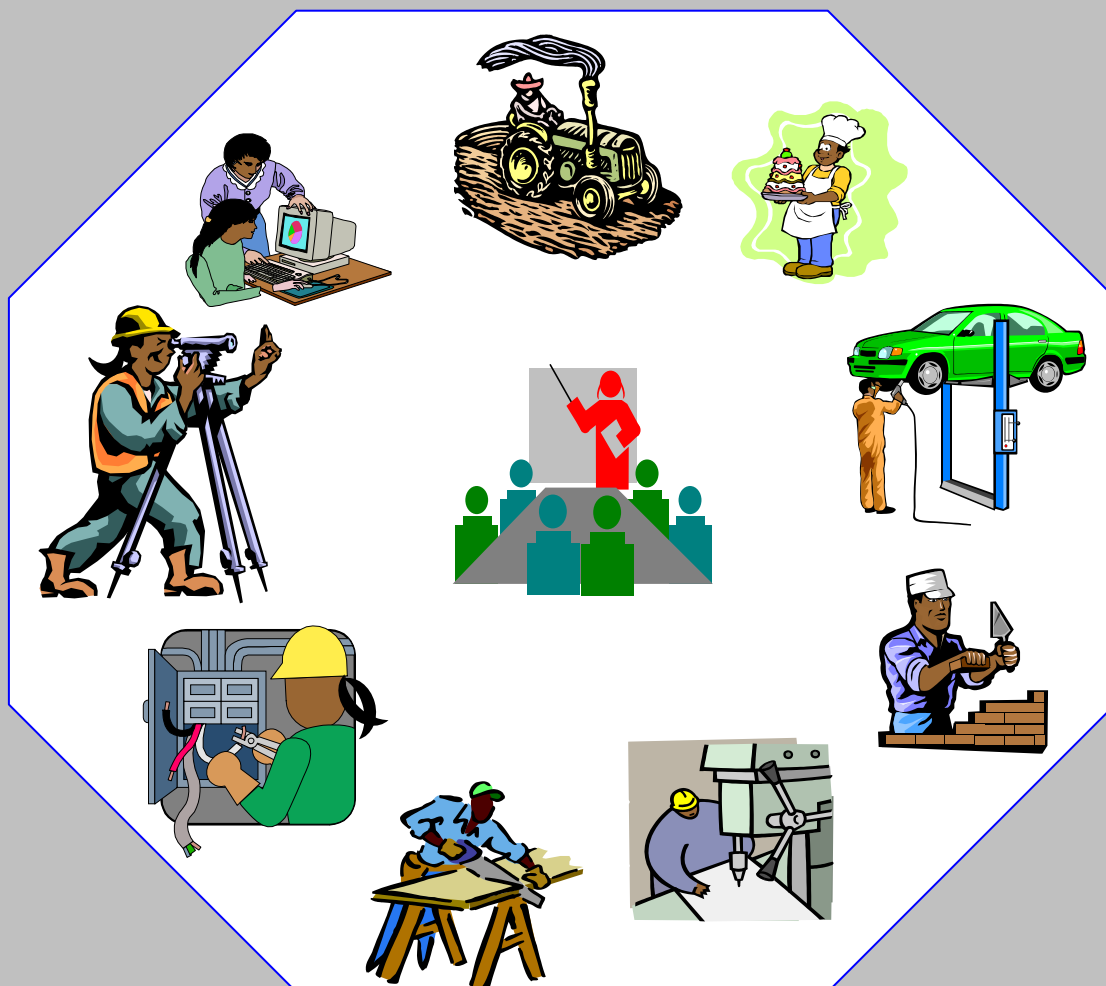




Federal Democratic Republic of Ethiopia
OCCUPATIONAL STANDARD



WEB DEVELOPMENT AND DATABASE ADMINISTRATION



Ministry of Education
Dec 2021

Introduction

Ethiopia has embarked on a process of reforming its TVET-System. Within the policies and strategies of the Ethiopian Government, technology transformation – by using international standards and international best practices as the basis, and, adopting, adapting and verifying them in the Ethiopian context – is a pivotal element. TVET is given an important role with regard to technology transfer. The new paradigm in the outcome-based TVET system is the orientation at the current and anticipated future demand of the economy and the labor market.

The Ethiopia Occupational Standards (EOS) is the core element of the Ethiopian National TVET-Strategy and an important factor within the context of the National TVET-Qualification Framework (NTQF). They are national Ethiopia standards, which define the occupational requirements and expected outcome related to a specific occupation without taking TVET delivery into account.

This document details the mandatory format, sequencing, wording and layout for the Ethiopia Occupational Standard which comprised of Units of Competence.

A Unit of Competence describes a distinct work activity. It is documented in a standard format that comprises:

- Occupational title and NTQF level
- Unit code
- Unit title
- Unit descriptor
- Elements and Performance criteria
- Variables and Range statement
- Evidence guide

Together all the parts of a Unit of Competence guide the assessor in determining whether the candidate is competent.

The ensuing sections of this EOS document comprise a description of the respective occupation with all the key components of a Unit of Competence:

- chart with an overview of all Units of Competence for the respective level including the Unit Codes and the Unit Titles
- contents of each Unit of Competence (competence standard)
- occupational map providing the technical and vocational education and training (TVET) providers with information and important requirements to consider when designing training programs for this standard and for the individual, a career path

Page 1	Ministry Science Higher Education Copyright	Web development and Database Administration Ethiopian Occupational Standard	Version 3 Dec 2021
--------	---	---	-----------------------

UNIT OF COMPETENCE CHART

Occupational Standard: Web Development and Database Administration V

Occupational Code: EIS WDDBA

NTQF Level V

EIS WDDBA5 01 1221

Establish and Maintain Client User Liaison

EIS WDDBA5 03 1221

Research and apply emerging web technology trends

EIS WDDBA5 05 1221

Develop complex cascading style sheets

EIS WDDA5 07 1221

Prepare Disaster Recovery and Contingency Plan

EIS WDDBA5 02 1221

Match Web and database Needs with the Strategic Direction of the Enterprise

EIS WDDBA5 04 1221

Develop System Infrastructure Design Plan for Web and Database

EIS WDDBA5 06 1221

Manage Web and database Project

UNIT OF COMPETENCE CHART

Occupational Standard: Web Development And Database Administration IV			
Occupational Code: EIS WDDBA			
<i>NTQF Level IV</i>			
EIS WDDBA4 01 1221 Estimate cost for Web and database projects	EIS WDDBA4 02 1221 Monitor and Administer Database	EIS WDDBA4 03 1221 Apply Object-Oriented Programming Language Skills	
EIS WDDBA4 04 1221 Use Advanced Structured Query Language	EIS WDDBA4 05 1221 Determine Suitability of Database Functionality and Scalability	EIS WDDBA4 06 1221 Perform Database System Test	
EIS WDDBA4 07 1221 Complete Database Backup and Recovery	EIS WDDBA4 08 1221 Create Technical Documentation	EIS WDDBA4 09 1221 Produce basic Server-side scrip for dynamic web page	
EIS WDDBA4 10 1221 Maintain Website Information standard			

UNIT OF COMPETENCE CHART

Occupational Standard: Web Development And Database Administration III			
Occupational Code: EIS WDDBA			
<i>NTQF Level III</i>			
EIS WDDBA3 01 1221 Website Technical Requirement modelling	EIS WDDBA3 02 1221 Model Data Objects	EIS WDDBA3 03 1221 Develop Website Information Architecture	EIS WDDBA3 04 1221 Design Program Logic
EIS WDDBA3 07 1221 Use Basic Structured Query Language	EIS WDDBA3 05 1221 Develop Cascaded style sheets	EIS WDDBA3 06 1221 Write Content for Web Page	EIS WDDBA3 08 1221 Integrate Database with a website
EIS WDDBA3 09 1221 Monitor and Support Data Conversion	EIS WDDBA3 10 1221 Evaluate and select Web Hosting Service		

UNIT OF COMPETENCE CHART

Occupational Standard:	Web Development and Database Administration Level II		
Occupational Code:	EIS WDDBA		
NTQF Level II			
EIS WDDBA2 01 1221 Operate Database Application	EIS WDDBA2 02 1221 Build simple websites using commercial programs	EIS WDDBA2 03 1221 Administrate Network and Hardware Peripherals	
EIS WDDBA2 04 1221 Implement maintenance Procedures	EIS WDDBA2 05 1221 Configure and Use Internet	EIS WDDBA2 06 1221 Operate Presentation Package	
EIS WDDBA2 07 1221 Record Client Support Requirements	EIS WDDBA2 08 1221 Update and Document Operational Procedures	EIS WDDBA2 09 1221 Prevent and Eliminate MUDA Procedures	

UNIT OF COMPETENCE CHART

Occupational Standard:	Web Development and Database Administration Level I	
Occupational Code:	EIS WDDBA	
<i>NTQF Level I</i>		
<u>EIS WDDBA1 01 1221</u> Operate Personal Computer	<u>EIS WDDBA1 02 1221</u> Connect Hardware Peripherals	<u>EIS WDDBA1 03 1221</u> Install Software Application
<u>EIS WDDBA1 04 1221</u> Protect Application or System Software	<u>EIS WDDBA1 05 1221</u> Maintain Inventories of Hardware and Software and Documentation	<u>EIS WDDBA1 06 1221</u> Operate word-processing applications
<u>EIS WDDBA1 07 1221</u> Operate Spreadsheet Application	<u>EIS WDDBA1 08 1221</u> Create a simple markup language document	<u>EIS WDDBA1 09 1221</u> Access and Use Database Application
<u>EIS WDDBA1 10 1221</u> Apply 5S Procedures		

NTQF Level V

Page 7	Ministry Science Higher Education Copyright	Web development and Database Administration Ethiopian Occupational Standard	Version 3 Dec 2021
--------	---	---	-----------------------

Occupational Standard: Information Technology Service Management Level V	
Unit Title	Establish and Maintain Client User Liaison
Unit Code	EIS WDDBA5 01 1221
Unit Descriptor	This unit defines the competency required to establish and maintain client user liaison in an IT environment, post implementation. This occurs after the business-critical functions have been determined.

