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Ministry of Labor and Skills

Web Development and Database Administration

Level-IV



Based on December 2021 Version-III Occupational standard (OS)

November, 2023

Addis Ababa, Ethiopia

Acknowledgment

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Preface

The reformed 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 TVET-System, curricula and curriculum development play an important role with regard to quality driven comparable TVET-Delivery. The Curricula help to facilitate the training 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).

This curriculum has been developed by a group of professional experts from different Regional TVET Bureaus, colleges, Industries, Institutes and universities based on the occupational standard for **Web Development and Database Administration Level IV**.

The curriculum development process has been actively supported and facilitated by **Ministry of Labor and Skills**.

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1. TVT-Program Design

1.1 TVT-Program Title: Web Development and Database Administration Level IV

1.2 TVT-Program Description

The Program is designed to develop the necessary knowledge, skills and attitude of the trainees to the standard required by the occupation. The contents of this program are in line with the occupational standard. The Trainees who successfully completed the Program will be qualified to work as a **Web developer and Database Administrator** with competencies elaborated in the respective OS. Graduates of the program will have the required qualification to work in the **Industry** sector in the field of **Web development and database administration.**

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 Estimate cost for Web and database projects, Monitor and Administer Database, Apply Object-Oriented Programming Language Skills, Use Advanced Structured Query Language, Determine Suitability of Database Functionality and Scalability, Perform Database System Test, Complete Database Backup and Recovery , Create Technical Documentation, Produce basic Server-side scrip for dynamic web page and Maintain Website Information standard in accordance with the performance criteria and evidence guide described in the OS.

1.3 TVT-Program Structure

Unit of Competence		Module Code & Title		Module Unit	Duration (In Hours)
EIS WDDBA4 03 1221	Apply Object-Oriented Programming Language Skills	EIS WDDBA4 M01 0322	Applying Object-Oriented Programming Language Skills	• Basic language syntax and layout • Basic OO principles • Debug code • Document activities • Test code	80
EIS WDDBA4 05 1221	Determine Suitability of Database Functionality and Scalability	EIS WDDBA4 M02 0322	Determining Suitability of Database Functionality and Scalability	• Functions and features of database management system • Gather data to determine database functionality • Critical database requirements. • Report preparation	40
EIS WDDBA4 04 1221	Use Advanced Structured Query language	EIS WDDBA4 M03 0322	Using Advanced structured Query language	• Advanced SQL statements • SQL statements with functions • SQL statements with aggregation and filtering	100
EIS WDDBA4 09 1221	Produce basic Server-side scrip for dynamic web page	EIS WDDBA4 M04 0322	Producing basic Server-side scrip for dynamic web page	• Web Document Requiring server-side dynamic interaction • Server-Side Scripts • Produce Web Documents • Test Scripts and Debug • Set Up Security	100

EIS WDDBA4 02 1221	Monitor and Administer Database	EIS WDDBA4 M05 0322	Monitoring and Administer Database	• Database startup • Database management • Database access management	40
EIS WDDBA4 06 1221	Perform Database System Test	EIS WDDBA4 M06 0322	Database System Testing	• Test Preparation and Planning • Conducting test • Reporting Quality-Affecting Issues	24
EIS WDDBA4 07 1221	Complete Database Backup and Recovery	EIS WDDBA4 M07 0322	Database Backup and Recovery	• Database Architecture • Database Backup Methods • Database Recovery Points & Procedures	24
EIS WDDBA4 10 1221	Maintain Website Information standard	EIS WDDBA4 M08 0322	Maintaining Website Information standard	• Organizational content information for website publication • Navigation links and payment details • Disclosure of policies and services • Product or service conditions communication • Customer service support	40
EIS WDDBA4 08 1221	Create Technical Documentation	EIS WDDBA4 M09 0322	Creating Technical Documentation	• Documentation needs identification • Design documentation • Develop documentation • Evaluating and edit documentation	60
EIS WDDBA4 01 1221	Estimate cost for Web and database	EIS WDDBA4 M10 0322	Estimate cost for Web and database projects	• Introduction of Project Cost Estimation • Basics of Website and Database	

projects		Projects • Factors Influencing Cost Estimation • Cost Estimation Methods • Cost Components Breakdown • Cost Estimation Tools and Techniques	60

*The time duration (Hours) indicated for the module should include all activities in and out of the TVT institution.

1.4 Duration of the TVET-Program

The Program will have duration of **558** hours including the on school/ Institution training and on-the-job practice or cooperative training time. Such cooperative training based on realities of the industry, nature of the occupation, location of the TVET institution, and other factors will be considered in the training delivery to ensure that trainees acquire practical and workplace experience.

