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Ministry of Labor and Skills

Web Development and Database Administration

Level-III



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

November, 2023

Addis Ababa, Ethiopia

Acknowledgment

Ministry of Labor and Skills wish to extend thanks and appreciation to the many representatives of TVET instructors and respective industry experts who donated their time and expertise to the development of this Curriculum for the TVET program Web development and database administration Level III.

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 III**.

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 III

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 technician** 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 model website technical requirement, model data objects, develop website information architecture, design program logic, develop cascaded style sheets, write content for web page, use basic structured query language, integrate database with a website, monitor and support data conversion, evaluate and select web hosting. 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 WDDBA3 01 1221	Website Technical Requirement modelling	EIS WDDBA3 M01 0322	Modeling website technical requirements	• Website technical environment • Human computer interface • Website hierarchy	30
EIS WDDBA3 02 1221	Model Data Objects	EIS WDDBA3 M02 0322	Modeling Data Object	• Conceptual data model • Normalization • Data model validation	50
EIS WDDBA3 03 1221	Develop Website Information Architecture	EIS WDDBA3 M03 0322	Developing Website Information Architecture	• Identification of Content Needs • Content structure • Navigation system • Showcase and sign off	50
EIS WDDBA3 04 1221	Design Program Logic	EIS WDDBA3 M04 0322	Designing Program Logic	• program logic design • program logic Documentation	50
EIS WDDBA3 05 1221	Develop Cascaded style sheets	EIS WDDBA3 M05 0322	Developing cascading style sheets	• Fundamentals of CSS and User-Centric Design • Web page creations using CSS and HTML • web page and CSS Validation and testing	90

EIS WDDBA3 06 1221	Write Content for Web Page	EIS WDDBA3 M06 0322	Writing Content for Web Page	• Site Content Requirement • Webpage Content Creation • Content Upload	50
EIS WDDBA3 07 1221	Use Basic Structured Query Language	EIS WDDBA3 M07 0322	Using Basic Structured Query Language	• Fundamental Concepts of a relational database • Data definition language • Data manipulation language • Data query language	100
EIS WDDBA3 08 1221	Integrate Database with a website	EIS WDDBA3 M08 0322	Integrating Database with a website	• website to database connection • Retrieve data from database and display on web pages • database user input manipulation	80
EIS WDDBA3 09 1221	Monitor and Support Data Conversion	EIS WDDBA3 M09 0322	Monitoring and Supporting Data Conversion	• Monitor data conversion • Support data conversion	30
EIS WDDBA3 10 1221	Evaluate and select Web Hosting Service	EIS WDDBA3 M10 0322	Evaluating and selecting Web Hosting Service	• ISP Selection • Permanent Online Presence • Technical Requirements for Web hosting • Benchmark and Test Performance	40

*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 **570** 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.	Modeling website technical requirements	20		10	**30**	
2.	Modeling Data Object	15	20	15	**50**	
3.	Developing Website Information Architecture	15	20	15	**50**	
4.	Designing Program Logic	15	20	15	**50**	
5.	Developing cascading style sheets	12	16	12	**90**	
6.	Writing Content for Web Page	15	20	15	**50**	
7.	Using Basic Structured Query Language	30	40	30	**100**	
8.	Integrating Database with a website	24	32	24	**80**	
9.	Monitoring and Supporting Data Conversion	15	10	10	**30**	
10.	Evaluating and selecting Web Hosting Service	30		10	**40**	

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 III**.**

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 ❖ Summarize main points	❖ 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
Demonstrat	❖ Conduct close follow up ❖ Use verbal description	❖ use Sign language interpreter ❖ Use video recorded material	❖ Illustrate in clear & short method ❖ Use Video recorded material	❖ Facilitate and support the trainees having severe upper limbs

ion	❖ Provide special attention in the process of guidance ❖ facilitate the support of peer trainees ❖ Prepare & use simulation	❖ Ensure attention of the trainees ❖ Provide structured training ❖ Show clear and short method ❖ Use gesture ❖ provide tutorial support (if necessary)	❖ Ensure the attention of the trainees ❖ provide tutorial support (if necessary)	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 WDDBA3 M01 0322 Modeling website technical requirements
NOMINAL DURATION :	**30 Hours**

MODULE DESCRIPTION: This module defines the competence required to design a website specification within a particular technical and human interface environment.

