs, requirements and deadlines
- If appropriate, work is allocated to relevant staff or contractors to optimize efficiency

LO2 Monitor and manage work

- People, resources and/or equipment are coordinated to provide optimum results
- Staff, clients and/or contractors are communicated within a clear and regular manner, to monitor work in relation to business goals or timelines
- Problem solving techniques are applied to work situations to overcome difficulties and achieve positive outcomes

LO3 Develop effective work habits

- Work and personal priorities are identified and a balance is achieved between competing priorities using appropriate time management strategies
- Input from internal and external sources is sought and used to develop and refine new ideas and approaches
- Business or inquiries are responded to promptly and effectively
- Information is presented in a format appropriate to the industry and audience

LO4 Interpret financial information

- Relevant documents and reports are identified
- Documents and reports are read and understood and any implications discussed with appropriate persons
- Data and numerical calculations are analyzed, checked, evaluated, organized and reconciled
- Daily financial records and cash flow are maintained correctly and in accordance with legal and accounting requirements
- Invoices and payments are prepared and distributed in a timely manner and in accordance with legal requirements
- Outstanding accounts are collected or followed-up

LO5 Evaluate work performance

- Opportunities for improvements are monitored according to business demands
- Work schedules are adjusted to incorporate necessary modifications to existing work and routines or changing needs and requirements
- Proposed changes are clearly communicated and recorded to aid in future planning and evaluation
- Relevant codes of practice are used to guide an ethical approach to

workplace practices and decisions

LEARNING METHODS:

- Discussion
- Demonstration
- Practical exercises
- Role playing
- Presentation
- Small group work
- Case study
- Individual assignment
- Projects and mini enterprises
- Brain storming
- guest speaker
- Games
- CD-ROMs
- Coaching/mentoring

MODULE ASSESSMENT:

- Written test
- Demonstration
- Interview
- Direct Observation with Oral Questioning

Resource Requirements

	ICT DBA4 15 0811 Managing and Maintaining Small/Medium Business Operations			
Item No.	**Category/Item**	**Description/ Specifications**	**Quantity**	**Recommended Ratio (Item: Trainee)**
A.	***Learning Materials***			
1.	CBLM KAB CEFE SYB	- Trainer's made handouts _Trainee handbooks	25	1:1
2.	Textbooks	If available	25	1:1
3.	Reference Books	1 Hisrich, Understanding Entrepreneurship. 2 Thimons, New Venture Creation	5	1:5

		3 Gupta, Micro and Small Business Management 4 Hailay G/Tinsae:Small Business Management 5 Gilkerson, self employment from dream to reality 6 Woretaw Bezabih ,entrepreneurship(Am haric version)		
B.	*Learning Facilities & Infrastructure*			
1	Demonstration room	- 8x12m; equipped with IT facilities	1	1:25
2.	Library	- Multipurpose		
3.	Shelves	- wooden or metal	5	
4	White Board	1.50 X 1.50	1	
5	Cabinet	- metal	1	
6	Internet and Virtual library	High speed Internet Connection Recommended E-VDO, Broad Band	1	1:25
C.	*Consumable Materials*			
1	Blank CD	- CD-R/RW	5	1:5
2	Stationery	- Whiteboard marker, printing paper, printer ink		
3	Flash disk	San disk or similar 4GB	5	1:5
4	• Zope card • Flip chart • Marker • Scotch • Candy • chocolate	• hard card/file(claser) • local • white board and permenant(all clours)		

2.   Annex

2.1   Resource Requirements

ICT ITS4 M01 0811 **Planning and Organizing Work**				
Item No.	**Category/Item**	**Description/ Specifications**	**Quantity**	**Recommended Ratio (Item: Trainee)**
A.	*Learning Materials*			
1	TTLM	Teacher's made handouts	25	1:1
2	Textbooks		25	1:1