No	Unit competency	TVET Institution training		Cooperative training	Total hours	Remarks
		Theory	Practical			
1.	Apply Object-Oriented Programming Language Skills	24	32	24	**80**	
2.	Determine Suitability of Database Functionality and Scalability	16	12	12	**40**	
3.	Use Advanced Structured Query Language	30	40	30	**100**	
4.	Produce basic Server-side scrip for dynamic web page	30	40	30	**100**	
5.	Monitor and Administer Database	12	16	12	**40**	
6.	Database System Testing	17		7	**24**	
7.	Database Backup and Recovery	7	10	7	**24**	
8.	Website Information standard	28		12	**40**	
9.	Create Technical Documentation	20	10	20	**50**	
10.	Estimate cost for Web and database projects	18	18	24	**60**	

1.5 Qualification Level and Certification

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

The trainee can exit after successfully completing the modules in one level and will be awarded the equivalent institutional certificate on the level completed. However, only institutional certificate of training accomplishment will be awarded.

1.6 Target Groups

Any citizen with disability who meets the entry requirements under items 1.7 and capable of participating in the training 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 directive of the **Ministry of Labor and Skills**.

1.8 Mode of Delivery

This TVT-Program is characterized as a formal Program on middle level technical skills. The mode of delivery is co-operative training. The time spent by the trainees in the real work place/ industry will give them enough exposure to the actual world of work and enable them to get hands-on experience.

The co-operative approach will be supported with school-based lecture-discussion, simulation and actual practice. These modalities will be utilized before the trainees are exposed to the industry environment. Hence based on the nature of the occupation, location of the TVT institutions, and interest of the industry alternative mode of cooperative training such as apprenticeships, internship and traineeship will be employed. In addition, in the areas where industry is not sufficiently available the established production and service centers/learning factories in TVT institutions will be used as cooperative training places. The Training-Institution and identified companies have forged an agreement to co-operate with regard to the implementation of this program.

1.9 Institutional Assessment

Two types of evaluation will be used in determining the extent to which training outcomes are achieved. The specific training 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 training modules and form part of the training process. Formative evaluation provides the trainee with feedback regarding success or failure in attaining training outcomes. It identifies the specific training errors that need to be corrected, and provides reinforcement for successful performance as well. For the teacher, 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 program 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 of institutional Assessment implementation guidelines.

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

1.10 TVT Teachers Profile

The teachers conducting this particular TVT Program are B Level and above who have satisfactory practical experiences or equivalent qualifications.

1.11 Training and Assessment Methodology

The program is delivered using a variety of training methods. The table below shows training and assessment methodology for non-impaired trainees and with reasonable adjustment for impaired trainees. In addition, as per the nature of the module title the trainer can use recommended and possible training and assessment methodology.

Learning Methods:				
For none impaired trainees	**Reasonable Adjustment for Trainees with Disability (TWD)**			
	Low Vision	**Deaf**	**Hard of hearing**	**Physical impairment**
Lecture-discussion	❖ Provide large print text ❖ Prepare the lecture in Audio/video ❖ Organize the class room seating arrangement to be accessible to trainees ❖ Write short notes on the black/white board using large text ❖ Make sure the luminosity of the light of class room is kept ❖ Use normal tone of voice ❖ Encourage trainees to record the lecture in audio format ❖ Provide Orientation on the physical feature of the work shop ❖ Summarize main points	❖ Assign sign language interpreter ❖ Arrange the class room seating to be conducive for eye-to-eye contact ❖ Make sure the luminosity of the light of class room is kept ❖ Introduce new and relevant vocabularies ❖ Use short and clear sentences ❖ Give emphasis on visual lecture and ensure the attention of the trainees ❖ Avoid movement during lecture time ❖ Present the lecture in video format	❖ Organize the class room seating arrangement to be accessible to trainees ❖ Speak loudly ❖ Ensure the attention of the trainees ❖ Present the lecture in video format ❖ Ensure the attention of the trainees	❖ Organize the class room seating arrangement to be accessible for wheelchairs users. ❖ Facilitate and support the trainees who have severe impairments on their upper limbs to take note ❖ Provide Orientation on the physical feature of the work shop

		❖ Summarize main points		
Demonstration	❖ Conduct close follow up ❖ Use verbal description ❖ Provide special attention in the process of guidance ❖ facilitate the support of peer trainees ❖ Prepare & use simulation	❖ use Sign language interpreter ❖ Use video recorded material ❖ Ensure attention of the trainees ❖ Provide structured training ❖ Show clear and short method ❖ Use gesture ❖ provide tutorial support (if necessary)	❖ Illustrate in clear & short method ❖ Use Video recorded material ❖ Ensure the attention of the trainees ❖ provide tutorial support (if necessary)	❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipment's/ machines ❖ Assign peer trainees to assist ❖ Conduct close follow up ❖ provide tutorial support (If necessary
Group discussion	❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with another group member ❖ Brief the thematic issues of the work	❖ Use sign language interpreters ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with another group member	❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with another group member ❖ Inform the group members to speak loudly	❖ Introduce the trainees with their peers
Exercise	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/practical training ❖ Introduce new and relevant vocabularies	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/ practical training	❖ Assign peer trainees ❖ Use additional nominal hours if necessary