Elements	Performance Criteria
1. Determine support areas	<p>1.1 Information technology used in the organisational unit is identified and recorded.</p> <p>1.2 <i>Stakeholders</i> of the <i>system</i> are identified.</p> <p>1.3 Organisational structure, culture and politics are identified in relation to support requirements.</p> <p>1.4 Level of support required by each organisational unit is determined</p>
2. Develop support procedures	<p>2.1 Organisational units are contacted, as required, to verify support needs.</p> <p>2.2 Procedures are established for providing required support, including method of contact, frequency of meetings and reports</p> <p>2.3 Agreed procedure, <i>service-level agreement</i>, is documented.</p>
3. Assign support personnel	<p>3.2 IT skills required to assist each organisational unit are identified with support activities.</p> <p>3.3 Personnel are assigned according to human resource processes.</p> <p>3.4 Availability of selected personnel is verified.</p> <p>3.5 Support is provided using agreed procedures.</p> <p>3.6 Feedback is obtained from the <i>appropriate person</i> on a regular basis.</p>

Variable	Range
----------	-------

Stakeholders	May include <ul style="list-style-type: none"> • sponsor • user • development team • project team
System	May include but is not limited to <ul style="list-style-type: none"> • databases • applications • servers • operating systems • gateways • application service provider (ASP) and ISP
Service-level agreement	May exist for many different infrastructure services, including <ul style="list-style-type: none"> • communications carriers • ISPs • ASPs • SLAs for vendor products SLAs should consider business processes and requirements, clearly specify and quantify service levels, identify evaluation or audit of service levels. May include <ul style="list-style-type: none"> • workload and performance considerations • expectations regarding servicing • penalties • charge back to business units
Appropriate person	May include <ul style="list-style-type: none"> • supervisor • teacher • authorised business representative or client

Evidence Guide

Critical Aspects of Competence	Demonstrates skills and knowledge in: <ul style="list-style-type: none"> • Ability to establish and maintain client liaison in an IT environment. • monitored resource utilization and cost efficiency and effectiveness of technology • Evidence of communication and reporting mechanisms consistent with the identified role and as agreed between the parties must be demonstrated.
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: <ul style="list-style-type: none"> • General knowledge of the role that IT plays in the client's business domain. Knowing what equipment supplies business-critical services (e.g. web server for e-business, internet file transaction security for client accounts) • Awareness of who the stakeholders are, what role they play in the organisation and how dependent they are on the IT infrastructure (e.g. salespeople and other mobile workforces may need a remote

	<p>access communication service while travelling.)</p> <ul style="list-style-type: none"> • Detailed knowledge of the IT system's current functionality in supplying the essential and desirable services to the organisation. (e.g. what servers are engaged in providing the services such as email, web, proxy, firewall, back-up) • Broad knowledge of quality assurance practices in relation to how the service is supplied (e.g. are response times for help desk issues adequate for maintaining the organisation's desired business activity level?) • Current industry-accepted hardware and software products, capabilities of IT devices, and detailed knowledge of areas related to the organisation's services, (e.g. specialised knowledge of website security, dynamic data exchange or on-line open file back-up system). 		
Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> • Plain English literacy and communication skills in relation to analysis, evaluation and presentation of information such as reporting on service history issues are necessary. These could be in response to particular problems or in response to an approach to quality assurance processes aimed at a general improvement. • Teamwork skills involve the contribution to solutions and goals of a non-routine or contingency nature (e.g. when a major system upgrade is needed and a workgroup approach is employed to implement it). • Group facilitation and presentation skills in relation to transferring and collecting information and gaining consensus on concepts, such as when there are alternatives to decide upon, in installing new technology or in altering the service process for the current system. • Project planning skills in relation to how to deliver on scope, time, cost and quality, and how to promote communications and manage risk. • Negotiation skills in relation to other team members and applied to a defined range of predictable problems, such as organising equitable workloads for each team member when extra (weekend or night) work is necessary for a major network upgrade. • Report writing skills for business, requiring depth in some areas, analysis and evaluation of information in a defined range of areas (e.g. outlining possible alternatives in technology or equipment changes). • Customer service skills, including a semi-educational role when dealing with end-user problems, so that, by explaining relevant concepts, the learner can empower the end-user to attempt remedial action, the next time a similar problem occurs. 		
Resources Implication	<p>Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.</p> <ul style="list-style-type: none"> • Service-level agreements • Documented support requirements 		
Page 10	Ministry Science Higher Education Copyright	Web development and Database Administration Ethiopian Occupational Standard	Version 3 Dec 2021

Assessment Methods	Competency may be assessed through: <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

Occupational Standard: Information Technology Service Management Level V	
Unit Title	Match Web and database Needs with the Strategic Direction of the Enterprise
Unit Code	EIS WDDBA5 02 1221
Unit Descriptor	This unit defines the competency required to ensure IT services meet current and future internal operational enterprise requirements

Elements	Performance Criteria
1. Evaluate current business strategy	<p>1.1 Current strategic plan of organization is analyzed to understand the industry environment and current organizational goals.</p> <p>1.2 Information related to current operational practices and the strategic plan is compared to determine possible IT gaps and improvement opportunities.</p> <p>1.3 Information regarding the impact of IT developments is reported to <i>appropriate person(s)</i></p>
2. Evaluate impact of changes	<p>2.1 Information on current IT systems supported by the organization is reviewed.</p> <p>2.2 Advantages and disadvantages of current and proposed IT systems are compared and documented.</p> <p>2.3 The objectives and implications of introducing changes are determined.</p> <p>2.4 Findings are document and forward to appropriate person(s) for feedback.</p>
3. Develop action plans	<p>3.1 Action plans are developed for the proposed changes that can be implemented according to organizational policies and procedures</p> <p>3.2 Action plans that take account of appropriate operational, financial, legal, human relations, internal and external operating environments and other relevant considerations are ensured.</p> <p>3.3 Document action plans, ensuring that standards, targets and implementation methods are detailed</p> <p>3.4 Documentation is forwarded to appropriate person for feedback/approval.</p>

Variable	Range		
Page 12	Ministry Science Higher Education Copyright	Web development and Database Administration Ethiopian Occupational Standard	Version 3 Dec 2021

Appropriate person	May include but not limited to: <ul style="list-style-type: none"> • supervisor, • authorized business representative or client
--------------------	---

Evidence Guide	
Critical Aspects of Competence	<p>Demonstrates skills and knowledge in:</p> <ul style="list-style-type: none"> • accessed and analyzed relevant information on changes to technology and resources; • analyzed strategic plans to determine future technology needs; • monitored resource utilization and cost efficiency and effectiveness of technology • Developed action plan
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> • Broad knowledge of technology and product directions for evaluating and forecasting vendor and technology trends • Analysis and planning approaches to technical problems or management requirements, taking into account the hardware platform used by the organization, and network and security guidelines • Broad knowledge for evaluating current system functionality to forecast for planning • Broad knowledge for evaluating internal and external operating environments • Broad knowledge for evaluating the operating systems supported by the organization to forecast for planning
Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> • Negotiation skills in relation to planning and selecting appropriate equipment and services for self and others, such as when planning for client support service delivery within quality, time and cost parameters • Evaluation and report writing skills involving analysis for evaluating IT changes, documenting recommendations and developing action plans • Evaluation skills to determine possible IT client support gaps • Broad strategic planning skills in relation to current operational practices and future requirements and the implications of introducing IT changes • Planning and analysis skills for reviewing objectives and performance measures • Time management skills in relation to planning the management of client support services • Organizing and presenting information in relation to business report writing requirements
Resources Implication	To demonstrate competency in this unit the learner will require access to:

	<ul style="list-style-type: none"> • Detailed information relating to business strategic plan • Budget constraints • A timeframe for the strategic plan • Business objectives • Business risks • Information on a range of IT business solutions
Methods of Assessment	Competency may be assessed through: <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

[TOP](#)

Occupational Standard: Web Development And Database Administration Level V	
Unit Title	Research and apply emerging web technology trends

Page 14	Ministry Science Higher Education Copyright	Web development and Database Administration Ethiopian Occupational Standard	Version 3 Dec 2021
---------	---	---	-----------------------

Unit Code	<u>EIS WDDBA5 03 1221</u>
Unit Descriptor	This unit describes the performance outcomes, skills and knowledge required to keep up-to-date with and apply emerging web technology

Elements	Performance Criteria
1. Identify emerging web technology trends and their uses	1.1 Review new developments in web technology 1.2 Identify appropriate web technology to meet the needs of the web application database start-up and operation for irregularities
2. Implement new web technology trends in a portfolio	2.1 Create <i>code</i> to apply the web technology 2.2 Test web application in a variety of <i>browsers</i> and rectify problems that arise
3. Analyse new information	3.1 Supervise information gathering from identified clients of the system 3.2 Analyse gathered client responses 3.3 Analyse new <i>system requirements</i> 3.4 Ensure that new system requirements and problems are documented
4. Confirm system specifications	4.1 Review documentation 4.2 Work with client to verify system specifications, updating documentation as required 4.3 Obtain final approval and sign-off from client

Variable	Range
<i>Code</i> may include:	May include but is not limited <ul style="list-style-type: none"> • active server pages (ASP) • active server pages. net (ASP.NET) • Coldfusion • JavaScript • jQuery • Java server pages (JSP) • Perl hypertext preprocessor (PHP) Ruby on Rails.
<i>Browsers</i> may include:	May include but not limited: <ul style="list-style-type: none"> • Firefox • Google Chrome • Internet Explorer • Konqueror • Lynx • Mozilla • Netscape Navigator

	<ul style="list-style-type: none"> • Opera • Safari.
System requirements may include:	May include but are not limited to <ul style="list-style-type: none"> • Client user • Cost constraints • Environment • Geography • System functionality.

Evidence Guide	
Critical aspects of Competence	<ul style="list-style-type: none"> • Assessment must confirm the ability to Review and development of new Web technology • detailed knowledge of client business to enable informed Web Technology product provision • Well documented and disseminated Quality assurance standards
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: <ul style="list-style-type: none"> • products related to data capture • internet technology • principles of analysis and design • programming control structures, object-oriented programming • web programming concepts, including: <ul style="list-style-type: none"> • hypertext transfer protocol (HTTP) • stateless programming • session management • authentication and web security • client-side programming
Underpinning Skills	<ul style="list-style-type: none"> • troubleshoot common system problems • analyses and evaluate broad features of a particular business domain • determine functional requirements • identify dynamic client and server-side requirements • identify and rectify website functional problems • identify and resolve bugs in the created code • select the most efficient and effective algorithms • apply web programming concepts • create software in a variety of languages, including client and server-side languages • Create aesthetically pleasing web pages.
Resource Implications	To demonstrate competence in this unit the candidate will review research, plan and develop new web site based the review
Assessment Methods	Competency may be assessed through: <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration

Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting
-----------------------	---

[TOP](#)

Occupational Standard: Information Technology Service Management Level V			
Unit Title	Develop System Infrastructure Design Plan		
Page 17	Ministry Science Higher Education Copyright	Web development and Database Administration Ethiopian Occupational Standard	Version 3 Dec 2021

Unit Code	<u>EIS WDDBA5 04 1221</u>
Unit Descriptor	This unit defines the competency required to specify the hardware, network, software and infrastructure required to support the system.