3	Reference Books			1:10
4	Journals/Publication/Magazines	ICT journals(Monthly)		1:25
B.	**_Learning Facilities & Infrastructure_**			
1	Lecture Room	8x12m; equipped with IT equipment and internet		1:25
2	Library	Multipurpose		
3	Shelves	wooden or metal	5	
4	Locker	wooden or metal	2	
5	Cabinet	metal	1	
C.	**_Consumable Materials_**			
1	Blank Disk	CD-R/RW DVD/CDRW	5	1:4
2	Stationery	Whiteboard marker, printing paper, printer ink		
3	Flash disk	San disk or similar 16GB	8	1:1
D.	**_Tools and Equipment_**			
1	Samples	• Sample Daily work plans • Sample Project plans • Sample Program plans • Sample Organization strategic and restructuring plans • Sample Resource plans • Sample Skills development plans • Sample Management strategies and objectives	7	1:25
2	Operating systems	Any operating system that has multi-user ability, Linux, Mac OS, Windows XP or above	7	1:25
3	ASP ISP	• The internet • PSTN for dial-up modems • CDMA 1X • EV-DO • private lines • VPN • data and voice • Current Internet Technologies		
4	UPS	• 750 Volt Ampere	25	
5	Divider	• American socket supporter	13	
6	Desktop Computer including its peripherals	- w/15 inch flat monitor and 120 GB Hard disk; RAM size 1GB; 3Gz or above	25	1:1
7	Multimedia projector	- LCD	1	Per section
8	Printer	- Capability of A3 printing - color printing capability	1	Per section
9	Network toolkit	- set/case	5	1:5

10	Maintenance toolkit	- set/case	5	1:5
11	Scanner	- HP 2055	2	1:13
12	Web cam	-8piexel and above	2	1:13

ICT ITS4 M02 0811 Contributing to the Development of Strategy				
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A.	*Learning Materials*			
1	TTLM	Teacher's made handouts	25	1:1
2	Textbooks		25	1:1
3	Reference Books			1:10
4	Journals/Publication/Magazines	ICT journals(Monthly)		1:20
B.	*Learning Facilities & Infrastructure*			
1	Lecture Room	8x12m; equipped with IT equipment and internet		1:20
2.	Library	Multipurpose		
3.	Shelves	wooden or metal	5	
4.	Locker	wooden or metal	2	
5.	Cabinet	metal	1	
C.	*Consumable Materials*			
1.	Blank Disk	CD-R/RW DVD/CDRW	5	1:4
2.	Stationery	Whiteboard marker, printing paper, printer ink flash disk		
D.	*Tools and Equipment*			
1	Operating systems	Any operating system that has multi-user ability, Linux, Mac OS, Windows XP or above	25	1:1
2	UPS	• 750 Volt Amper	25	1:1
3	Divider	American socket supporter	25	1:1
4	Desktop Computer including its peripherals	w/15 inch flat monitor and 120 GB Hard disk; RAM size 1GB; 3Gz or above	25	1:1
5	Multimedia projector	LCD	1	1:25
6	Printer	Capability of A3 printing, color printing capability	1	Per section

ICT ITS4 M03 0811 Assisting with Policy Development for Client Support				
Item	Category/Item	Description/ Specifications	Quantity	Recommended Ratio

No.				(Item: Trainee)
A.	***Learning Materials***			
1	TTLM	Teacher's made handouts	25	1:1
2	Textbooks		25	1:1
3.	Reference Books			
4	Journals/Publication/Magazines	ICT journals(Monthly)	3	1:10
B.	***Learning Facilities & Infrastructure***			
1	Lecture Room	10x15m; equipped with IT equipment and internet	1	1:25
2	Library	Multipurpose		
3	Shelves	wooden or metal	5	
4	Locker	wooden or metal	2	
5	Cabinet	metal	1	
C.	***Consumable Materials***			
1	Blank Disk	CD-R/RW DVD/CDRW	5	1:4
2	Stationery	Whiteboard marker, printing paper, printer ink flash disk UTP cable cat6e RJ -45		
D.	***Tools and Equipment***			
1	Databases	Oracle, Sybase, Microsoft SQL server, Ingres, DB2,Informix, MySQL, SQL server		
2	Applications	• commercial software applications; • organization-specific software; • Word processing (ms-word,…) • spreadsheet(ms-excel) • database, • graphic • communication packages	installed for every desktop	All computers

3	Servers	• Server windows • Linux server		
4	Operating systems	Any operating system that has multi-user ability, Linux, Mac OS, Windows XP or above		
5	Gateways	internal, external, and wireless modems; ADSL modems, Server, Router, Hub, switch, bridge, Brouter, Repeater, Wireless NIC		
6	ASP ISP	• Internet • PSTN for dial-up modems • CDMA 1X • EV-DO		