Individual assignment	❖ prepare the assignment questions in large text ❖ Encourage the trainees to prepare and submit the assignment in large texts ❖ Make available recorded assignment questions ❖ Facilitate the trainees to prepare and submit the assignment in soft or hard copy	❖ Use sign language interpreter ❖ Provide briefing /orientation on the assignment ❖ Provide visual recorded material	❖ Provide briefing /orientation on the assignment ❖ Provide visual recorded material	

Assessment Methods:				
Interview		❖ Use sign language interpreter ❖ Ensure or conform whether the proper communication was conducted with the trainee through the service of the sign language interpreter ❖ Use short and clear questioning ❖ Time extension	❖ Speak loudly ❖ Using sign language interpreter if necessary	❖ Use written response as an option for the trainees having speech challenges
Written test	❖ Prepare the exam in large texts ❖ Use interview as an option if necessary ❖ Prepare the exam in audio format ❖ Assign human reader ❖ (if necessary) ❖ Time extension	❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers ❖ Avoid essay writing ❖ Time extension	❖ Prepare the exam using short sentences, multiple choices, true or false, matching and short answers if necessary.	❖ Use oral response as an option to give answer for trainees having severe upper limb impairment ❖ Time extension for trainees having severe upper limb impairment

Demonstration/Observation	❖ Brief the instruction or provide them in large text ❖ Time extension	❖ Use sign language interpreter ❖ Brief on the instruction of the exam ❖ Provide activity-based/ practical assessment method ❖ Time extension	❖ Provide activity-based assessment ❖ Brief on the instruction of the exam ❖ Use loud voice ❖ Time extension	❖ Provide activity-based assessment ❖ Conduct close follow up ❖ Time extension

2. Module design

MODULE TITLE and CODE :	EIS WDDBA4 M01 0322 Object-oriented programming language
NOMINAL DURATION :	80 Hours

MODULE DESCRIPTION: This module defines the competency 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 trainee will be able to:

- Apply basic language syntax and layout
- Apply basic OO principles in the target language
- Perform Debugging code
- Document activities
- Identify and perform Test code

MODULE CONTENTS:

Unit One: Basic language syntax and layout

1.1 Introduction to Object Oriented Programming language

1.2 Basic language syntax rules

1.3 Different Types Object Oriented Programming Languages

1.3.1. Start coding with python

1.3.2. Python Data-types, Operators and Expression

1.4 Sequence, Selection and Iteration constructs

1.5 Modular Programming Approach

1.6 Arrays and Arrays of objects

Unit Two: Basic OO principles

2.1 Primitive Member Variables in Class Implementation

2.2 Flexible Object Construction

2.3 User-Defined Aggregation in Class Design

2.4 Navigation Hierarchical Inheritance

2.5 Code Extension through Versatile Polymorphism

Unit Three: Debug code

3.1 Integrated Development Environment (IDEs)

3.2 Program Debugging Techniques

Unit Four: Document activities

4.1 Crafting Maintainable Object-Oriented Code

4.2 Documentation of Object-Oriented Code

Unit Five: Test code

5.1 Simple Tests in Object-Oriented Programming

5.2 Documentation of performed test

5.3 Code Corrections and Documentation

ASSESSMENT CRITERIA:

Unit One: Apply basic language syntax and layout

- Understand Basics of Object-Oriented Programming language
- Knows GUI to interact with operator
- Identify Basic language syntax rules and best practices
- Perform with Data-types, Operators and Expression
- Perform Basics of Sequence, Selection and Iteration constructs
- Apply Modular Programming Approach
- Identify Arrays and Arrays of objects

Unit Two: Apply basic OO principles in the target language

- Implementation of Primitive Member Variables in Class

- Construction of Flexible Object
- Implementation of User-Defined Aggregation in Class Design
- Navigate Hierarchical Inheritance
- Identification of Code Extension through Versatile Polymorphism

Unit Three: Debug code

- Use Integrated Development Environment (IDEs)
- Use Program Debugging Techniques

Unit Four: Document activities

- Follow Crafting Maintainable Object-Oriented Code
- Document Object-Oriented Code

Unit Five: Test code

- Develop and Conduct Simple Tests in Object-Oriented Programming
- Perform test
- Make Corrections in Code and Documentation

MODULE TITLE and CODE :	EIS WDDBA4 M02 0322	Determining the suitability of database functionality and scalability
NOMINAL DURATION :	**40 Hours**	

MODULE DESCRIPTION : This module defines the competence required to identify current and future business requirements for a database.

LEARNING OUTCOMES

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

- Understand business requirement
- Describe database functionality
- Explain database scalability
- Identify database functionality and scalability requirements.
- Analyze the gab of the database features
- Generate report

MODULE CONTENTS:

Unit One: Functions and features of database management system

1.1. Introduction to DBMS
1.2. Functions of DBMS
1.3. Applications of DBMS

Unit Two: Gather data to determine database functionality

2.1. Business requirement
2.2. Database objectives with business requirements.
2.3. Design database
2.4. Organization business model
2.5. Document preparation
2.6. Getting client confirmation

Unit Three: Critical database requirements.