LEARNING OUTCOMES

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

- Understand hardware and software business requirements and website architecture principles
- Gather data through formal and informal ways and analyze responses
- Analyze user profile and user needs
- Identify operating system and search engine to develop a site

  Understand hierarchical structure for pages and information to ensure logical and accessible content presentation.

MODULE CONTENTS:

Unit One: Website technical environment

1.1. Hardware and software in business requirements

1.2. Website Development Requirements: Standards, Software, and Hardware

1.3. Website architecture principles

1.4. Website development tools, equipment and standards

1.5. Information gathering

Unit Two: Human computer interface

2.1. User profiling and needs analysis

2.2. Determination of user content and requirements

2.3. Principles of website design

2.4. Identification of operating system

2.5. Determination of search engine

Unit Three: Website hierarchy

3.1. Hierarchy of pages and information

3.2. Logic and accessibility of content

3.3. Clear and consistent navigation across pages

ASSESSMENT CRITERIA:

Unit One: Technical environment

- Understand hardware and software in business requirements and their types in designing a website
- Understand website architecture principles
- Identify website development tools, equipment and standards.
- Comprehend information gathering goals and methods

Unit Two: Human computer interface

- Analyse user profile and user needs in line with the work steps
- Understand user research and content planning
- Comprehend appropriate design principles for site
- Understand application of design principles
- Understand in choosing appropriate operating system and search engines

Unit Three: Website hierarchy

- Understand hierarchy concepts in line with user needs and goals
- Understand in enhancing navigation
- Understand in maintaining consistent and clear navigation between pages

MODULE TITLE and CODE :	EIS WDDBA3 M02 0322 Modeling Data Object
NOMINAL DURATION :	**50 Hours**

MODULE DESCRIPTION : This module describes the knowledge and skill which is necessary to create robust and efficient data models that accurately represent real-world entities and their relationships.

LEARNING OUTCOMES

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

- Understand and analyze business operations
- Design an ER diagram on a real-world entity and with their relationships
- Apply rules of normalization
- Understand validation and documentation of data model

MODULE CONTENTS:

Unit One: Conceptual data model

1.1. Analysis of business data operations

1.2. Scope of the system

1.3. Entities, attributes, data types and relationships of data

1.4. Review business rules

1.5. Documentation of entity relationship diagram

Unit Two: Normalization

2.1 Identification of suitable business data

2.2 Rules of normalization

2.3 Normalize business data and document results

2.4 Compare normalization results with ER diagram

2.5 Reconcile differences between data

Unit Three: Data model validation

3.1 Validation of data model with client.

3.2 Resolve arising issues or recommendations

3.3 Documentation of data model

3.4 Client Approval Submission

ASSESSMENT CRITERIA:

Unit One: Conceptual data model

- Understand and analyze business operations and scopes
- Understand and identify types of entities, attributes, data types and relationships
- Design an ER diagram on a real-world entity and with their relationships
- Review business rules to determine impact
- Document of entity relationship diagram

Unit Two: Normalization

- Identify suitable business data
- Understand normalization of business data and documentation of results
- Understand normalization rules and benefits
- Apply stages of normalization
- Compare normalization results with ER diagram
- Understand in reconciling differences between data

Unit Three: Data model validation

- Understand Validation of data model with client
- Understand in resolving issues or recommendations
- Understand documentation of completed data model
- Document functionality and scalability of database.

MODULE TITLE and CODE :	EIS WDDBA3 M03 0322 Information Architecture
NOMINAL DURATION :	**50 Hours**

MODULE DESCRIPTION : This module covers the competencies required to develop information architecture for a complex website that meets current and future business requirements

LEARNING OUTCOMES

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

- Identify content needs
- Plan content structure
- Develop navigation system
- Showcase and provide a comprehensive sign-off

MODULE CONTENTS:

Unit One: Identification of Content Needs

1.1 Strategic intent of website

1.1.1. Difference between a Webpage and a Website

1.1.2. Website strategy

1.2 Development of information requirement

1.2.1 Intended audiences

1.2.2 Types of client interactions

1.2.3 Long- and Short-term goals for the site

1.3. Identification and Categorization of Information

1.4 Content Requirements

Unit Two: Content structure

2.1 Web design Software and Code Editor

2.2 Information And Documents Clustering

2.3 Hierarchy of information

2.4 Navigation Tools planning

Unit Three: Navigation system

3.1. Web Navigation Design

3.2. Enhancement of Site Navigation

3.3. User-Friendly Web Navigation Techniques

3.4. Developing Demographics-Driven, Logical Labeling Systems

Unit Four: Showcase and sign off

4.1. Information Architecture Prototyping

4.2. Prototype Usability Testing

4.3. Site Content Formatting: Best Practices and Tools

4.4. Adjustment of architecture based on feedback

4.5. Confirmation of Business Requirements with Signed-off Prototypes

ASSESSMENT CRITERIA:

Unit One: Identification of Content Needs

- Knows about Strategic intent of website
- Develops information requirement
- Identify and Categorize Information within Business Structures
- Identify content requirements

Unit Two: Content structure

- Understand Software and Coding
- Organize Website Content
- Knows Hierarchy of information
- Write Client Navigation plan

Unite Three: Navigation system

- Build website navigation system

- Enhance Site Navigation
- Build Flexible Navigation for User-Friendly Information and Product Access
- develop Demographics-Driven, Logical Labeling Systems

Unit Four: Showcase and sign off

- Construct prototype of information architecture design
- Test Prototype Usability
- Ensure Proper Formatting for Site Content Across the Environments
- Adjust architecture based on feedback
- Confirm Business Requirements with Signed-off Prototypes

MODULE TITLE and CODE :	EIS WDDBA3 M04 0322 Designing Program Logic
NOMINAL DURATION :	**50 Hours**

MODULE DESCRIPTION : This module defines the competencies required to develop program logic with good programming practices. Included are decision-making, looping, flowcharts and pseudocode to provide some familiarity with these development tools

LEARNING OUTCOMES

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

- Identify and select the program logic design approach
- Document the program logic design

MODULE CONTENTS:

Unit One: program logic design

2.1. Systems development life cycle

2.2. Design documentation

2.3. design approach coding

Unit Two: Program logic Documentation

2.4. Project planning standards

2.5. documentation of Project scope

2.6. project scope statement

2.7. Identification and revising References.

2.8. Logic design templates

2.9. Logic design validation

ASSESSMENT CRITERIA:

Unit One: program logic design

- Develop Systems development life cycle
- Understand and Design document
- Demonstrate design approach coding

Unit Two: Program logic Documentation

- Understand Project standards
- Understand and document Project scope
- Understand project scope statement
- Identify and revising References
- Understand logic design templates
- Check Logic design validation

MODULE TITLE and CODE :	EIS WDDBA3 M05 0322	Develop cascading style sheets
NOMINAL DURATION :	**90 Hours**	

MODULE DESCRIPTION: This unit describes the performance outcomes, skills and Knowledge required to develop cascading style sheets (CSS) that are attached to a mark-up language document.

LEARNING OUTCOMES

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

- Understand the fundamentals of CSS and essential design principles
- Demonstrate method of positioning and arranging document elements
- Understand the concept of style sheets and their application across multiple pages
- Design Responsive Website
- Explore techniques for handling browser-specific styling challenges
- Emphasize the importance of adhering to industry standards in CSS
- Address browser-specific differences to enhance website accessibility

MODULE CONTENTS:

Unit One: Fundamentals of CSS and User-Centric Design

1.1. Introduction to CSS and basic design principles

1.2. User requirements for CSS style

1.3. Development of CSS to Match User Requirements

Unit Two: Web page creations using CSS and HTML

2.1 Style elements of a web page

2.2 Page layout creation

2.3 Positioning document elements

2.4 Style sheets application on multiple pages on a website

2.5 Web pages creation for varied screen resolutions

2.6 Application layering for the Desired Design

Unit Three: web page and CSS Validation and testing

3.1 CSS standard and validation

3.2 Web page evaluation across various browsers

3.3 Rectification of browser

ASSESSMENT CRITERIA:

Unit One: Foundations of CSS and User-Centric Design

- gather and analyze user preferences for styling
- prioritize and incorporate user preferences into the design process
- understand and apply basic design principles, such as layout, color, and typography
- apply CSS concepts to create simple styles for web elements
- address challenges in translating user requirements into effective CSS styles