		• private lines • VPN • data and voice • Current Internet Technologies		
7	UPS	• 750 Volt Amper	25	
8	Divider	• American socket supporter	13	
9	Desktop Computer including its peripherals	w/15 inch flat monitor and 120 GB Hard disk; RAM size 1GB; 3Gz or above	25	1:1
10	Multimedia projector	LCD	1	Per section
11	Printer	Capability of A3 printing color printing capability	1	Per section
12	Network toolkit	set/case	5	1:5
13	Maintenance toolkit	set/case	5	1:5

ICT ITS4 M04 0811 Applying Object-Oriented Programming Language Skills				
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A.	Learning Materials			
1.	TTLM	Teacher's made handouts	25	1:1
2.	Textbooks		25	1:1
3.	Reference Books	Deite, How to C++ Savitch, Programming in c++ Shaums Outline in C++ Deitel Deitel, Visual Basic, How to Program	3	1:10
4.	Journals/Publication/ Magazines	ICT journals(Monthly)	3	1:10
B.	Learning Facilities & Infrastructure			
1	Lecture Room	10x15m; equipped with IT equipment and internet	1	1:25
2.	Library	Multipurpose		
3.	Shelves	wooden or metal	5	
4.	Locker	wooden or metal	2	
5.	Cabinet	metal	1	
C.	Consumable Materials			
1.	Blank Disk	CD-R/RW DVD/CDRW	5	1:4
2.	Stationery	Whiteboard marker, printing paper, printer ink flash disk UTP cable cat6e RJ -45		

D.	Tools and Equipment			
1.	Databases	• Oracle, Sybase, Microsoft SQL server, Ingres, DB2,Informix, MySQL, SQL server	installed for every desktop	All computers
2	Applications	• C++ compiler • Java compiler • Visual basic studio		
3	Servers	Server windows Linux server		
4	Operating systems	Any operating system that has multi-user ability, Linux, Mac OS, Windows XP or above		
5	Gateways	Internal, external, and wireless modems ADSL modems, Server, Router, Hub, switch, bridge, Brouter, Repeater, Wireless NIC		
6	ASP ISP	• Internet • PSTN for dial-up modems • CDMA 1X • EV-DO • private lines • VPN • data and voice • Current Internet Technologies		
7	UPS	• 750 Volt Ampere	25	
8	Divider	• American socket supporter	13	
9	Desktop Computer including its peripherals	- w/15 inch flat monitor and 120 GB Hard disk; RAM size 1GB; 3Gz or above	25	1:1
10	Multimedia projector	- LCD	1	Per section
11	Printer	- Capability of A3 printing - color printing capability	1	Per section
12	Network toolkit	- set/case	5	1:5
13	Maintenance toolkit	- set/case	5	1:5

ICT ITS4 M05 0811		Determine Suitability of Database Functionality and Scalability		
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A.	Learning Materials			
1	TTLM	Teacher's made handouts	25	1:1
2	Textbooks		25	1:1
3	Reference Books			1:13
4	Journals/Publication/Magazines	ICT journals(Monthly)		1:25

B.	Learning Facilities & Infrastructure			
1	Lecture Room	8x12m; equipped with IT equipment and internet		1:25
2	Library	Multipurpose		
3	Shelves	wooden or metal	5	
4	Locker	wooden or metal	2	
5	Cabinet	metal	1	
C.	Consumable Materials			
1	Blank Disk	CD-R/RW DVD/CDRW	5	1:5
2	Stationery	Whiteboard marker, printing paper, printer ink, flash disk		
D.	Tools and Equipment			
1	Applications	• Oracle • Sybase • Microsoft SQL server • Ingres • DB2 • Informix • MySQL • Postgres SQL	installed for every desktop	All computers
2	Servers	• Server windows • Linux server		
3	Operating systems	Any operating system that has multi-user ability, Linux, Mac OS, Windows XP or above		
4	Back up tools	External hard disk 500 GB	5	1:5
5	UPS	750 Volt Amper		
6	Divider	American socket supporter	25	1:1
7	Desktop Computer including its peripherals	w/15 inch flat monitor and 120 GB Hard disk; RAM size 1GB; 3Gz or above	25	1:1
8	Multimedia projector	LCD	1	1:25