3.1. Database capacity

3.2. Scalability parameters

3.3. Comparing database features

3.4. Database features gap documentation.

Unit Four: Report preparation

4.1. Database features documentation

4.2. Report submission

ASSESSMENT CRITERIA:

Unit one: Functions and features of database management system

- Understand database management system
- Identify DBMS functions
- Describe applications of DBMS

Unit Two: Gather data to determine database functionality

- Identify business requirements
- Confirm database objectives in line with defined requirements
- Analyze database to identify the business rules, entities and relationships.
- Identify existing and proposed business models
- Document existing database and environment according to work place procedure.
- Confirm database functionality with client.

Unit Three: Critical database requirements.

- Identify reserve and long-term capacity of the database
- Identify implications for the system architecture, data models, data structures, and hardware and software requirements for scalability.
- Compare functionality and scalability features of the database.
- Determine and document gap between the database features

Unit Four: Report preparation

- Document functionality and scalability of database.
- Submit report on database functionality and scalability to client for review.

MODULE TITLE and CODE :	EIS WDDBA4 M03 0322	Advanced Structured Query Language
NOMINAL DURATION :	**100 Hours**	

MODULE DESCRIPTION : This module defines the competency required to use advanced structured query language (SQL) to manipulate database structures with associated data in a relational database and explore advanced concepts such as subqueries and functions.

LEARNING OUTCOMES

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

- Use the WHERE clause to filter data based on specific conditions in SQL statements.
- Gain proficiency in using the ORDER BY clause to sort query results
- Master the concepts and techniques of joining multiple tables in SQL queries to retrieve related data
- Use functions and operators in SQL to manipulate data
- Use the HAVING clause to filter grouped data based on conditions in SQL statements.

MODULE CONTENTS:

Unit One: Advanced SQL statements

1.1. DBMS fundamentals
1.2. Database tools and equipment
1.3. Functions of where clause
1.4. Functions of order by clause
1.5. Boolean operators
1.6. Elimination of duplicated and null values
1.7. Functions of join operator
1.8. Functions of union operator
1.9. Data control language
1.10. Transaction control language

Unit Two: SQL statements with functions

2.1. Arithmetic operations

2.2. String functions and operators

2.3. Mathematical functions

2.4. Date functions

Unit Three: SQL statements with aggregation and filtering

3.1. Function of group by statement

3.2. Function of having clause

3.3. Backup database

ASSESSMENT CRITERIA:

Unit One: Advanced SQL statements

- Understand DBMS fundamentals
- Identify information-based database tools and equipment
- Use comparison operators in the 'where' clause to compare numeric, character, string, date and time data
- Retrieve specific columns using specific query and clause to sort query output
- Use Boolean operators with the correct precedence
- Suppress duplicate values from query results and exclude null values from a query result
- Retrieve data from two or more tables with join operator
- Combine the result-set of two or more SELECT statements using union
- Grant and revoke a database
- Execute TCL

Unit Two: SQL statements with functions

- Execute arithmetical operations with the correct precedence.
- Use string functions and operators to obtain the required query output

- Execute mathematical functions to obtain the required output
- Use date functions to obtain the required output

Unit Three: SQL statements with aggregation and filtering

- Use 'Group by' to aggregate data by multiple columns
- Aggregate data in the query output
- Filter aggregated data using the 'having' clause
- Backup a database

MODULE TITLE and CODE :	EIS WDDBA4 M04 0322 Producing server-side script for dynamic web pages
NOMINAL DURATION :	**100 Hours**

MODULE DESCRIPTION : This module describes the outcome skills and knowledge required to produce server-side scripts for dynamic web pages, using a range of relevant features from different appropriate languages.

LEARNING OUTCOMES

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

- Identify and define the necessary dynamic functionalities required for a web document.
- Design a web document and produce server-side code
- Write XHTML code considering accessibility standards
- Test web documents iteratively
- Configure server software to minimize potential database attacks, enhancing overall security.

MODULE CONTENTS:

Unit One: Web Document Requiring server-side dynamic interaction

1.1. Dynamic Functionality a website

1.2. Web Scripting Language

1.3. Web Document Requirements

Unit Two: Server-Side Scripts

2.1. Development Environment

2.2. Basic syntax of Server-side scripts

2.2.1. Variables and data types

2.2.2. Control structures

2.2.3. Functions and procedures

2.3. Forms and user input

2.4. Working with Database

2.5. Security Features in web development

Unit Three: Produce Web Documents

3.1. Introduction to XHTML

3.2. Write Accessible XHTML

3.3. Server-Side Scripts to XHTML Standards

Unit Four: Test Scripts and Debug

4.1. Iterative Testing for Functionality

4.2. Documentation and Submission for Approval

Unit Five: Set Up Security

5.1. Permission management for error prevention

5.2. Server security for database attack prevention

ASSESSMENT CRITERIA:

Unit One: Web Document Requiring server-side dynamic interaction

- Successful identification and articulation of dynamic functionalities.
- Understanding of client-side technologies.
- Understanding of server-side technologies.
- Ability to analyse and design server-side solutions.
- Accurate identification and documentation of comprehensive web document requirements.