Unit Two: Web page creations using CSS techniques

- Understand the fundamentals of CSS and essential design principles
- Understand how to gather user preferences and requirements for effective styling
- Apply learned principles to develop CSS that aligns with user preferences
- follow principles of layout design using CSS
- apply methods of positioning and arrange document elements
- explain concept of style sheets and their application across multiple pages
- solve challenges of designing for different screen sizes
- Emphasize the importance of adhering to industry standards in CSS
- Address browser-specific differences to enhance website accessibility

Unit Three: Web page and CSS Validation and testing

- Evaluate CSS code for adherence to industry standards, such as W3C standards
- Understand of the importance of conforming to established CSS guidelines.
- employ CSS validation tools to identify and address code errors
- Evaluate the effectiveness of the use of validation tools.

- Explore techniques for handling browser-specific styling challenges
- Test web pages on different browsers.
- Idntify accessibility issues related to browser differences

MODULE TITLE and CODE :	EIS WDDBA3 M06 0322	Writing Content for Web Page
NOMINAL DURATION :	**50 Hours**	

MODULE DESCRIPTION : This module defines the competence required to write concise, clear and Relevant content for web pages on behalf of a client.

LEARNING OUTCOMES

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

- Understand content requirements
- Create compelling web content
- Optimize content for accessibility and visibility
- Edit content effectively
- Upload and manage web content

MODULE CONTENTS:

Unit One: Site Content Requirement Determination

1.1. Customer information needs identification

1.1.1. Audience analysis

1.1.2. Site functionality assessment

1.1.3. Client requirement

1.2. Site purpose & functionality

1.3. Content channels and format identification

1.4. Template and style guide selection

1.5. Relevant site content identification

1.6. Site design alteration negotiation

Unit Two: Webpage Content Creation

2.1 Content generation based on client requirements

2.2 Optimization of content for accessibility and visibility

2.3 Content Editing for audience and functionality

Unit Three: Content Upload

3.1 Server access and FTP log-in

3.2 File transfer protocol management

3.3 Logical design and extensions organization of files

ASSESSMENT CRITERIA:

Unit One: Site Content Requirement

- Identify and analyse customer information needs
- Validate the accuracy of site goals and functionalities
- Identify and propose content channels relevant to the target audience.
- Select appropriate templates and style guides according to organizational procedures.
- Demonstrate an understanding of information architecture and its impact on content.
- Demonstrate effective communication skills in negotiating design changes.

Unit Two: Webpage Content Creation

- Generate content in accordance with client requirements.
- Optimize content for search engine visibility.
- Refine content based on site functionality and client requirements.

Unit Three: Content Upload

- Successfully log in to the server using administrative or anonymous FTP.
- Effectively manage file transfer protocols.
- Organize files logically based on design principles and user needs.
- Demonstrate the successful upload and management of content.

MODULE TITLE and CODE :	EIS WDDBA3 M07 0322 Basic Structured Query Language
NOMINAL DURATION :	**100 Hours**
MODULE DESCRIPTION : This module defines the compétence required to use a basic 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 trainee will be able to: • At the end of the module the trainee will be able to: • Describe data management approaches • Practice installing and uninstalling DBMS software • Explain structured query language • Differentiate SQL keywords from identifiers • Apply SQL DDL to create and manipulate database structures • Apply SQL DML to manipulate a database data • Use SQL query to retrieve data from the database • Explain SQL data control language • Differentiate between SQL DDL, DML, DQL and DCL	
MODULE CONTENTS: **Unit One: Fundamental Concepts of a relational database** 1.1 Data management approaches 1.2 Relational Database management system 1.3 Basics of Structured query language	

Unit Two: Data definition language

2.1 Introduction to SQL data definition language commands

2.2 Database planning

2.3 Naming convention for all database elements

2.4 Database structure creation and manipulation

Unit Three: Data manipulation language

3.1 Overview of SQL data manipulation language commands

3.1 Data insertion

3.2 Modification of existing data

3.4 Data deletion

Unit Four: Data query language

4.1 Selection of data from a single table

4.2 Selection of data from multiple tables

4.3 Retrieval of data selectively

4.4 Working with functions

4.5 Working with sub-queries

ASSESSMENT CRITERIA:

Unit one: Fundamental concepts of a relational database

- Understand database management system
- Identify disadvantage of the file-based approach
- Grasp relational database management system
- Identify the different data models
- Understand the relationship of relational data model with the Structured query language