ICT ITS4 M06 0811 Monitoring and Supporting Data Conversion				
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A.	Learning Materials			
1	Manuals	• Service manual, schematic diagram/parts Operating • Instructions/User's/Owner's manual list	25	1:1
2	TTLM	To be prepared by teacher	25	1:1
B.	Learning Facilities & Infrastructure			

1	Lecture Room	8x12m equipped with the equipment and internet		1:25
2	Shelves	Wooden/metal	5	
3	Locker	Wooden /metal	2	
4	Cabinet	Metal	1	
C.	**Consumable Materials**			
1	Blank disk	CD-R/CD-RW DVD-R/DVD-RW	5	1:5
2	Stationery	White board marker, printing paper & ink		
3	Hardware	• RJ-45,UTPCAT6E • Electrical tape ,PBC pipe • Breaker • Outlet • Isolated wire		
D.	**Tools and Equipment**			
1	Applications	• Commercial application software • Organization specific software • Office package • Graphic • Database • Oracle, Sybase, Postgres SQL, Microsoft SQL Server, MS Access, ingress, DB2, DB4, Informix, MSQL, MYSQL, SQL Server • Communication packages		
2	Hardware	• DSL modems(internal, external, wireless) • NIC(internal, external, wireless) • Hub, switch, bridge, router, gateway		
3	Operating system	• Linux, Mac Os, windows XP or above • Window server 2003 or above		
4	Asp ISP	• DSL • ADSL • T1&T2 • PSTN for dialup modems • CDMA 1x • Private lines • VPN • Data and voice • Current internet technologies		
5	UPS	750volt meter		
6	Divider	American socket supporter		

7	Desktop computer Including its peripherals	• w/15 inch flat screen monitor and 120 hard disk RAM size 1GB,3ghz ,& above		
8	Workstation /server/	• 500harddisk,2ghz RAM,4.0dualquore processor		
9	Multimedia projector	LCD		
10	Printer	Capability of printing A3and color printing capability (DeskJet)		
11	Network toolkit	Set/case		
12	Maintenance toolkit	Set/caasse		
13	Scanner	Hp 2055		
14	Webcam	8 and Above pixel		
15	Flash disk	Scan disk16GB		

ICT ITS4 M07 0811 Building Internet Infrastructure				
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A.	**Learning Materials**			
1.	TTLM	Teacher's made handouts	25	1:1
2.	Textbooks		25	1:1
3.	Reference Books			1:10
4.	Journals/Publication/Magazines	ICT journals(Monthly)		1:25
B.	**Learning Facilities & Infrastructure**			
1	Lecture Room	8x12m; equipped with IT equipment and internet		1:25
2.	Library	Multipurpose		
3.	Shelves	wooden or metal	5	
4.	Locker	wooden or metal	2	
5.	Cabinet	metal	1	
C.	**Consumable Materials**			
1.	Blank Disk	CD-R/RW DVD/CDRW	5	1:5
2.	Stationery	Whiteboard marker, printing paper, printer ink, flash disk; UTP cable cat 6e; RJ -45 RJ-11		
D.	**Tools and Equipment**			
2	Applications	• commercial software applications; • organization-specific software; • communication packages	installed for every desktop	All computers
3	Servers	• Server windows • Linux server		

4	Operating systems	Any operating system that has multi-user ability – • Linux, Mac OS, Windows XP or above		
5	Gateways	• internal, external, and wireless modems • ADSL modems, Server, Router, Hub, switch, Bridge, Router, Repeater, Wireless NIC		
6	ASP ISP	• Broadband Internet • Dialup • PSTN for dial-up modems • CDMA 1X • EV-DO • private lines • VPN • data and voice • Current Internet Technologies		
7	UPS	750 Volt Ampere		
8	Divider	American socket supporter	25	1:1
9	Desktop Computer including its peripherals	w/15 inch flat monitor and 120 GB Hard disk; RAM size 1GB; 3Gz or above	13	1:2
10	Multimedia projector	LCD	25	1:1
11	Printer	Capability of A3 printing w/ color printing capability	1	Per section
12	Network toolkit	set/case	1	Per section
13	Maintenance toolkit	set/case	5	1:5

ICT ITS4 M08 0811 Developing Website Information Architecture				
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A.	**Learning Materials**			
1	TTLM	Teacher's made handouts	25	1:1
2	Textbooks		25	1:1
3	Reference Books	Service Level Agreement	3	1:10