Elements	Performance Criteria
1. Specify architecture requirements	<p>1.1 Critical principles, functions and framework for the system to operate across business units, are identified. taking into account the project deliverables, acceptance criteria and current IT blueprint</p> <p>1.2 Functions are organised into layers or wrappings and components to meet business requirements.</p> <p>1.3 Processing environment, the hardware, network and software required to support the operational environments are identified.</p> <p>1.4 The system topology model, templates and standards are refined to guide development</p> <p>1.5 The project guidelines, standards, models, acceptance criteria and general framework are utilised to develop the architecture</p>
2. Specify hardware and software	<p>2.1 Various products and vendors are evaluated against the requirements of the architecture to determine the best IT solution.</p> <p>2.2 Current and future capacity requirements are estimated and evaluated against client future requirements.</p> <p>2.3 Requirements are identified for upgrade or change through analysis of software versions and interoperability status of existing system and applications.</p>
3. Conduct walk-through and compare/contrast expected performance	<p>3.2 Requirements model are compared against technical specifications and acceptance criteria.</p> <p>3.3 Requirements model are compared against vendor proposed offering</p> <p>3.4 The requirements model benchmarked against current industry standards and IT blueprint for performance, interoperability and expected future organisational requirements.</p>
4. Document and report on findings	<p>4.1 System infrastructure design plan are prepared including hardware, network, software and general infrastructure aspects</p> <p>4.2 Recommendations are documented and referred to the appropriate person for improvement.</p>

Variable	Range
System	<p>May include</p> <ul style="list-style-type: none"> • Databases • Applications

	<ul style="list-style-type: none"> • Servers • operating systems • gateways • ASP • ISP
Acceptance criteria	May include <ul style="list-style-type: none"> • Timeframe • cost implications • technical and logistical Considerations
Business requirements	May be in reference to <ul style="list-style-type: none"> • the business • system • application • network or people in the organisation
Hardware	May include but is not limited to <ul style="list-style-type: none"> • workstations • personal computers, Laptop and PDA • modems and other connectivity devices • networks • ADSL modems • remote sites • servers
Project	May include a <ul style="list-style-type: none"> • total organisational change • a systems-only change • a business improvement process • e-business solution involving the total organisation or part of the organisation
Standards	May include <ul style="list-style-type: none"> • ISO/IEC/AS and relevant standards • organisational standards • project standards
Software	May include but is not limited to <ul style="list-style-type: none"> • commercial Software • in-house developed Software • packaged or customised Software
Network	May include but is not limited to <ul style="list-style-type: none"> • large and small LANs, WANs • the internet • PSTN for dial-up modems • CDMA 1X • EV-DO • private lines • VPNs • data and voice • Current Internet Technologies

Architecture	<p>May include but is not limited to:</p> <ul style="list-style-type: none"> • Operating system: any operating system that has multi-user ability, Linux, Mac OS, Windows XP or above • Database software: Oracle, Sybase, Microsoft SQL server, Ingres, DB2, Informix, MySQL, SQL server • Configuration: small memory model, large memory model, requests per second
	<p>Requirements may be in reference to</p> <ul style="list-style-type: none"> • the business • system • application • network • people in the organisation
Solution	<p>May include but is not limited to</p> <ul style="list-style-type: none"> • new hardware, • hardware upgrades, • new software, software upgrades, • user training • implementing a new system
Client	<p>May include but is not limited to</p> <ul style="list-style-type: none"> • internal departments, • external organisations, • individual people • employees
Applications	<p>May include but are not limited to</p> <ul style="list-style-type: none"> • commercial software applications; • organisation-specific software; • word processing, • spreadsheet, • database, • graphic • communication packages <p>May include presentation applications contained in:</p> <ul style="list-style-type: none"> • Microsoft Office • Lotus Suite
Specifications	<p>May include but are not limited to</p> <ul style="list-style-type: none"> • technical requirements • user problem statement • current system functionality
Documentation	<p>May follow</p> <ul style="list-style-type: none"> • ISO/IEC/AS and relevant standards • audit trails • naming standards • version control • project management • report writing conventions • maintaining equipment inventory

	<ul style="list-style-type: none"> • client training • satisfaction reports
Organisational requirements	<p>May be in reference to</p> <ul style="list-style-type: none"> • the business • system • application • network • people in the organisation

Evidence Guide

Critical Aspects of Competence	<p>Demonstrates skills and knowledge in:</p> <ul style="list-style-type: none"> • Specified hardware and software • Conducted walk-through and compared/contrasted expected performance criteria against vendor proposed offerings • Documented and reported on findings
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> • Current industry-accepted hardware and software products • Broad general knowledge of the client business domain, particularly the business function and organisation (e.g. when specifying architecture requirements) • Basic knowledge of cabling and telecommunications technologies (e.g. when specifying architecture requirements) • Broad knowledge of vendor product directions and technology directions (e.g. when specifying hardware and software) • Networking technologies, including broad knowledge of general features and capabilities incorporating substantial depth in some areas (e.g. when specifying architecture requirements) • Broad knowledge of systems architectural design principles and methodologies (e.g. when specifying architecture requirements) • Broad knowledge of modelling techniques and methodologies (e.g. when specifying architecture requirements, and for comparing and contrasting after walk-through of expected performance criteria against vendor proposed offerings)
Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> • Problem solving skills for a broad range of unpredictable problems involving analysis, diagnosis and evaluation (e.g. when specifying the critical principles, functions and framework for the system to operate across the enterprise or business units, taking into consideration the project deliverables, acceptance criteria and current IT blueprint) • Plain English literacy and communication skills in relation to analysis, evaluation and presentation of information (e.g. when the initial statement of hardware needs is written) • Group facilitation and presentation skills in relation to transferring and collecting information (e.g. when estimating current and future capacity requirements and evaluating against client's future

	<p>requirements, and for documenting recommendations for improvement and referring them to appropriate technical specialists)</p> <ul style="list-style-type: none"> • Questioning and active listening skills (e.g. when specifying the critical principles, functions and framework for the system to operate across the enterprise or business units, taking into consideration the project deliverables, acceptance criteria and current IT blueprint) • Technological capability assessment skills involving analysis, diagnosis and evaluation (e.g. when evaluating various products against architecture requirements to determine the best IT solution, and for estimating current and future capacity requirements and evaluating against client's future requirements) • Research skills for specifying, analysing and evaluating broad features of a particular business domain and best practice in system development (e.g. when evaluating various products against architecture requirements to determine the best IT solution, and for benchmarking requirements model against current industry standards and IT blueprint for performance, interoperability and expected future organisational needs) • Project planning skills in relation to set benchmarks and identified scope (e.g. when specifying the critical principles, functions and framework for the system to operate across the enterprise or business units, taking into consideration the project deliverables, acceptance criteria and current IT blueprint) • Report writing skills for business requiring depth in some areas, analysis and evaluation of information in a defined range of areas (e.g. when documenting recommendations for improvement and referring them to appropriate technical specialists)
Resources Implication	<p>Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.</p> <ul style="list-style-type: none"> • Client requirements • The project deliverables • The acceptance criteria • Current IT blueprint • Information on a range of IT business solutions and vendor offerings • Future organisational business process requirements • Technical specifications
Methods of Assessment	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	<p>Competency may be assessed in the work place or in a simulated work place setting</p>

[TOP](#)

Occupational Standard: Web Development and Database Administration Level V	
Unit Title	Manage Web and Database Project
Unit Code	EIS WDDBA5 05 1221
Unit Descriptor	This unit describes the performance outcomes, skills and knowledge required to manage information technology (IT) projects within a medium to large organization

Element	Performance Criteria
1. Manage website and database project activities definition	1.1 Confirm organisational <i>project governance policy and processes</i> 1.2 Confirm web and database problem or opportunity as well as project objectives 1.3 Develop project charter, including preliminary statement of

Page 23	Ministry Science Higher Education Copyright	Web development and Database Administration Ethiopian Occupational Standard	Version 3 Dec 2021
---------	---	---	-----------------------

	<p>project scope and obtain sign-off</p> <p>1.4 Conduct a <i>feasibility</i> study and prepare a business case as necessary</p>
2. Undertake project planning	<p>2.1 Plan web and database <i>system related</i> information-<i>gathering activities</i> to determine project requirements, <i>constraints</i> and risks</p> <p>2.2 Identify project partitioning on the basis of intended system development life cycle and risk</p> <p>2.3 Prepare project work breakdown, schedule and budget</p> <p>2.4 Compile <i>project-management plan documents</i> as necessary to communicate the intended management strategy for the project and obtain sign-off</p>
3. Establish the Web and Database project team	<p>3.1 Identify and select team members, including roles and responsibilities, based on project solution requirements</p> <p>3.2 Determine training and support needs of team members</p> <p>3.3 Establish project team values and agreed behavioural standards with team members</p>
4. Manage project execution activities	<p>4.1 Monitor delivery and acceptance of assigned project team work activities and manage individuals as necessary</p> <p>4.2 Monitor and control the quality of project deliverables</p> <p>4.3 Monitor and control project scope changes, risks and issues</p> <p>4.4 Manage system testing and hand-over activities</p>
5. Coordinate project closure	<p>5.1 Prepare project support plans and <i>maintenance or support documents</i></p> <p>5.2 Obtain final project sign-off</p> <p>5.3 Conduct post-project review and document lessons learned</p> <p>5.4 Review and update disaster recovery plan</p> <p>5.5 Close project</p>

Variable	Range
<i>Project governance policy and processes</i>	May include but not limited: <ul style="list-style-type: none"> • established roles and responsibilities for key project stakeholders • mandated positions to be filled on various project-governance boards or committees, such as the project steering committee or quality-review board • mandated project-management standard or development methodology for the organisation • project portfolio prioritisation process or criteria • project selection process or criteria.
<i>Feasibility</i> in relation to Database solutions	May refer to but not limited: <ul style="list-style-type: none"> • economic • operational • technical.
<i>System related Information-gathering activities</i>	May include but not limited: <ul style="list-style-type: none"> • interviews • research related to existing documents, and similar or previous projects • surveys • workshops.
<i>Development Constraints</i>	May include but not limited: <ul style="list-style-type: none"> • external or internal project dependencies • limitations or standards that the project must adhere to: <ul style="list-style-type: none"> • resources budget • quality • timeframe.
<i>Project-management plan documents</i> may include:	May include but not limited: <ul style="list-style-type: none"> • change control • communications • human resource • procurement • quality • risk management • training.
<i>Hand-over activities</i> may include:	<ul style="list-style-type: none"> • communications to users and other stakeholders • production system environment verification tests • user training and documentation.
<i>Maintenance or support documents</i> may include:	<ul style="list-style-type: none"> • additional tasks or changed responsibilities within the support team for ongoing support of the new system • new policies and procedures and how these differ to current practices • technical documents relating to the system:

	<ul style="list-style-type: none"> • specifications • system dependencies • technical requirements.
--	--

Evidence Guide	
Critical aspects of competence	<ul style="list-style-type: none"> • define, plan, execute and close a reasonably complex project to meet project requirements.
Underpinning Knowledge	<p>Knowledge includes:</p> <ul style="list-style-type: none"> • characteristics of leaders and technical teams • consultation and communication techniques and strategies • how to establish technical teams and determine stages of team development • estimation and cost-analysis techniques • methods of communication and communication styles, including interviewing techniques • objectives and benefits analysis • organisational values, policies and processes • performance management and project team appraisal methods • processes for monitoring team and own performance • project cash flow and budgeting • range of project-management methods and tools • self-awareness
Underpinning Skills	<p>Skills include:</p> <ul style="list-style-type: none"> • analytical skills to determine current system deficiencies and new system objectives • communication skills to: <ul style="list-style-type: none"> - gather stakeholder needs - liaise with enterprise senior management • counselling skills to mentor and coach team members and resolve conflict • literacy skills to present options and recommendations in reports • negotiation skills to ensure expected project outcomes are achievable • numeracy and documentation skills to develop cost-benefit analyses • planning and organisational skills to plan project activities • research skills to identify solution alternatives • technical team management and leadership skills, including providing feedback.
Resources	To demonstrate this unit of competence the following resources will

Implication	be required: <ul style="list-style-type: none"> • real or appropriate simulated organisation with a desire to implement an IT project to address an identified problem, opportunity or unfulfilled legislative need • appropriate learning and assessment support when required modified equipment for people with special needs.
Assessment Methods	Competence may be assessed through: <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, where appropriate.</p> <p>Assessment processes and techniques must be culturally appropriate, and suitable to the communication skill level, language, literacy and numeracy capacity of the candidate and the work being performed.</p> <p>Indigenous people and other people from a non-English speaking background may need additional support.</p> <p>In cases where practical assessment is used it should be combined with targeted questioning to assess required knowledge.</p>

[TOP](#)

Occupational Standard: Web Development and Database Administration Level V	
Unit Title	Develop complex cascading style sheets
Unit Code	EIS WDDBA5 06 1221

Page 27	Ministry Science Higher Education Copyright	Web development and Database Administration Ethiopian Occupational Standard	Version 3 Dec 2021
---------	---	---	-----------------------

Unit Descriptor	This unit describes the performance outcomes, skills and knowledge required to develop complex cascading style sheets (CSS) that are attached to a mark-up language document.
------------------------	---

Element	Performance Criteria
1. Determine requirements and develop CSS	1.1 Obtain user requirements for style 1.2 Develop CSS to match user requirements 2.3 Apply style sheets to multiple pages in a website
2. Use advanced CSS techniques to create web pages	2.1 Style elements of a web page using <i>advanced CSS</i> techniques 2.2 Position document elements using advanced CSS 2.3 Apply style sheets to multiple pages in a website
3. Ensure web page and CSS are validated and tested in all major browsers	3.1 Validate CSS against <i>industry standards</i> 3.2 Test website in various <i>browsers</i> 3.3 Rectify browser differences to ensure website is accessible

Variable	Range
<i>Advanced CSS</i>	May include but not limited: <ul style="list-style-type: none"> • application of browser-specific rules • application of layering to achieve desired design • application of transparency • attribute selectors • fluid page layouts • new release of CSS rules.
<i>Industry standards</i> may include:	May include but not limited: <ul style="list-style-type: none"> • W3C • Web 2.0.
<i>Browsers</i> may include:	May include but not limited: <ul style="list-style-type: none"> • Firefox • Google Chrome • Internet Explorer • Mozilla • Netscape Navigator • Opera • Safari.

Evidence Guide

Page 28	Ministry Science Higher Education Copyright	Web development and Database Administration Ethiopian Occupational Standard	Version 3 Dec 2021
---------	---	---	-----------------------

Critical aspects of competence	<ul style="list-style-type: none"> • develop a complex website styled and formatted using CSS • create a complex page layout using CSS • test web pages in a variety of browsers • Validate the CSS against industry standards.
Underpinning Knowledge	<ul style="list-style-type: none"> • overview knowledge of design principles • detailed knowledge of: <ul style="list-style-type: none"> - hypertext markup language (HTML) and eXtensible hypertext markup language (XHTML) - CSS - hypertext transfer protocol (HTTP) protocol - World Wide Web Consortium (W3C) standards - Techniques to correct browser incompatibilities.
Underpinning Skills	<p>Skills include:</p> <ul style="list-style-type: none"> • analytical skills to identify appropriate CSS rules to be applied to obtain desired result • communication skills to liaise with end users • initiative and enterprise skills to recommend design features • follow documented instruction from a supplied guide • interpret workplace instructions and other technical documents • document element dimensions • relative and absolute measurements • create the CSS in allocated timeframe • plan the layout of the web page • create web pages that will function in a variety of screen resolutions • resolve browser incompatibilities • learning and literacy skills to keep up-to-date with industry guidelines • technical skills to: <ul style="list-style-type: none"> - produce valid accessible web pages - use CSS in the most efficient and effective way.
Resources Implication	<ul style="list-style-type: none"> • appropriate learning and assessment support when required • modified equipment for people with special needs • computer • aesthetic presentation brief • HTML documents to have CSS applied to them • internet access to validate the CSS against the W3C variety of browsers.
Assessment Methods	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning

	<ul style="list-style-type: none"> • Observation / Demonstration
Context of Assessment	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, where appropriate.</p> <p>Assessment processes and techniques must be culturally appropriate, and suitable to the communication skill level, language, literacy and numeracy capacity of the candidate and the work being performed.</p> <p>Indigenous people and other people from a non-English speaking background may need additional support.</p> <p>In cases where practical assessment is used it should be combined with targeted questioning to assess required knowledge.</p>

Occupational Standard: Information Technology Service Management Level V	
Unit Title	Prepare Disaster Recovery and Contingency Plan
Unit Code	EIS WDDBA5 07 1221
Unit Descriptor	This unit defines the competency required to analyse the impact of the system on the organisation and carry out risk analysis, disaster recovery and contingency planning for the project.

Elements	Performance Criteria
1. Evaluate impact of system on business continuity	<p>1.1 Business-critical functions and the security environment is Identify from documentation and from discussion with business area and project team.</p> <p>1.2 Critical data and software is identified from documentation</p> <p>1.3 Potential impacts of business risk and threats on IT systems are assessed.</p> <p>1.4 Statutory requirements, commercial requirements and contingency possibilities are Identified and evaluated according to specifications and cost constraints</p>
2. Evaluate threats to system	<p>2.1 Threats to the system are identified with consideration of security analysis and internal and external business environment.</p> <p>2.2 Risk minimisation alternatives are evaluated against specifications and cost constraints.</p> <p>2.3 Critical components and/or software and document recommendations are identified regarding possible service arrangements</p> <p>2.4 Identified risks and problems are documented.</p>
3. Formulate prevention and recovery strategy	<p>3.1 Prevention and recovery options are evaluated to support critical business functions against business specifications and cost constraints</p> <p>3.2 Current operational procedures are reviewed to ensure adequate risk safeguards and contingency plan are in place</p> <p>3.3 Disaster recovery and prevention strategy is submitted to appropriate person for approval</p>

4. Develop disaster recovery plan to support strategy	<p>4.1 Resources required for disaster recovery are identified and documented according to specifications and cost constraints</p> <p>4.2 Processes required for disaster strategy are identified and documented according to project standards</p> <p>4.3 <i>Cut-over criteria</i> are identified before initiating disaster plan.</p> <p>4.4 Disaster recovery plan is documented and submit to appropriate person for review and sign-off.</p>
---	---

Variable	Range
Business-critical functions	<p>May include but are not limited to</p> <ul style="list-style-type: none"> • financial systems • customer service functions • payroll
Documentation	<p>May follow</p> <ul style="list-style-type: none"> • ISO/IEC/AS standards • audit trails • naming standards • version control • project management templates and report writing • maintaining equipment inventory • client training and satisfaction reports
Project team	<p>May include:</p> <ul style="list-style-type: none"> • <input type="checkbox"/> Solution developers and business clients working together • <input type="checkbox"/> Individual business analysts • A number of third-party solution developers working together • A number of different businesses working in partnership
Software	<p>May include but is not limited to</p> <ul style="list-style-type: none"> • commercial • in-house • packaged or customised software
Specifications	<p>May include but is not limited to</p> <ul style="list-style-type: none"> • technical requirements • user problem statement • current system functionality
Constraints	<p>May include but is not limited to</p> <ul style="list-style-type: none"> • time • budget • resource • hardware, software • policy and legal constraints
System	<p>May include but is not limited to</p> <ul style="list-style-type: none"> • databases • applications • servers

	<ul style="list-style-type: none"> • operating systems • gateways • application service provider and ISP
Appropriate person	<p>May include a</p> <ul style="list-style-type: none"> • supervisor • teacher • authorised business representative or client
Threats	<p>May include:</p> <ul style="list-style-type: none"> • Weather (storms, earthquake) • Security • Information technology failure (hardware, software) • Accident • Espionage • Sabotage (hackers) • Telecommunications network failure • Denial of service • Virus attack <p>Supplementary questioning of the client may be used during the assessment phase, where necessary, to ensure that all issues relating to threats to the system are considered and appropriate choices made given the need to prevent, limit, recover, respond and recover from disasters</p>
Back-up strategy	<p>May include</p> <ul style="list-style-type: none"> • hot standby site • warm standby site • cold standby site • mobile van • supplier • bureau • contacts through user group • third parties
Contingency plans	<p>The contingency plan will vary in format and content detail, but will typically:</p> <ul style="list-style-type: none"> • Identify weaknesses and provide for the implementation of a disaster prevention program • Minimise disruption to business operations • Provide a coordinated approach to the disaster recovery process
Statutory requirements	<p>May include</p> <ul style="list-style-type: none"> • legislation (e.g. Privacy Act) • industry-imposed controls and standards. In certain organisations (e.g. health and banking), there may be strict laws regarding confidentiality and reporting of data
Security environment	<p>May Includes</p> <ul style="list-style-type: none"> • legislation • organisational security policies • customs