Unit Two: Data definition language

- Identify tables required to build a database
- Identify required columns, data types, keys, relationships, indexes and constraints
- Use relevant naming conventions for all database elements
- Create tables that implement all required elements
- Add, modify and delete columns to/from a table
- View detailed information regarding a table
- Create relationships between tables
- Delete a table from a database
- Drop Database

Unit 3: Data manipulation language

- Insert rows into tables
- Insert data into specific columns in a table
- Update some or all of the data in a table
- Delete rows from a table

Unit 4: Data query language

- All the data from a table is retrieved following work procedure.
- Data from specific columns in a single table is retrieved.
- Clause is used to sort query output.
- Number of rows restricted is retrieved by placing criteria in the clause.
- Number of rows restricted is retrieved by placing specific criteria in the select statement.
- Comparison operators in the clause is used to compare numeric, character, string, date and time data
- Boolean operators are 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

- Action is taken to exclude null values from a query result
- Arithmetical operators 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
- Clause used to aggregate data by multiple columns
- Aggregated data is sorted in the query output
- Aggregated data is filtered using the clause
- Single and nested sub-queries are constructed
- Sub-queries are constructed that return a single row, and multiple rows
- Correlated sub-queries are used to retrieve required data
- Sub-queries are written that use aggregates

MODULE TITLE and CODE :	EIS WDDBA3 M08 0322	Integrating database with a website
NOMINAL DURATION :	**80 Hours**	
MODULE DESCRIPTION: This module describes defines the competency required to skills and knowledge that define to ensure database integration with website.		
LEARNING OUTCOMES At the end of the module the trainee will be able to: • Connect website to database • Retrieve data from database and display on web pages • Update database data from user input		
MODULE CONTENTS: **Unit One: website to database connection** 1.1. Web servers, databases and server-side scripting languages 1.2. User Identification and site data technical requirements. 1.3. Install web servers. 1.4. Connect database with web application **Unite Two: Retrieve data from database and display on web pages** 2.1 Data retrieval using structured query language (SQL) 2.2 Data display stored in database 2.3 Display format data in database **Unite Three: database user input manipulation** 3.1 Updating existing data stored in the database 3.2 Insertion of data in the database 3.3 Deletion of data in the database 3.4 check error and validation of data		

ASSESSMENT CRITERIA:

Unite One: website to database connection

- Understand web servers, databases and server-side scripting languages
- Understand and identify user and technical data requirements
- Understand and install web servers.
- Understand and Connect database with web application.

Unite Two: Retrieve data from database and display on web pages

- Perform Retrieve data stored in database
- Ability to display data stored in database
- Ability to display format data stored in database

Unit Three: database user input manipulation

- Understand and update existing data stored in the database
- Ability to insert data in the database.
- Ability to delete data in the database
- Ability to check error and validate of data

MODULE TITLE and CODE :	EIS WDDBA3 M09 0322	Monitoring and Supporting Data Conversion
NOMINAL DURATION :	**30 Hours**	

MODULE DESCRIPTION : This module defines the competence required to monitor and support data.

LEARNING OUTCOMES

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

- Monitor data conversion
- Support data conversion

MODULE CONTENTS:

Unit One: Monitor data conversion

1.1 Current data model methodologies.

1.2 Conversion support documentation.

1.3 Back up data before conversion.

1.4 Identification Client requirement.

1.5 Software, hardware or environmental pre-requisites

1.6 Validation data accuracy and integrity.

1.7 Data conversion tools.

1.8 Documentation of data rejection behavior of the conversion.

Unit Two: Support data conversion

2.1 Verification of data and signing by appropriate person

2.2 Store, update and export convert data

2.3 Data loading and indexing on the production server

2.4 Documentation of backup copies of conversion files

ASSESSMENT CRITERIA:

Unit One: Monitor data conversion

- Identify data model methodologies
- Apply Convert support document.
- Protect data before conversion.
- Understand Client requirements.
- Identify Software, hardware or environmental pre-requisites.
- Validate data accuracy and integrity
- Understand data conversion tools
- Documents data rejection behavior of the conversion

Unit Two: Support data conversion

- Understand and verify data.
- Store, update and export converted data
- Identify data load and indexing on the production server
- Document backup copies of conversion files

MODULE TITLE and CODE :	EIS WDDBA3 M10 0322	Evaluating and selecting hosting service
NOMINAL DURATION :	**40 Hours**	

MODULE DESCRIPTION : This module defines the performance outcomes, skills and knowledge required to evaluate and select an appropriate hosting service for current and future business needs.