4	Journals/Publication/Maga zines	ICT journals(Monthly)	3	1:10
B.	**Learning Facilities & Infrastructure**			
1	Lecture Room	10x15m; equipped with IT equipment and internet	1	1:25
2	Library	Multipurpose	1	1:25
3	Shelves	wooden or metal	5	
4	Locker	wooden or metal	2	
5	Cabinet	metal	1	
C.	**Consumable Materials**			
1	Blank Disk	CD-R/RW ; DVD/CDRW	5	1:4
2	Stationery	• Whiteboard marker, printing paper, printer ink • flash disk • UTP cable cat6e • RJ -45	As required	
D.	**Tools and Equipment**			
1	Databases	Oracle, Sybase, Microsoft SQL server, Ingres, DB2,Informix, MySQL, SQL server	installed for every desktop	All computers
2	Applications	• Uniserver software • Vertirigo software		
3	Servers	• Server windows • Linux server		
4	Operating systems	Any operating system that has multi-user ability, Linux, Mac OS, Windows XP or above		
5	Sample	• E-business website • Business strategy • Client demographics documentation		
6	ASP ISP	• Internet • PSTN for dial-up modems • CDMA 1X • EV-DO • private lines • VPN • data and voice • Current Internet Technologies		
7	UPS	• 750 Volt Ampere	25	
8	Divider	• American socket supporter	13	
9	Desktop Computer including its peripherals	w/15 inch flat monitor and 120 GB Hard disk; RAM size 1GB; 3Gz or above	25	1:1
10	Multimedia projector	LCD	1	Per section
11	Printer	Capability of A3 printing with color printing capability	1	Per section
12	Network toolkit	set/case	5	1:5

13	Maintenance toolkit	set/case	5	1:5

ICT ITS4 M09 0811 Determining Maintenance Strategy				
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A.	*Learning Materials*			
1.	TTLM	Teacher's made handouts	25	1:1
2.	Textbooks		25	1:1
3.	Reference Books			1:10
4.	Journals/Publication/Magazines	ICT journals(Monthly)	As required	1:25
B.	*Learning Facilities & Infrastructure*			
1	Lecture Room	8x12m; equipped with IT equipment and internet		1:25
2.	Library	Multipurpose	1	
3.	Shelves	wooden or metal	5	
4.	Locker	wooden or metal	2	
5.	Cabinet	metal	1	
C.	*Consumable Materials*			
1.	Blank Disk	CD-R/RW and DVD/CDRW	5	1:4
2.	Stationery	Whiteboard marker, printing paper, printer ink and flash disk		
D.	*Tools and Equipment*			
2	Applications	• In-house software • Packaged or customized software	installed for every desktop	All computers
3	Servers	• Server windows • Linux server		
4	Operating systems	Any operating system that has multi-user ability, Linux, Mac OS, Windows XP or above		
5	Hardware	• Modems • Server, Router, Hub, switch, bridge, Brouter, Repeater, Wireless NIC • Workstations, personal computers, connectivity devices		
6	ASP ISP	• the internet • PSTN for dial-up modems • CDMA 1X • EV-DO • private lines • VPN • data and voice • Current Internet Technologies		

7	UPS	750 Volt Ampere		
8	Divider	American socket supporter	25	
9	Desktop Computer including its peripherals	w/15 inch flat monitor and 120 GB Hard disk; RAM size 1GB; 3Gz or above	13	
10	Multimedia projector	LCD	25	1:1
11	Printer	Capability of A3 printing with color printing capability	1	Per section
12	Network toolkit	set/case	1	Per section
13	Maintenance toolkit	set/case	5	1:5

ICT ITS4 M10 0811 Migrating to New Technology				
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A.	Learning Materials			
1	TTLM	Teacher's made handouts	25	1:1
2	Textbooks		25	1:1
3.	Reference Books			
4	Journals/Publication/Magazines	ICT journals(Monthly)	3	1:10
B.	Learning Facilities & Infrastructure			
1	Lecture Room	10x15m; equipped with IT equipment and internet	1	1:25
2	Library	Multipurpose		
3	Shelves	wooden or metal	5	
4	Locker	wooden or metal	2	
5	Cabinet	metal	1	
C.	Consumable Materials			
1	Blank Disk	CD-R/RW and - DVD/CDRW	5	1:4
2	Stationery	• Whiteboard marker, printing paper, printer ink • flash disk • UTP cable cat6e • RJ -45		
D.	Tools and Equipment			
1	Databases	Oracle, Sybase, Microsoft SQL server, Ingres, DB2,Informix, MySQL, SQL server\	installed for every desktop	All computers
2	Applications	• commercial software applications; • organization-specific software; • Word processing (ms-word,…) • spreadsheet(ms-excel) • database,		