Unit Two: Server-Side Scripts

- Successful setup of a development server.
- Effective design and implementation of server-side code.
- Proficient retrieval of data from external sources.
- Successful insertion, updating, and deletion of entries from an external data source.
- Proper validation of input boxes.
- Correct implementation of password encryption.

- Successful implementation of scripts for session management and secure login.
- Effective management of cookies.

Unit Three: Produce Web Documents

- Production of XHTML code meeting accessibility standards.
- Appropriate implementation of server-side scripts conforming to current XHTML standards.

Unit Four: Test Scripts and Debug

- Thorough and iterative testing resulting in correct functionality.
- Accurate and comprehensive documentation submission for approval.

Unit Five: Set Up Security

- Accurate determination and implementation of necessary permissions.
- Successful configuration of server software for enhanced database security.

MODULE TITLE and CODE :	EIS WDDBA4 M05 0322 Database Monitoring and Administration
NOMINAL DURATION :	**40 Hours**

MODULE DESCRIPTION: This unit defines the competency required to manage, monitor and administer a database.

LEARNING OUTCOMES

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

- Understand principles of database
- Configure the system for effective database startup
- Implement data dictionary compilation and verify data structures
- Monitor network server logs for unauthorized access and security breaches
- Manage database access, including allocation or removal of access privileges
- Update data according to organizational guidelines
- Verify the storage and retrieval capability of recent database backups

MODULE CONTENTS:

Unit one: Database startup

1.1. Principles of databases

1.2. System configuration for database startup

1.3. Monitoring irregularity for database startup and operation

Unit Two: Database management

2.1. Data Dictionary Compilation and Structure Verification

2.2. Data Integrity Constraint Maintenance

2.3. Creation and design of indexes and multiple-field keys

2.4. Database Monitoring Lock Options

2.5. Backup Verification and Retrieval

2.6. Monitoring and Resizing of Storage Resources

2.7. Evaluation of Organizational Guidelines for Data Updates

Unit Three: Database access management

3.1. Access Privilege Management

3.2. Monitor network Server Logs

3.3. Manage system resources

ASSESSMENT CRITERIA:

Unit One: Database startup

- Understand principles of database
- Configure system settings necessary for database startup
- Understand and implement hardware and software requirements for the database
- Monitor Database Start-up and Operations

Unit Two: Database management

- Compile a comprehensive data dictionary
- Understand data relationships and dependencies
- Understand the importance of data integrity for overall system reliability
- Create and manage multiple-field keys
- Troubleshoot issues related to database locks
- Retrieve and restore data from backups
- Monitor data storage usage trends over time
- Adherence to organizational guidelines and policies during data updates

Unit Three: Database access management

- Understand the process of granting and revoking access privileges
- Allocate appropriate access levels based on user roles and responsibilities
- Analyze server logs to identify and understand various types of network activities
- Identify and classify security threats and incidents
- Monitor and assess system resources, including CPU, memory, disk space, and network usage within a database environment

MODULE TITLE and CODE :	EIS WDDBA4 M06 0322 Database System Testing
NOMINAL DURATION :	**24 Hours**

MODULE DESCRIPTION This module 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 will be able to:

- Set up and configure a test environment
- Align the determination of the software life cycle with foundational work principles
- Understand system architecture for effective modularization
- Understand and apply quality benchmarks
- Observe, identify, and articulate potential or existing quality problems
- Apply organization and industry standards effectively in testing processes
- Meticulously review and examine expected results and requirements

MODULE CONTENTS:

Unit one: Test Preparation and Planning

1.1. Test Environment Preparation
1.2. Software Life Cycle Determination
1.3. Test Plan and Tool Selection
1.4. System Modularization for Live Scenario Mirroring
1.5. Gathering and Preparing Logs, Result Sheets
1.6. Announcements for Scheduled Tests
1.7. Preparation of Test Scripts
1.8. Review of Expected Results and Requirements

Unit Two: Conducting test

2.1. Introduction to Backup

2.2. Execution and Documentation of Test Scripts

2.3. Quality Benchmarks and Comparisons

2.4. Organization/Industry Standards Adoption

2.5. Comparison of Actual and Expected Results

Unit Three: Reporting Quality-Affecting Issues

3.1. Database Recovery Points

3.2. Recognition of Potential or Existing Quality Problems

3.3. Identification of potential risks and critical control points

3.4. Identification of Quality Variations

3.5. Reporting quality variations and potential problems

ASSESSMENT CRITERIA:

Unit one: Test Preparation and Planning

- Set up and configure a test environment
- Align the determination of the software life cycle with foundational work principles
- Define a comprehensive test plan
- Understand the system architecture for effective modularization
- Identify and collect relevant logs
- Create and maintain a comprehensive log inventory
- Design comprehensive and effective test cases within the scripts
- Meticulously examine expected results and requirements
- Ensure that expected results adhere to established standards and guidelines

Unit Two: Conducting test

- document the test execution process comprehensively
- Understand quality benchmarks
- Testing outcomes against established quality benchmarks

- Identify standards effectively in the testing processes
- Identify and document discrepancies between actual and expected results.