	<ul style="list-style-type: none"> • expertise and knowledge that are, or may be, relevant <p>The security environment also includes the threats to security that are, or are held to be, present in the environment</p>
Cut-over criteria	<p>May include:</p> <ul style="list-style-type: none"> • Estimate of time before system is operational • Estimate of business impact • Authorisations to cut-over • Actual system down time • Refresher of cut-over plan
Commercial requirements	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • Back-up • Storage and recovery of data • Access to internal network • Passwords/logons • Encryption • Firewalls • Hacking • Confidentiality • Integrity • Availability
Standards	<p>May include</p> <ul style="list-style-type: none"> • ISO/IEC/AS standards • organisational standards • project standards

Evidence Guide			
Critical Aspects of Competence	<p>Demonstrates skills and knowledge in:</p> <ul style="list-style-type: none"> • Evaluated impact of system on business continuity • Evaluated threats to system • Formulated prevention and recovery strategy • Developed disaster recovery plan to support strategy 		
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> • Broad knowledge of basic engineering (e.g. when evaluating threats) • Broad knowledge of fire/safety knowledge (e.g. when formulating prevention and recovery strategy) • Detailed knowledge of back-up methodologies (e.g. when formulating prevention and recovery strategy) • Broad knowledge of systems engineering (e.g. when evaluating threats) • Specific components of the business planning process relevant to the development of IT business solutions (e.g. when evaluating impact of system on business continuity) • Broad knowledge of the client business domain (e.g. when evaluating impact of system on business continuity) 		
Page 34	Ministry Science Higher Education Copyright	Web development and Database Administration Ethiopian Occupational Standard	Version 3 Dec 2021

	<ul style="list-style-type: none"> Detailed knowledge of the system's current functionality (e.g. when evaluating impact of system on business continuity)
Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> Logistic management skills for identified resources and procedures skills (e.g. when IT hardware, software and resources required for disaster recovery are identified and documented according to project specifications and cost constraints) Negotiation skills in relation to self and other team members and applied to a defined range of predictable problems (e.g. when business-critical functions are identified from project documentation and discussion with client business area and project team) Project planning skills in relation to scope, time, cost, quality, communications, risk analysis and management (e.g. when business-critical functions are identified from project documentation and discussion with client business area and project team, and when contingency possibilities are identified and evaluated according to project specifications and cost constraints) Research skills for specifying, analysing and evaluating broad features of a particular business domain and best practice in system development (e.g. when threats to the system are identified, taking into consideration security analysis and internal and external business environment)□ Facilitation and presentation skills in relation to transferring and collecting information and gaining consensus on concepts (e.g. when business-critical functions are identified from project documentation and discussion with client business area and project team, and when disaster recovery plan is documented and submitted to higher authorities for review and sign-off)
Resources Implication	<p>Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.</p> <ul style="list-style-type: none"> A vulnerability assessment and general definition of requirements Business impact analysis Acceptance test plan Information technology security assurance specifications
Assessment Methods	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> Interview / Written Test / Oral Questioning Observation / Demonstration
Context of Assessment	<p>Competency may be assessed in the work place or in a simulated work place setting</p>

NTQF Level IV

Occupational Standard: Web Development And Database Administration Level IV	
Unit Title	Estimate Cost For Web And Database Projects
Unit Code	EIS WDDBA4 01 1221
Unit Descriptor	This unit describes the performance outcomes, skills and knowledge required to estimate cost, It involves preparing detailed estimates and quotes and updating schematic drawings and specifications.
Elements	Performance Criteria
1. Confirm and update schematic drawings and specifications	1.1. Existing specifications and drawings are obtained and additional or new schematic drawings and specifications prepared for installation if required 1.2. All fittings equipment locations are confirmed with customer
2. Price materials and other relevant items and establish availability	2.1. Quotations and delivery dates are obtained from suppliers to ensure fair comparisons between suppliers 2.2. Material costs are estimated based on company or industry and conditions 2.3. Pricing documentation is checked to ensure supply proposal matches <i>customer specification</i> for material, quality and performance
3. Estimate materials and other relevant item requirements	3.1. Estimations allowing for <i>contingencies</i> are prepared during installation and <i>relevant legislation, codes, regulations and standards</i> 3.2. Costs are calculated using standard unit measures where relevant 3.3. Estimates are ensured to return a profit on installation where appropriate
4. Prepare and confirm quote with customer	4.1. An equipment installation quote that meets customer requirements is prepared 4.2. <i>Changes and variations</i> are negotiated to meet customer and company's needs
5. Establish customer's financial arrangements	5.1. Customer's approval of <i>purchase arrangements</i> and method of payment is obtained 5.2. Finance company negotiations are completed successfully where required and customer's agreement obtained

Variable	Range
Customer specification	May include: Cable Connectors Requirements for: ➤ Equipment

	<ul style="list-style-type: none"> ➤ Labor ➤ Materials ➤ Other resources <p>Timeframes Scope of works Support system.</p>
Contingencies	<p>May include:</p> <ul style="list-style-type: none"> • Need for integration with existing building works schedules where available • Requirements for installation method or of any proprietary system being installed • Relevant constraints.
Relevant legislation, codes, regulations and standards	<p>May Include but not limited :</p> <ul style="list-style-type: none"> • Relevant National standards and codes • ISO/IEC standards • Ethiopian building codes and regulations • Environmental Protection Acts • Fire regulations • Institute of Electrical and Electronics Engineers (IEEE) • Mining legislation • Noise abatement and heritage legislation • OHS • Relevant international standards • Trade Practices Act.
Changes and variations	<p>May Include but not limited :</p> <ul style="list-style-type: none"> • Availability • Delivery • Disputes • Insurance • Maintenance • Preparation of manuals • Restricted site access • Testing requirements • Time penalties.
Purchase arrangements	<p>May Include but not limited:</p> <ul style="list-style-type: none"> • Buy, rent or lease option • Conditions of payment • Conditions surrounding installation/modification • Legal requirements

	<ul style="list-style-type: none"> • Service and warranty arrangements.
--	--

Evidence Guide	
Critical Aspects of Competence	<p>Must demonstrate skills and knowledge of competencies to:</p> <ul style="list-style-type: none"> • prepare detailed estimates, updated schematic drawings and specifications, including material costs for equipment installations • negotiate with contractors on material availability and pricing for customer equipment installations • complete detailed quotes for installations that allow for changes and variations • prepare and confirm quote and financial arrangements with customer
Underpinning Knowledge and Attitudes	<p>Demonstrate knowledge of:</p> <ul style="list-style-type: none"> • features of customer equipment • legislation, codes of practice and other formal agreements that impact on the work activity • manufacturer's requirements for safe operation of equipment • processes and techniques required to prepare plans, estimate and quote for installations • specific occupational health and safety (OHS) requirements relating to the activity and site conditions • typical issues and challenges that occur when dealing with customers
Underpinning Skills	<p>Demonstrate:</p> <ul style="list-style-type: none"> • analytical skills to read and interpret drawings related to customer's equipment • communication skills to liaise and negotiate with customers and suppliers on technical and operational matters • literacy skills to interpret technical documentation, such as equipment manuals and specifications • numeracy skills to estimate and quote for installation • problem solving skills to solve equipment and logistics problems • task management skills to work systematically with required attention to detail and adherence to all safety requirements • technical skills to estimate requirements for customer equipment installation
Resources Implication	<p>Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.</p>
Assessment Methods	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning

	<ul style="list-style-type: none"> • Observation / Demonstration
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

[TOP](#)

Occupational Standard: Web Development And Database Administration level IV

Page 40	Ministry Science Higher Education Copyright	Web development and Database Administration Ethiopian Occupational Standard	Version 3 Dec 2021
---------	---	---	-----------------------

Unit Title	Monitor and Administer Database
Unit Code	EIS WDDBA4 02 1221
Unit Descriptor	This unit defines the competency required to manage, monitor and administer a database.

Elements	Performance Criteria
1. Start up a database	1.1 Configure system for <i>database</i> start-up 1.2 Monitor database start-up and operation for irregularities
2. Manage database	2.1 Take action to ensure that a data dictionary has been compiled and that data structures are in place 2.2 Maintain data integrity constraints according to <i>business requirements</i> 2.3 Create and design indexes and multiple-field keys according to business requirements 2.4 Monitor the locking options chosen for the database 2.5 Confirm that recent back-ups of the database have been stored and that back-ups can be retrieved as a full working copy 2.6 Monitor the data storage space for ongoing viability and resize as needed 2.7 Update data according to <i>organizational guidelines</i>
3. Manage database access	3.1 Allocate or remove access privileges according to user status 3.2 Monitor <i>network server</i> log-in log file for illegal log-in attempts or for security breaches 3.3 Manage <i>system</i> resources in the context of database administration

Variable	Range
Database	May include but is not limited to relational databases, object-relational databases, proprietary databases, commercial off the shelf (COTS) database packages such as Oracle, PostgreSQL, Sybase, Microsoft SQL server, Microsoft Access, Ingres, DB2, DB4, Informix, mSQL, MySQL, SQL server
Business requirements	May include, customer, supplier, payroll, inventory or tax requirements
Organizational guidelines	May include but are not limited to personal use of emails and internet access, content of emails, downloading information and accessing particular websites, opening mail with attachments, virus risk, dispute resolution, document procedures and templates, communication methods and financial control mechanisms.
Network server	May include but is not limited to Novell NetWare 5 or above or any operating system that has multi-user ability, Linux, Mac OS, Windows

	2000 or above
System	May include but is not limited to hardware and software components that run a computer

Evidence Guide	
Critical aspects of Competence	<ul style="list-style-type: none"> Assessment must confirm the ability to consistently manage and administer a database. Monitor data and provide solutions to a defined range of unpredictable problems
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> General knowledge of structured query language (SQL) General knowledge of database administration Detailed knowledge of tuning methodologies General knowledge of the principles of databases Detailed knowledge of database management tools Detailed knowledge of back-up and recovery methodologies Detailed knowledge of database security
Underpinning Skills	<ul style="list-style-type: none"> Analysis skills in relation to working database processes Report writing skills for business Database management skills requiring depth in some areas Analysis and evaluation of information relating to database performance Problem solving skills in database processes Research skills for identifying, analyzing and evaluating features of a particular database
Resource Implications	To demonstrate competence in this unit the candidate will require access to a live database, preferably on a LAN on which there is a server that offers log-in functionality.
Assessment Methods	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> Interview / Written Test / Oral Questioning Observation / Demonstration
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

[TOP](#)

Occupational Standard: Web Development And Database Administration level IV	
Unit Title	Apply Object-Oriented Programming Language Skills
Unit Code	EIS WDDBA4 03 1221

Page 42	Ministry Science Higher Education Copyright	Web development and Database Administration Ethiopian Occupational Standard	Version 3 Dec 2021
---------	---	---	-----------------------