		• graphic • communication packages		
3	Servers	• Server windows • Linux server		
4	Operating systems	Any operating system that has multi-user ability, Linux, Mac OS, Windows XP or above		
5	Gateways	• internal, external, and wireless modems • ADSL modems, Server, Router, Hub, switch, bridge, Brouter, Repeater, Wireless NIC		
6	ASP ISP	• Internet • PSTN for dial-up modems • CDMA 1X • EV-DO • private lines • VPN • data and voice • Current Internet Technologies		
7	UPS	750 Volt Ampere	25	
8	Divider	American socket supporter	13	
9	Desktop Computer including its peripherals	w/15 inch flat monitor and 120 GB Hard disk; RAM size 1GB; 3Gz or above	25	1:1
10	Multimedia projector	LCD	1	1:25
11	Printer	Capability of A3 printing with color printing capability	5	1:5
12	Network toolkit	set/case	5	1:5
13	Maintenance toolkit	set/case	5	1:5
14	ATX Motherboard	Socket type/slot type, FSB 800MPS	5	1:5
15	CPU	Socket type/slot type,3.4 dual core	5	1:5
16	Tower case	ATX	5	1:5
17	RAM	SDRAM 2GB and DDRAM 2GB	4	1:6
18	Hard disk	250GB	5	1:5
19	DVD RW	Combo or similar	5	1:5

		ICT ITS4 M11 0811 **Establishing Quality Standards**		

Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A.	*Learning Materials*			
1.	Service manual, schematic diagram/parts list	Manuals	25	1:1
2.	Operating instructions/User's/Owner's manual		25	1:1
B.	*Learning Facilities & Infrastructure*			

1	Lecture Room	8x12m equipped with the equipment and internet		1:25
2	Shelves	Wooden/metal	5	
3	Locker	Wooden /metal	2	
4	Cabinet	metal	1	
C.	*Consumable Materials*			
1.	Blank disk	CD-R/CD-RW and DVD-R/DVD-RW	5	1:5
2.	Stationery	White board marker, printing paper & ink		
D.	*Tools and Equipment*			
1.	Applications	• Commercial application software • Organization specific software • Office package • Graphic • Database • Communication packages		
2.	Operating system	Linux, Mac Os, windows XP or above		
3.	Asp ISP	• DSL • ADSL • T1&T2 • PSTN for dialup modems • CDMA 1x • Private lines • VPN • Data and voice • Current internet technologies		
4.	UPS	750volt meter		
5.	Divider	American socket supporter		
6.	Desktop computer Including its peripherals	w/15 inch flat screen monitor and 120 hard disk RAM size 1GB,3ghz ,& above		
7.	Multimedia projector	LCD		
8.	Printer	Capability of printing A3and color printing capability (DeskJet)		
9.	Network toolkit	Set/case		
10.	Maintenance toolkit	Set/case		
11.	Scanner	HP 2055		
12.	Webcam	8 and Above pixel		
13.	Flash disk	Scan disk16GB		

ICT ITS4 M12 0811   Utilizing Specialized Communication Skills

Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A.	*Learning Materials*			
1	Manuals	Service manual, schematic diagram/parts list; Operating instructions/User's/Owner's manual	25	1:1
2	TTLM	Teacher made hand-outs	25	1:1
B.	*Learning Facilities & Infrastructure*			
1	Lecture Room	8x12m equipped with the equipment and internet		1:25
2	Shelves	Wooden/metal	5	
3	Locker	Wooden /metal	2	
4	Cabinet	metal	1	
C.	*Consumable Materials*			
1	Blank disk	CD-R/CD-RW and DVD-R/DVD-RW	5	1:5
2	Stationery	White board marker, printing paper & ink		
D.	*Tools and Equipment*			
1	Applications	• Commercial application software • Organization specific software • Office package • Graphic • Database • Communication packages		
2	Operating system	Linux, Mac Os, windows XP or above		
3	Asp ISP	• DSL • ADSL • T1&T2 • PSTN for dialup modems • CDMA 1x • Private lines • VPN • Data and voice • Current internet technologies		
4	UPS	750volt meter		
5	Divider	American socket supporter		
6	Desktop computer Including its peripherals	w/15 inch flat screen monitor and 120 hard disk RAM size 1GB,3ghz ,& above		
7	Multimedia projector	LCD		
8	Printer	Capability of printing A3and color printing capability (Desk Jet)		
9	Network toolkit	Set/case		