Unit Three: Reporting Quality-Affecting Issues

- Observe and recognize potential or existing quality problems during the testing process
- Identify and document variations that may impact the quality of the system
- Articulate and express identified variations and potential problems clearly and comprehensively.
- Recognize potential or existing quality problems

MODULE TITLE and CODE :	EIS WDDBA4 M07 0322	Database Backup and Recovery
NOMINAL DURATION :	**24 Hours**	
MODULE DESCRIPTION: This unit defines the competency required to back-up and recover a database		

LEARNING OUTCOMES

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

- Identify and comprehend the file system architecture of a database.
- Recognize potential risks and failure scenarios associated with the database.
- Execute online file backups following organizational standards.
- Utilize advanced techniques such as disk mirroring and RAID configurations.
- Determine strategic recovery points based on backup arrangements and organizational guidelines.

MODULE CONTENTS:

Unit one: Database Architecture

1.1. Architecture of database file system

1.2. Identify Risks and Failure Scenario

1.3. OHS

Unit Two: Database Backup Methods

2.1. Introduction to Backup

2.2. Types of backups

2.3. Backup and Restoration Methods

2.4. Full Offline Backups

2.5. Online File Backups

2.6. Disk Mirroring and RAID Configurations

2.7. Off-site Backup Copies

2.8. Onsite Backup

Unit Three: Database Recovery Points & Procedures

3.1 Database Recovery Points

3.2 Restore Process

3.3 Point-of-Failure Database Restoration

ASSESSMENT CRITERIA:

Unit One: Database Architecture

- Describe the file system architecture of a database.
- Identify potential risks that can impact the database architecture.
- recognize failure scenarios that may occur in a database environment
- Understand OHS

Unit Two: Database Backup Methods

- Define Backup
- Define Types of backups
- evaluate different backup and restoration methods
- Perform a full offline backup of a database
- Adhere to organizational and security standards during the backup process
- Execute online file backups following organizational standards
- set up and utilize disk mirroring
- Establish procedures for creating off-site and On-site backup copies

Unit Three: Database Recovery Points & Procedures

- Identify strategic recovery points based on backup arrangements and organizational guidelines.
- Develop a comprehensive test plan for the restore process
- Minimize downtime during the testing process and address any issues promptly
- Understand the steps involved in point-of-failure restoration

MODULE TITLE and CODE :	EIS WDDBA4 M08 0322 Website Information Standard
NOMINAL DURATION :	**40 Hours**

MODULE DESCRIPTION: This module defines the performance outcomes, skills and knowledge required to establish and maintain the accuracy and usability of information stored on client websites.

LEARNING OUTCOMES

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

- Prepare and publish organizational content and information required by industry for website
- Provide navigation links and payment information
- Ensure disclosure of policies and services
- Communicate product or service conditions and notifications
- Ensure customer service support
- Facilitate group discussion

MODULE CONTENTS:

Unit One: Organizational content information for website publication

1.1 Organizational information validation

1.2 Inclusion of specific organization details

1.3 Website displays compliant privacy, security, and liability

Unit Two: Navigation links and payment details

2.1 Accessibility of links from all sections

2.2 Various payment options on the website

Unit Three: Disclosure of policies and services

3.1 Clear website statement delineating charges

3.2 Warranty details shown before completing orders

3.3 Post-purchase support details directed on the website

3.4 Different website policies

Unit Four: Product or service conditions communication

4.1. Screen display of limitations and legislative restrictions

4.2. Quick order confirmation and cancellation

4.3. Website facilitates prompt communication

Unit Five: Customer service support

5.1. Communication of service standards with users

5.2. Feedback from website users

5.3. Management of user lodging complaints to a website

5.4. Facilitate group discussion

ASSESSMENT CRITERIA:

Unit One: Prepare and publish organizational content and information required by industry for website

- Validate organizational information and seek approval prior to uploading to a website
- Ensure specific details of the organization are made available on the website
- Ensure privacy, security and liability statements are correctly displayed on the website and conform to legislative requirements and web development standards
- Develop and make available organizational information

Unit Two: Provide navigation links and payment information

- Ensure website users have navigation links to access appropriate information regardless of where they are located within the website
- List various payment options on the website

Unit Three: Ensure disclosure of policies and services

- Present a clear website statement outlining charges
- Present warranty information on appropriate screen, prior to finalizing orders
- Provide after-sales support and services information and direct website user to its location

- Ensure website contains policies regarding cancellations, returns and refunds, and associated conditions

Unit Four: Communicate product or service conditions and notifications

- Ensure appropriate screens display limitations and legislative restrictions on who or where goods and services will be sold or shipped to
- Ensure the website provides facilities to confirm orders and cancellations as quickly as possible
- Ensure website provides facilities to communicate to client with minimum delay, details of orders, hold-ups or errors with ordered or cancelled goods or services, information about changed costs or adjustments, and expected date of arrival