Unit Descriptor	This unit 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.
------------------------	---

Elements	Performance Criteria
1. Apply basic language syntax and layout	1.1 Basic <i>language</i> syntax rules and best practices are observed 1.2 Language data-types, operators and expressions are used 1.3 The appropriate language syntax for sequence, selection and iteration constructs is used. 1.4 A modular programming approach is used 1.5 Arrays and arrays of objects are used
2. Apply basic OO principles in the target language	2.1 A class that contains primitive member/instance variables is implemented 2.2 A class that contains multiple options for object construction is implemented 2.3 A class uses user defined aggregation 2.4 Inheritance is implemented to at least 2 levels of depth 2.5 Polymorphism is used at a simple level through inheritance to enable easy code extension
3. Debug code	3.1 An <i>integrated development environment</i> is used, particularly the language debugging facilities 3.2 Program debugging techniques are used to detect and resolve errors.
4. Document activities	4.1 Guidelines for developing maintainable code adhering to a set of coding standard is followed 4.2 Internal documentation standards and tools are followed and used
5. Test code	5.1 Simple tests are developed and conducted to confirm the coding process meets design specification 5.2 The tests performed are documented 5.3 Corrections are made to the code and the documentation as needed
Variable	Range
Language	This may be any of the following languages, but is not limited to: <ul style="list-style-type: none"> • Visual Basic • Java • C++ • Small Talk • Eiffel

Integrated development environment	This may include but not limited to: <ul style="list-style-type: none"> • Visual C++ • Visual Studio suite • J-Edit • Code Warrior • Jbuilder
------------------------------------	--

Evidence Guide

Critical aspects of Competence	Assessment must confirm that: <ul style="list-style-type: none"> • Application programs are designed and built in accordance with systems and programming requirements and standards. • Application or programs developed using object-oriented language meets required user specifications
Underpinning Knowledge	Knowledge includes: <ul style="list-style-type: none"> • Understanding of Object oriented programming concepts • Object oriented programming language • Small size application development • Using a GUI to interact with operator
Underpinning Skills	Skills include: <ul style="list-style-type: none"> • Reading and interpreting program specifications, translating requirements from problem space to machine space • Integrated Development environment usage • Programming techniques • Internal (code) documentation techniques • Testing and debugging techniques • Documentation techniques
Resources Implication	To demonstrate this unit of competence the following resources will be required: <ul style="list-style-type: none"> • Programming language and development environment • User requirements and specification • Program and documentation standards • Personal computer or workstation
Assessment Methods	Competence may be assessed through: <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

[TOP](#) Occupational Standard: Web Development And Database Administration level IV

Unit Title	Use Advanced Structured Query Language
Unit Code	EIS WDDBA4 04 1221
Unit Descriptor	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.

Elements	Performance Criteria
1. Write ADVANCED SQL statement to retrieve and sort data	<p>2.1 Data from a table and specific columns is retrieved using specific query and Clause used to sort query output</p> <p>2.2 Number of rows restricted is retrieved by placing specific criteria and Clause select statement</p> <p>2.3 Comparison operators in the 'where' clause is used to compare numeric, character, string, date and time data</p> <p>2.4 Boolean operators is used with the correct precedence</p> <p>2.5 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</p> <p>2.6 SQL syntax is used to suppress duplicate values from query results and action taken to exclude null values from a query result</p> <p>2.7 Inner join syntax is employed to retrieve data from two or more tables</p> <p>2.8 'Left outer', 'right outer' and 'full outer' syntax is used to join tables in the select statement</p> <p>2.9 Correct syntax in the 'where' clause is used to retrieve data from multiple tables</p> <p>2.10 Union query that retrieves data from more than one table is written</p>
2. Write ADVANCED SQL statements that use functions	<p>2.1 Arithmetical operations are used with the correct precedence.</p> <p>2.2 String functions and operators is used to obtain the required query output</p> <p>2.3 Mathematical functions are used to obtain the required output, where required</p> <p>2.4 Date functions are used to obtain the required output</p> <p>2.5 SQL aggregate functions are used to obtain the required output</p>
3. Write ADVANCED SQL statements that use aggregation and filtering	<p>3.1 'Group by' used to aggregate data by multiple columns</p> <p>3.2 Aggregated data is sorted in the query output</p> <p>3.3 Aggregated data is filtered using the 'having' clause</p>

Variable	Range
Comparison operators	<p>May include</p> <ul style="list-style-type: none"> • equal to • not equal to • greater than • less than

	<ul style="list-style-type: none"> • greater than or equal to • less than or equal to
Boolean operators	May include <ul style="list-style-type: none"> • use of AND, OR, NOT
Database	May include but not limited to <ul style="list-style-type: none"> • Oracle • Sybase, • Microsoft SQL Server • Ingres • DB2 • Informix • MySQL • Postgres SQL
Arithmetical operators	May include but not limited to: <ul style="list-style-type: none"> • Addition • Subtraction • Multiplication • Modulus • Division
Mathematical functions	May include but not limited to: <ul style="list-style-type: none"> • COS • log • power • Sin • square root
Information requirements	May include but not limited to: <ul style="list-style-type: none"> • reports • summaries • letters • other business documents required by the organization
Tools and equipment	May include but not limited to: <ul style="list-style-type: none"> • Computer • DBMS software

Evidence Guide

Critical aspects of Competence	Demonstrates skills and knowledge in: <ul style="list-style-type: none"> • Write advanced SQL statement to retrieve and sort data • Write advanced SQL statements that use functions • Write advanced SQL statements that use aggregation and filtering • Write and execute SQL sub-queries
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: <ul style="list-style-type: none"> • Broad knowledge of data modeling structures • Data analysis, particularly in determining data types, data structures and to query and report design

	<ul style="list-style-type: none"> • Run time facilities in relation to implementing live database • DBMS fundamentals
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Assessment Methods	Competency may be assessed through: <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

Occupational Standard: Web Development And Database Administration level IV	
Unit Title	Determine Suitability of Database Functionality and Scalability
Unit Code	EIS WDDBA4 05 1221
Unit Descriptor	This unit defines the competence required to identify current and future business requirements for a database.

Elements	Performance Criteria
1. Determine database functionality	<p>1.1 Business requirements are defined following existing data.</p> <p>1.2 Database objectives are confirmed inline with defined requirements.</p> <p>1.3 Database is analyzed to identify the business rules, entities and relationships.</p> <p>1.4 Existing and proposed business models are identified.</p> <p>1.5 Existing database and environment are documented according to work place procedure.</p> <p>1.6 Database functionality is confirmed with client.</p>
2. Identify scalability and functionality requirements	<p>2.1 Reserve and long-term capacity of the database is identified.</p> <p>2.2 Implications for the system architecture, data models, data structures, and hardware and software requirements are identified for scalability.</p> <p>2.3 Functionality and scalability features of the database are compared.</p> <p>2.4 Gap between the features is determined and documented.</p>
3. Prepare report	<p>3.1 Functionality and scalability of database are documented.</p> <p>3.2 Report on database functionality and scalability is submitted to client for review.</p>

Variable	Range
Objectives	<p>May include but are not limited to how and what the organization wants to achieve in:</p> <ul style="list-style-type: none"> • work environment • problem solution processes • preventative maintenance and diagnostic policy • roles and technical responsibilities in the IT department • vendor and product service-level support agreements
Database	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • relational databases • object-relational databases • proprietary databases

	<ul style="list-style-type: none"> commercial off the shelf (COTS) database packages
Documentation	<p>May follow:</p> <ul style="list-style-type: none"> ISO/IEC/AS standards, audit trails, naming standards, version control, project management templates and report writing principles
Client	<p>May include but not limited to:</p> <ul style="list-style-type: none"> internal departments, external organizations, individual people and employees
System architecture	<p>May include but not limited to:</p> <ul style="list-style-type: none"> Operating system: Novell NetWare 5 or above or any operating system that has multi-user ability, Linux, Windows 7 or above Database software: Oracle, Sybase, Microsoft SQL server, Ingres, DB2, Informix, mSQL, MySQL, SQL server Configuration: small memory model, large memory model, requests per second
Hardware	<p>May include but not limited to:</p> <ul style="list-style-type: none"> workstations personal computers modems and other connectivity devices networks DSL modems remote sites and servers
Software	<p>May include but not limited to:</p> <ul style="list-style-type: none"> commercial in-house packaged or customized software

Requirements	<p>May be in reference to:</p> <ul style="list-style-type: none"> the business system platform application database network or people in the organization
Scalability	<p>May include:</p> <ul style="list-style-type: none"> reserve capacity and long-term capacity <p>In relation to databases</p> <ul style="list-style-type: none"> scalability relates to multi-tier architecture scalable workflow architecture database replication distributed databases, server clustering

Tools and equipment	May include but not limited to: <ul style="list-style-type: none"> • Computers , • DBMS software
---------------------	--

Evidence Guide

Critical aspects of Competence	Demonstrates skills and knowledge in: <ul style="list-style-type: none"> • Identifying entities and relationships • Developing normalization • Validating model
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: <ul style="list-style-type: none"> • OHS principles and responsibilities in regard to self and others • Function and features of databases • Data modeling • Network architecture • Common system hardware in relation to • client/server/database architecture
Underpinning Skills	Demonstrates skills to: <ul style="list-style-type: none"> • Determine database functionality • identify scalability and functionality requirements
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

[TOP](#)

Occupational Standard: Web Development And Database Administration level IV	
Unit Title	Perform Database System Test
Unit Code	EIS WDDBA4 06 1221
Unit Descriptor	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.