10	Maintenance toolkit	Set/case		
11	Scanner	HP 2055		
12	Webcam	8 and Above pixel		
13	Flash disk	Scan disk16GB		

ICT ITS4 M13 0811 Developing Team and Individuals				
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A.	*Learning Materials*			
1	Manuals	Service manual, schematic diagram/parts list; Operating instructions / User's / Owner's manual	25	1:1
2	TTLM	Teacher made handouts	25	1:1
B.	*Learning Facilities & Infrastructure*			
1	Lecture Room	8x12m equipped with the equipment and internet		1:25
2	Shelves	Wooden/metal	5	
3	Locker	Wooden /metal	2	
4	Cabinet	metal	1	
C.	*Consumable Materials*			
1.	Blank disk	CD-R/CD-RW DVD-R/DVD-RW	5	1:5
2	Stationery	White board marker, printing paper & ink		
D.	*Tools and Equipment*			
1	Applications	• Commercial application software • Organization specific software • Office package • Graphic • Database • Communication packages		
2	Operating system	Linux, Mac Os, windows XP or above		
3	Asp ISP	• DSL • ADSL • T1&T2 • PSTN for dialup modems • CDMA 1x • Private lines • VPN • Data and voice • Current internet technologies		

4	UPS	750volt meter		
5	Divider	American socket supporter		
6	Desktop computer Including its peripherals	w/15 inch flat screen monitor and 120 hard disk RAM size 1GB,3ghz ,& above		
7	Multimedia projector	LCD		
8	Printer	Capability of printing A3and color printing capability (Desk Jet)		
9	Network toolkit	Set/case		
10	Maintenance toolkit	Set/case		
11	Scanner	HP 2055		
12	Webcam	8 and Above pixel		
13	Flash disk	Scan disk16GB		

ICT ITS4 M14 0811 Managing and Maintain Small/Medium Business Operation				
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A.	*Learning Materials*			
1	TTLM	Teacher's made handouts	25	1:1
2	Textbooks		25	1:1
3	Reference Books			
4	Journals/Publication / Magazines	ICT journals(Monthly)	3	1:10
B.	*Learning Facilities & Infrastructure*			
1	Lecture Room	10x15m; equipped with IT equipment and internet	1	1:25
2	Library	Multipurpose		
3	Shelves	wooden or metal	5	
4	Locker	wooden or metal	2	
5	Cabinet	metal	1	
C.	*Consumable Materials*			
1	Blank Disk	CD-R/RW and DVD/CDRW	5	1:4
2	Stationery	• Whiteboard marker, printing paper ink • flash disk		
D.	*Tools and Equipment*			
1	Applications	• Commercial application software • Organization specific software • Office package • Graphic • Database		

		• Communication packages		
2	Operating system	Linux, Mac Os, windows XP or above		
3	Asp ISP	• DSL • ADSL • T1&T2 • PSTN for dialup modems • CDMA 1x • Private lines • VPN • Data and voice • Current internet technologies		
4	UPS	750volt meter		
5	Divider	American socket supporter		
6	Desktop computer Including its peripherals	w/15 inch flat screen monitor and 120 hard disk RAM size 1GB,3ghz ,& above		
7	Multimedia projector	LCD		
8	Printer	Capability of printing A3and color printing capability (Desk Jet)		
9	Network toolkit	Set/case		
10	Maintenance toolkit	Set/case		
11	Scanner	HP 2055		
12	Webcam	8 and Above pixel		
13	Flash disk	Scan disk16GB		