Unit Five: Ensure customer service support

- Explain service standards and make them available to all potential and current website users
- Ensure website users have a method for providing feedback on aspects of information held on the website
- Ensure website users have a method for providing feedback on aspects of information held on the website
- Ensure acknowledgements of complaints are transmitted to website users lodging complaints, with a description of what will take place within the organization to address issues raised
- Define and implement mechanisms which enhance effective group interaction

MODULE TITLE and CODE :	EIS WDDBA4 M09 0322 Create Technical Documentation
NOMINAL DURATION :	**50 Hours**

MODULE DESCRIPTION : This module describes the competence required to create technical documentation that is clear to the target audience and easy to navigate. Absolutely done well, technical documentation simplifies complicated ideas into clear and easy to understand guides that even non experts can understand.

LEARNING OUTCOMES

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

- Documentation needs identification
- Design documentation
- Develop documentation
- Evaluating and edit documentation

MODULE CONTENTS:

Unit One: Documentation needs identification

1.1 Identification of documentation requirements

1.2 Interpreting and evaluating documentation requirements

1.3 Industry documentation standards

1.4 Defining and documenting scope of work

1.5 Validation and confirmation of the scope of work

Unit Two: Design documentation

2.1 Identification of information requirements

2.2 Creating document templates

2.3 System functionality review

2.4 Information content meets requirements

2.5 Validation of technical documentation structure

Unit Three: Develop documentation

3.1. Writing technical documentation

3.2. Translating technical terminology

3.3. Applying content format and style

Unit Four: Evaluating and edit documentation

4.1 Submitting technical documentation

4.2 Gathering and analyzing feedback

4.3 Incorporating alterations into the technical documentation

4.4 Editing technical documentation

ASSESSMENT CRITERIA:

Unit One: Documentation needs identification

- Understand and Identification of documentation requirements.
- Analyze and interpreting the documentation needs.
- Understand industry documentation standards
- Determine documentation of the scope of work
- Conduct validation and confirmation of the scope of work

Unit Two: Design documentation

- Identify information requirements
- Create document templates
- Conduct the system review
- Extract content that meets information requirements
- Validate technical documentation structure

Unit Three: Develop documentation

- Write technical documentation
- Translate technical terminology

- Apply content format and style

Unit Four: Evaluating and edit documentation

- Submit technical documentation
- Gather and analyzing feedback
- Incorporate alterations into the technical documentation
- Edit technical documentation

MODULE TITLE and CODE :	EIS WDDBA4 M10 0322	Estimating cost for website and database projects
NOMINAL DURATION :	**60 Hours**	

MODULE DESCRIPTION : This module describes the performance outcome, skills and knowledge required to estimate cost. It involves preparing detailed estimates and quotes and updating schematic drawings and specifications.

LEARNING OUTCOMES

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

- Understand Project Dynamics
- Define Project Scope and Requirements
- Identify Cost Components and Factors:
- Break Down Costs into Components:
- Evaluate Technology Stack Impact
- Apply Estimation Methods Effectively
- Utilize Tools for Cost Estimation
- Develop Proficiency in Cost Estimation
- Enhance Decision-Making Skills

MODULE CONTENTS:

Unit One: Introduction of Project Cost Estimation

1.1 Overview of Project Cost Estimation

1.2 Understanding Project Requirements

1.3 Key Components of Project Scope Definition:

1.4 Importance of Accurate Cost Estimation

Unit Two: Basics of Website and Database Projects

2.1 Understanding Project Scope

2.2 Types of Website and Database Projects

2.3 Differentiating Between Website and Database Components

2.4 Project Life Cycle Overview

Unit Three: Factors Influencing Cost Estimation

3.1 Project Size and Complexity

3.2 Functional Requirements

3.3 Technology Stack

3.4 Resource Requirements (Human, Technological)

3.5 External Dependencies

3.6 Project Risks and Contingencies

Unit Four: Cost Estimation Methods

4.1 Expert Judgment

4.2 Analogous Estimation

4.3 Parametric Estimation

4.4 Three-Point Estimation

4.5 Bottom-Up Estimation

Unit Five: Cost Components Breakdown

5.1 Development Costs

5.2 Infrastructure Costs

5.3 Maintenance and Support Costs

5.4 Contingency Costs

Unit Six: Cost Estimation Tools and Techniques

6.1 Project Management Software

6.2 Cost Estimation Tools

6.3 Version Control Systems

6.4 Collaboration and Communication Tools

ASSESSMENT CRITERIA:

Unit One: Introduction of Project Cost Estimation

- Demonstrate a contextual understanding of project cost estimation within the broader context of website and database projects.
- Communicate the importance and objectives of project cost estimation to their peers or stakeholders.
- Apply the overview concepts to real-world scenarios in website and database projects.
- Identify and categorize key cost elements specific to website and database projects.
- Understanding of how different components of the technology stack contribute to overall project costs.
- Consider and analyze how scalability requirements impact project costs in website and database development.
- Identify and define the scope of website and database projects, considering both functional and non-functional requirements.