Elements	Performance Criteria
1. Prepare for test	<p>1.1 Test environment is prepared in line with work guideline.</p> <p>1.2 Software life cycle is determined based on work principles.</p> <p>1.3 Test plan and appropriate test tools are defined.</p> <p>1.4 System is recognized and separated into run able modules mirroring live scenarios.</p> <p>1.5 Logs and result sheets are gathered and prepared.</p> <p>1.6 Scheduled test are announced to ensure preparedness and understanding of implications for operations.</p> <p>1.7 Test scripts (online test) or test run (batch test) are prepared for running.</p> <p>1.8 Expected results are reviewed against acceptance criteria (walkthrough) and system requirements Documentation.</p>
2. Conduct test	<p>2.1 Test scripts and document results are run in line with test and acceptance processes.</p> <p>2.2 Required quality benchmarks or comparisons are performed in readiness for acceptance testing.</p> <p>2.3 Organization/industry standards are adopted, where appropriate.</p> <p>2.4 Actual results to expected results are compared on completion of each system unit, and completed result sheets.</p>
3. Report problems that affect quality	<p>3.1 Recognize potential or existing quality problems.</p> <p>3.2 Identify instances of variation in quality from specifications or work instructions.</p> <p>3.3 Report variation and potential problems to supervisor/manager according to sector guidelines</p>

Variable	Range
test environment	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • Data • program libraries • network/communications and other equipment • operating system and other support software

Test tools	<p>May include:</p> <ul style="list-style-type: none"> • Code/unit/class testing: <ul style="list-style-type: none"> ▪ Assert Mate, Bounds Checker, C-Cover, Code Review, Code Wizard, Deep Cover, FailSafe, Hindsight, Insure++, JCAST, Logiscope, Java Pure Check • Stress load testing: automated test facilities, e-Load, E-TEST Suite, e-MONITO, Astra SiteManager, Astra SiteTest, AutoTester Web, LoadRunner, JavaLoad • Applications testing: <ul style="list-style-type: none"> ▪ DataShark, Cyrano Suite, Datatect, preVue-C/S
Tools and equipment	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • Test server (computer), • Wamp • Xaamp • Filezilla • DBMS and DB applications

Evidence Guide	
Critical Aspects of Competence	<p>Demonstrates skills and knowledge in:</p> <ul style="list-style-type: none"> • preparing test cases • conducting test • Monitoring quality of work • Reporting problems that affect quality • Implementing quality assurance procedures
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> • broad general knowledge of system requirements with detailed knowledge of particular system requirements and features • broad knowledge of automated test tools with detailed knowledge of features and processes in some areas • organizational rules for preparing test • detailed knowledge of underlying test data • detailed knowledge of input/output requirements • Accessing and using management systems to keep and maintain accurate records
Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> • prepare for test • conduct test • Participating in maintaining and improving quality at work • Identifying hazards and critical control points in process of production
Resources Implication	<p>Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.</p>

Assessment	Competency may be assessed through:
------------	-------------------------------------

Methods	<ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

[TOP](#)

Occupational Standard: Web Development And Database Administration level IV	
Unit Title	Complete Database Backup and Recovery
Unit Code	EIS WDDBA4 07 1221

Page 53	Ministry Science Higher Education Copyright	Web development and Database Administration Ethiopian Occupational Standard	Version 3 Dec 2021
---------	---	---	-----------------------

Unit Descriptor	This unit defines the competency required to back-up and recover a database
------------------------	---

Elements	Performance Criteria
1. Review database architecture	<p>1.1 The architecture of a database file system is identified and consequently, determined the most appropriate methods for back-up and recovery</p> <p>1.2 Risks and failure scenarios are identified and examined that are likely or possible</p>
2. Determine backup methods appropriate to database requirements	<p>2.1 A range of back-up and restoration methods are evaluated based on organizational and security standard and on the assessment of likely or possible failure scenarios</p> <p>2.2 Full off-line back-ups are completed according to organizational and security standards with minimal down time</p> <p>2.3 On-line file back-ups are completed as determined by organizational and security standards and with minimal down time</p> <p>2.4 Disk mirroring and redundant array of inexpensive disks (RAID) hard disk configurations are employed to keep copies of files</p> <p>2.5 Off-site copies of back-up files are arranged</p>
3. Establish recovery points and disaster recovery procedures	<p>3.1 Database recovery points are determined based on the back-up arrangements according to organizational Guidelines.</p> <p>3.2 The restore process is tested in order to ensure that the database can be restored to a given recovery point, with minimal down time</p> <p>3.3 The restoration of the database to the point of failure is completed, without loss of committed transactions</p>

Variable	Range
Occupational Health and Safety (OHS)	<ul style="list-style-type: none"> • Correct posture, lighting, type of desk, type of monitor, style of chair, typing position, repetitive strain injury prevention, ventilation, light position, correct lifting method, and length of time in front of computer. • May also include physical safety considerations such as general electrical safety and cabling, power supply and leads as they apply to computer and peripheral installations.
Tools and equipment	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • Computers , DBMS software, Tapes, Server

Evidence Guide

Critical aspects of Competence	<p>Assessment must confirm the ability to:</p> <ul style="list-style-type: none"> • apply problem solving techniques to determine the root cause of a routine malfunction or to refer the problem according to escalation procedures
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> • Broad knowledge of help desk and maintenance practices • Current industry-accepted hardware and software products, with broad knowledge of general features and capabilities and detailed knowledge in some areas • Broad knowledge of the operating system • Broad knowledge of current industry practices • Broad knowledge of diagnostic tools
Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> • review database architecture • determine backup methods appropriate to database requirements • establish recovery points and disaster recovery procedures
Resources Implication	<p>Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.</p>
Assessment Methods	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	<p>Competency may be assessed in the work place or in a simulated work place setting</p>

[TOP](#)

Occupational Standard: Web Development And Database Administration level IV	
Unit Title	Create Technical Documentation
Unit Code	EIS WDDBA4 08 1221

Unit Descriptor	This unit defines the competency required to create technical documentation that is clear to the target audience and easy to navigate
------------------------	---

Elements	Performance Criteria
1. Identify and analyze documentation needs	1.1 The client is consulted to identify documentation requirements. 1.2 Documentation requirements are interpreted and evaluated, and details with the client confirmed 1.3 Industry and documentation standards are investigated for requirements 1.4 The scope of work is defined and documented to be produced 1.5 The client is consulted to validate and confirm the scope of work
2. Design documentation	2.1 Information requirements are identified with reference to layout and structure documented 2.2 Document templates and style guides are created consistent with information requirements 2.3 A review of the system is conducted in order to understand its functionality 2.4 Content that meets information requirements is extracted in accordance with relevant copyright restrictions 2.5 The structure of the technical documentation is developed giving focus to the flow of information, style, tone and content format 2.6 The technical documentation structure is validated with the client
3. Develop documentation	3.1 Technical documentation is written based on the template and scope of work using the information gathered 3.2 Technical terminology is translated into plain English where appropriated 3.3 Content format and style is applied in accordance with relevant documentation standards and templates
4. Evaluate and edit documentation	4.1 Technical documentation is submitted to appropriate person for reviewed 4.2 Feedback is gathered and analyzed following working guideline. 4.3 Alterations into the technical documentation is incorporated 4.4 The technical documentation is edited for technical and grammatical accuracy

Variable	Range
Requirements	May be in reference to the business, system, application, organizational policies, network or people in the organisation

Client	May include but is not limited to internal departments, external organizations, individual people and internal employees
System	May include but is not limited to network, application, software, business, computers, financial system, management system and information system
Technical documentation	May include system or project specifications, system design, system functionality, reports, help references, technical manuals, operational procedures, training materials and self-paced tutorials, on-line help, user guides and brochures.
Appropriate person	May include a supervisor, teacher, authorized business representative or client.
Channels	May include text, audio, animation and graphics provided through books, manuals, CD-ROMs, DVDs, computer-based tutorials, help screens and the world wide web.
Content	May include information and interactive features, such as product information, company information, copyright and disclaimer notices, site map, frequently asked questions, what's new, customer-specific information, customer only information, error messages, instructions, feedback mechanisms, reference pages, forms, background articles, ratings/rankings/testimonials/quotes from reviews, hyperlink titles.
Documentation standards	May include but are not limited to policy relating to sign-off, storage, distribution, revision. May include ISO/IEC/AS standards, organizational standards, audit trails, naming conventions, version control, project management templates and report writing principles

Evidence Guide	
Critical Aspects of Competence	<p>Assessment must confirm the ability to create technical documentation that meets business requirements, caters for a diverse readership, is clear to the target audience and easy to navigate such as</p> <ul style="list-style-type: none"> • Identified and analyzed documentation needs • Designed documentation • Developed documentation • Evaluated and edited Documentation
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> • Content features, such as clarity and readability • Instructional design principles • Functions and features of templates and style guides • Document design, web design and usability • The use of word processing software and multimedia authoring tools • Identifying target audiences • Analyzing audience needs • Identifying relevant content • Determining appropriate content, formats and styles • Writing content
Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> • design documentation

	<ul style="list-style-type: none"> • develop documentation
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Assessment Methods	Competency may be assessed through: <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

[TOP](#)

Occupational Standard: Web Development And Database Administration level IV	
Unit Title	Produce server-side script for dynamic web pages
Unit Code	EIS WDDBA4 09 1221
Unit Descriptor	This unit defines the outcomes, skills and knowledge required to produce server-side scripts for dynamic web pages, using a range of relevant features from different appropriate languages.

Elements	Performance Criteria
-----------------	-----------------------------

1. Analyse requirements for web documents requiring server-side dynamic interaction	1.1 Determine necessary dynamic functionality of the web document 1.2 Determine appropriate language to achieve that functionality 1.3 Determine web document requirements
2. Design server-side scripts	2.1 Design web document and server-side code to interact with an external data source 2.2 Design web document and server-side code to allow an administrator to insert, update and delete entries to the external data source 2.3 Implement security features in the web document
3. Produce web documents	3.1 Write eXtensible hypertext markup language (XHTML) considering accessibility 3.2 Write server-side scripts to current XHTML standards
4. Test scripts and debug	4.1 Test web document against required functionality and reiterate until correct 4.2 Complete documentation and submit to appropriate person for approval
5. Set up security	5.1 Determine necessary permissions to prevent error messages displaying to the public 5.2 Configure server software to minimise potential database attacks

Variable	Range
Web document	may include but not limited: <ul style="list-style-type: none"> previously created and new HTML documents; saved email files with or without attachments saved HTML documents.
Language	may include but not limited: <ul style="list-style-type: none"> active server pages (ASP) .NET Perl hypertext pre-processor (PHP) Ruby On Rails.
External data source	may include but not limited: <ul style="list-style-type: none"> Microsoft Structured Query Language (MS SQL) database MySQL database

	<ul style="list-style-type: none"> • Oracle database • Postgre database • eXtensible markup language (XML).
Documentation	<p>may include but not limited:</p> <ul style="list-style-type: none"> • audit trails • International Organization for Standardization (ISO), International Electrotechnical Commission (IEC) and Australian Standards (AS) standards • naming standards • project-management templates • report-writing protocols • version control.
Appropriate person	<p>may include but not limited:</p> <ul style="list-style-type: none"> • authorised business representative • client • supervisor.