2.3 Occupational Map

Electrotechnology - Communication Sector

Information and Communication Technology Sub-sector

Level V	**IT Service Management**
Level IV	**IT Service Management**
Level III	**Hardware and Network Servicing** — **Web and Multi Media Designing and Development** — **Database**
Level II	**IT Support Service**
Level I	**IT Support Service**
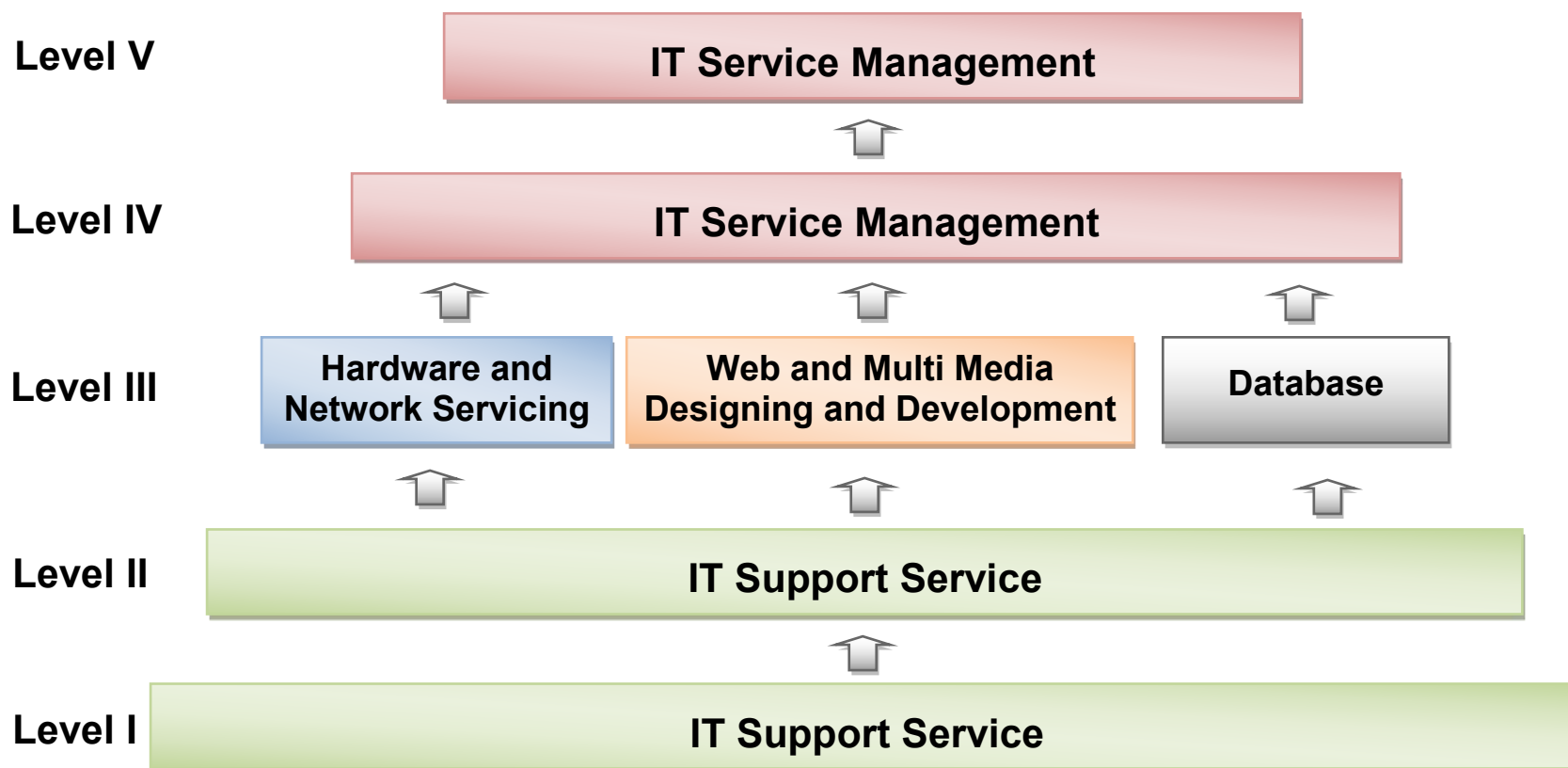
Edited By

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4	Husien Kassa	W/ro Siheen PTC
5	Abdu Yimam	W/ro Siheen PTC
6	Tewodros Bogale	Kombolcha PTC
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3	Kedir Adege	Kombolcha PTC
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5	Selamyihun Kiflu	Admas College (Dessie)