LEARNING OUTCOMES

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

- Review and compare hosting services.
- Monitor server performance and availability.
- Ensure OS supports business software and applications.
- Implement security systems and payment technologies.
- Test and assess ISP performance during both on and off-peak times.
- Evaluate service with appropriate parameters.

MODULE CONTENTS:

Unit One: ISP Selection

1.1. Comparable characteristics of hosting services
1.2. Flexible Email and Mailing list services
1.3. Business needs support service standards
1.4. Data capacity for partial outages
1.5. Security technologies assessment
1.6. Evaluation of scripting language availability
1.7. Assessment of optional server applications for advanced web functions
1.8. Client selection criteria with ISP hosting service

Unit Two: Permanent Online Presence

2.1. Server performance and availability

2.2. Negotiate escalation procedures and performance standards

2.3. Security and backup procedures for business needs

Unit Three: Technical Requirements for Web hosting

3.1. OS compatibility with business software and applications

3.2. Web-host server for dynamic websites

3.3. Security systems and payment technologies

Unit Four: Benchmark and Test Performance

4.1. ISP performance during on and off-peak times

4.2. Email and Mailing services backup procedures

4.3. Services align with business needs

4.4. Quality of Service Delivered

ASSESSMENT CRITERIA:

Unit One: ISP Selection

- Assess the carefulness of the review of hosting services' comparable characteristics.
- Evaluate the flexibility of email and mailing list services in meeting current and future business needs.
- Review the adequacy of support service standards in meeting business needs.
- Assess the ISP hosting service's data capacity to cover partial outages.
- Evaluate the availability of security technologies.
- Review the availability of scripting languages.
- Assess the evaluation of optional server applications for advanced web business functions.
- Confirm the alignment of client selection criteria with the selected ISP hosting service.

Unit Two: Ensure Permanent Online Presence

- Evaluate the establishment of systems to monitor server performance and availability.

- Assess the negotiation and articulation of escalation procedures and performance standards with the ISP.
- Review the establishment and meeting of business needs for security and backup procedures.

Unit Three: Technical Requirements for Web hosting

- Assess the action taken to ensure the OS supports business development software, applications, extensions, and databases.
- Evaluate the establishment of web-host servers that support dynamic websites using preferred business technologies.
- Review the establishment of current and future disk space requirements.
- Assess the availability and flexibility of site-analysis reports to meet business needs.
- Evaluate the implementation of security systems and payment technologies according to expectations and requirements.

Unit Four: Benchmark and Test Performance

- Evaluate the testing of ISP performance during on and off-peak times.
- Assess the establishment of email and mailing services backup procedures.
- Review the actions taken to ensure support services perform according to business needs.
- Check the quality of service delivered process.

3. 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	How to Write Effective Requirements for IT	Thomas Hathaway and Angela Hathaway,2016	5	1:5
2.2	Information architecture for world wide web	Second edition By:o,Reilly Media, Inc second edition	5	1:5
2.3	Introduction to SQL: Mastering the Relational Database Language,	Rick F. van der Lans, Fourth Edition/20th Anniversary Edition	5	1:5
2.4	An Object-Oriented Approach to Programming Logic and Design	Joyce Farrell 2012, 4th Edition	5	1:5
2.5	Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5	Robin Nixon, 2015, 5th 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

4. 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
2	Gari Lencha	MSc	ICT Management	Gimbi Polytechnic	0917819599	Garilencha12@gmail.com
3	Kalkidan Daniel	BSc	Computer Science	Entoto Polytechnic College	0978336988	kalkidaniel08@gmail.com
4	Solomon Melese	M-Tech	Computer Engineering	M/G /M /Polytechnic College	0918578631	solomonmelese6@gmail.com
5	Tewodros Girma	MSc	Information system	Sheno Polytechnic College	0912068479	girmatewodiros @gmail.com
6	Yohannes Gebeyehu	BSc	Computer Science	Entoto Polytechnic College	0923221273	yohannesgebeyehu73@gmail.com