Unit Two: Basics of Website and Database Projects

- Demonstrate a foundational understanding of the key concepts related to websites and databases.
- Identify key cost elements associated with developing and maintaining websites and databases.
- Link fundamental concepts to the broader project scope and how they impact cost estimation.
- Communicate how the fundamental aspects of websites and databases translate into cost implications to stakeholders.
- Understand how choices in web architecture impact development and maintenance costs.
- Apply the foundational concepts to real-world cost estimation scenarios in website and database projects.

Unit Three: Factors Influencing Cost Estimation

- Demonstrate a foundational understanding of the key concepts related to websites and databases.
- Identify key cost elements associated with developing and maintaining websites and databases.
- Link fundamental concepts to the broader project scope and how they impact cost estimation.
- Communicate how the fundamental aspects of websites and databases translate into cost implications to stakeholders.
- Understand how choices in web architecture impact development and maintenance costs.
- Apply the foundational concepts to real-world cost estimation scenarios in website and database projects.

Unit Four: Cost Estimation Methods

- Demonstrate a clear understanding of the different cost estimation methods
- Apply various cost estimation methods to different project scenarios.
- differentiate between different cost estimation methods based on their strengths, limitations, and suitability for specific projects
- Communicate the concepts of cost estimation methods to their peers or stakeholders.
- Document and communicate the results of parametric estimation.
- Identify and understand the key parameters involved in parametric estimation methods.
- Use historical data to inform and justify their analogous estimates.
- Demonstrate their ability to compare current projects with past projects to derive cost estimates.
- Identify trends and patterns in historical data for better estimation.
- Identify and justify the selection of experts for judgment in cost estimation.
- Communicate effectively with experts to gather insights for estimation.
- Demonstrate the ability to incorporate feedback from experts into the cost estimation

process.

Unit Five: Cost Components Breakdown

- Demonstrate a comprehensive understanding of the different cost components involved in project estimation.
- Categorize cost components into development and infrastructure costs, maintenance and contingency costs, and other relevant classifications.
- Apply the knowledge of cost components breakdown in different project scenarios.
- Communicate the significance of each cost component to their peers or stakeholders.
- Identify and accurately calculate the different cost associated with various project activities.
- link development costs directly to the project scope and requirements identified
- Identify and justify the inclusion of contingency and reserve funds

Unit Six: Cost Estimation Tools and Techniques

- Demonstrate a clear understanding of the various cost estimation tools available in the industry.
- Communicate the purpose and benefits of different cost estimation tools to their peers or stakeholders.
- Allocate tasks and resources within project management software and estimate associated costs.
- Create and apply formulas to perform cost calculations accurately.
- demonstrate proficiency in using project management software for cost estimation
- Demonstrate effective use of collaboration features within project management software for cost estimation discussions.

2. Annex: Resource Requirements

Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A.	**Learning Materials**			
1.	TTLM	TTTLM prepared by Ministry of Labor and skill	25 pcs	1:1
2.	Reference Books			
2.1	Language of SQL	2nd edition	5	1:5
2.2	Beginning SQL		5	1:5
2.3	Learning PHP, MySQL & JavaScript with jQuery, CSS & HTML5	Robin Nixon,2015, Fourth Edition	5	1:5
B.	**Learning Facilities & Infrastructure**			
1.	Lecture room	31.5 m^2	1	1:25
2.	Whiteboard	240 x 120 cm	1 pcs	1:25
3	Internet	Broadband	1	1:25
4	Library		1	1:25
5	Locker	wooden or metal	1	1:25
C.	**Consumable Materials**			
1.	Blank Disk	- CD-R/RW - DVD-R/RW	25 pcs	1:1
2.	Stationer Materials	- Whiteboard marker, printing paper, printer ink	-	-
3.	Flash disk	8 GB or 16 GB	2	2:25

D.	**Tools and Equipment**			
1.	Laptop	Core i7, Ram 8 GB, Hard disk 1TB	1	1:25
2.	Desktop Computer	17 inch flat monitor and 500 GB Hard disk; RAM size 1GB; 3Gz or above processing speed	25	1:1
3.	Software	Visual Studio and SQL Server 2014 and WAMP and XAMPP	25	1:1
4.	UPS	1000 Volt Ampere	25	1:1
5.	Divider		8	1:3
6.	Projector	LCD	1	1:25
7.	Printer	Any	1	1:25
8.	Operating systems	Windows or Linux or Mac	25	1:1
9.	Back up Hard disk	1TB	1	1:25

3. Developer's Profile

No	Name	Qualification	Field of Study	Organization/ Institution	Mobile number	E-mail
1	Frew Atkilt	M-Tech	Network & Information Security	Bishoftu Polytechnic College	0911787374	frew.frikii@gmail.com
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3	Kalkidan Daniel	BSc	Computer Science	Entoto Polytechnic College	0978336988	kalkidaniel08@gmail.com
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