Evidence Guide	
Critical aspects of Competence	<p>Evidence of the ability to:</p> <ul style="list-style-type: none"> • create dynamic web pages from a client requirement using server-side scripting to retrieve information from a web-hosted database • create scripts for the quick upload of data to web-hosted databases • create server-side scripts for inserting, updating and deleting data from a web server database • create server-side scripts to encode passwords • create server-side scripts to upload and retrieve images • create server-side scripts to manage sessions and secure login.
Underpinning Knowledge and Attitudes	<ul style="list-style-type: none"> • server-side technologies and relevant web scripting languages • server-side web analysis and design parameters • programming control structures, object-oriented programming • hypertext transfer protocol (HTTP) • stateless programming • session management • authentication and web security.
Underpinning Skills	<ul style="list-style-type: none"> • determine functional requirements • identify dynamic server-side requirements • create a user-friendly web page • liaise with the client • initiative and enterprise skills to provide feedback and recommend the most appropriate technology solutions

	<ul style="list-style-type: none"> • learning skills to research encountered problems independently • follow documented instruction from a supplied guide • follow server-side naming conventions • interpret workplace instructions and other technical documents • keep up-to-date with latest industry guidelines • planning and organisational skills to determine the most appropriate solution • identify and rectify website functional problems • identify and resolve bugs in the code created • identify and resolve error messages • select the most efficient and effective algorithms • best-fit solution to client requirements • solutions to encountered problems • apply web-programming concepts • create hypertext markup language (HTML) and XHTML pages • create software in a variety of server-side languages • create web pages that are aesthetically pleasing, logically laid out and user-friendly.
Resources Implication	<p>Assessment must ensure access to:</p> <ul style="list-style-type: none"> • client requirements • functionality and scope requirements • security policy • database server • internet and server access • software development environment • web browsers ment support when required. • Where applicable, physical resources • appropriate learning and assess • should include equipment modified for people with special needs.
Assessment Methods	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration

Occupational Standard: Web Development And Database Administration level IV	
Unit Title	Maintain Website Information Standard
Unit Code	EIS WDDBA4 10 1221
Unit Descriptor	This unit describes the performance outcomes, skills and knowledge required to establish and maintain the accuracy and usability of information stored on client websites.

Elements	Performance Criteria
1. Prepare and publish organisational content and information required by industry for website	1.1 Validate organizational information and seek approval prior to uploading to a website 1.2 Ensure specific <i>details</i> of the organisation are made available on the website 1.3 Ensure privacy, security and liability statements are correctly displayed on the website and conform to <i>legislative requirements</i> and <i>web development standards</i> 1.4 Develop and make available <i>organisational information</i>
2. Provide navigation links and payment information	2.1 Ensure website users have navigation links to access appropriate information regardless of where they are located within the website 2.2 List various payment options on the website
3. Ensure disclosure of policies and services	3.1 Present a clear website statement outlining <i>charges</i> 3.2 Present <i>warranty information</i> on appropriate screen, prior to finalising orders 3.3 Provide <i>after-sales support</i> and services information and direct website user to its location 3.4 Ensure website contains policies regarding cancellations, returns and refunds, and associated conditions
4. Communicate product or service conditions and notifications	4.1 Ensure appropriate screens display limitations and legislative restrictions on who or where goods and services will be sold or shipped to 4.2 Ensure the website provides facilities to confirm orders and cancellations as quickly as possible 4.3 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

5. Ensure customer service support	<p>5.1 Explain service <i>standards</i> and make them available to all potential and current website users</p> <p>5.2 Ensure website users have a method for providing feedback on aspects of information held on the website</p> <p>5.3 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</p>
6. Facilitate group discussion	<p>6.1 Mechanisms which enhance <i>effective group interaction</i> is defined and implemented</p> <p>6.2 Strategies which encourage all group members to participate are used routinely</p> <p>6.3 Objectives and agenda for meetings and discussions are routinely set and followed</p> <p>6.4 Relevant information is provided to group to facilitate outcomes</p> <p>6.5 Evaluation of group communication strategies is undertaken to promote participation of all parties</p> <p>Specific communication needs of individuals are identified and addressed</p>

Variable	Range
<i>Details</i>	<p>may include but not limited:</p> <ul style="list-style-type: none"> • contact details • physical address • virtual details for online communications • web presence information.
<i>Legislative requirements</i>	<p>may include but not limited:</p> <ul style="list-style-type: none"> • copyright • liability statements • privacy legislation.
<i>Web development standards</i>	<p>may include but not limited:</p> <ul style="list-style-type: none"> • Authoring Tool Accessibility Guidelines (ATAG) • User Agent Accessibility Guidelines (UAAG) • Web Content Accessibility Guidelines (WCAG).
<i>Organisational information</i>	<p>may include but not limited:</p> <ul style="list-style-type: none"> • copyright notice on website if required • information to notify the website user of which country the website is located in • information with regard to licences or qualifications or memberships needed by potential users of the website • local laws applicable to transactions that may be conducted

	<ul style="list-style-type: none"> • notation on website indicating when the site was last updated • policy on how information gathered on website users by the website will be handled.
<i>Charges</i>	may include but not limited: <ul style="list-style-type: none"> • product or service costs • shipping and handling charges and taxes to the customer prior to finalising orders.
<i>Warranty information</i>	may include but not limited: <ul style="list-style-type: none"> • length of warranty • time limits on warranty coverage • what is covered • what is not covered • who administers the warranty.
<i>After-sales support</i>	may include but not limited: <ul style="list-style-type: none"> • duration of service and support • nature of service and support • under what circumstances it is provided or made available • who is responsible for it.
<i>Standards</i>	may include but not limited: <ul style="list-style-type: none"> • International Organization for Standardization (ISO), International Electrotechnical Commission (IEC) and Australian Standards (AS) standards • organisational standards • project standards.
<i>effective group interaction</i>	<ul style="list-style-type: none"> • Identifying and evaluating what is occurring within an interaction in a non-judgmental way • Using active listening • Making decision about appropriate words, behavior • Putting together response which is culturally appropriate • Expressing an individual perspective Expressing own philosophy, ideology and background and exploring impact with relevance to communication

Evidence Guide

Critical aspects of Competence	Evidence of the ability to: <ul style="list-style-type: none"> • Demonstrated effective communication skills with clients accessing service and work colleagues • evaluate and analyse current practices • interpret organisation, legislative and industry requirements • develop policy • provide a site accessible to a variety of customers via electronic communication • ensure that information meets all the requirements for an effective
--------------------------------	--

	and efficient e-commerce interaction.
Underpinning Knowledge and Attitudes	<ul style="list-style-type: none"> • Dynamics of groups and different styles of group leadership • Communication skills relevant to client groups • consumer protection legislation • content features, including clarity and readability • document design, web design and usability • electronic commerce modelling language • information architecture • instructional design principles • obligations of merchants and service providers • organisational requirements • privacy legislation.
Underpinning Skills	<ul style="list-style-type: none"> • analytical skills to collect and evaluate organisational information for web publication • communication skills to liaise and negotiate with colleagues and clients • interpret and write organizational policy • interpret legislative and standards requirements • analyses websites • publish on a website • write hypertext markup language (HTML) code. • Role boundaries setting • Negotiation • Establishing empathy
Resources Implication	<p>Assessment must ensure access to:</p> <ul style="list-style-type: none"> • range of organisational policies, procedures and guidelines • customer service manuals and general data • appropriate organisational structures • information standards for legislative and organisational requirements • software and web development tools • appropriate learning and assessment support when required • modified equipment for people with special needs.
Assessment Methods	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

NTQF Level III

Occupational Standard: Web Design and Database Administration Level III	
Unit Title	Website Technical Requirements modeling
Unit Code	EIS WDDBA3 01 1221
Unit Descriptor	This unit defines the competence required to design a website to specifications within a particular technical and human interface environment.

Elements	Performance Criteria
1. Define technical environment	<p>1.1 Business requirements, hardware and software requirements are identified following working procedures.</p> <p>1.2 Software and hardware types are defined to ensure that site is designed to meet business requirements.</p> <p>1.3 Appropriate standards, software and hardware required to develop the site are identified in accordance with business requirements.</p>
2. Define human computer interface	<p>2.1 User analysis is conducted to determine a user profile and user needs in line with work steps.</p> <p>2.2 User content and requirements are determined in accordance with business requirements.</p> <p>2.3 Appropriate design principles are determined for site.</p> <p>2.4 Appropriate operating system is identified in accordance with user needs.</p>
3. Determine site hierarchy	<p>3.1 Hierarchy of pages is identified according to site design.</p> <p>3.2 Logic and accessibility of content to user is ensured according to business requirements.</p> <p>3.3 Consistency and clarity of navigation between pages is ensured in line with site hierarchy.</p>
4. Gather data through formal and informal processes	<p>4.1 Information gathering workshops and interviews are conducted to gather data</p> <p>4.2 Reports and other data sources are reviewed for relevant business information</p> <p>4.3 Business-critical factors relating to current and future directions of the organization are confirmed with stakeholders</p> <p>4.4 Group and individual responses are analyzed to clearly define business priorities</p>

Variable	Range
Business requirements	May include but not limited to: <ul style="list-style-type: none"> • meeting customer needs • organizational goals
Hardware	May include but not limited to: <ul style="list-style-type: none"> • workstations • personal computers • modems and other connectivity devices • remote sites and servers
Standards	May include <ul style="list-style-type: none"> • XML standards • ISO and IEEE to web-oriented groups like IETF and W3C, IEEE Std
User	May include <ul style="list-style-type: none"> • a person within a department • a department within the organization or a third party
Operating system	May include but not limited to: <ul style="list-style-type: none"> • Windows variety • Linux
Information hierarchy	May include <ul style="list-style-type: none"> • page layout • technical specifications • content structure • secure access provisions and locations and links to other internet resources where appropriate
Design principles	May include but are not limited to : <ul style="list-style-type: none"> • user compatibility • product compatibility • task compatibility • workflow compatibility • consistency • familiarity • simplicity • WYSIWYG • Flexibility • Responsiveness

	<ul style="list-style-type: none"> • invisible technology • robustness • protection • ease of learning
Search engine	A website that allows the entry of a search parameter and based on the request, searches through its list of websites for the best match. It then displays the results for selection A wide variety of search tools may be used
Tools and equipment	May include but not limited to: <ul style="list-style-type: none"> • Web servers • e-business website • Site servers software • Requirements documentation • Customer relationship model
<i>Business-critical factors</i>	<ul style="list-style-type: none"> • response times • scalability • traffic • data knowledge and management • security • customer demographics • customer confidence • expectations

Evidence Guide	
Critical aspects of competence	Assessment confirmed that the candidate has - <ul style="list-style-type: none"> • gathering data through different processes • identified business requirements • defined technical environment • defined human computer interface • determined site hierarchy
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: <ul style="list-style-type: none"> • current industry systems development methodologies • Current industry-accepted hardware and software products, including broad knowledge of general features and capabilities • website architecture principles • website development tools and standards

	<ul style="list-style-type: none"> • business process design • documenting technical specifications • basic information architecture
Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> • gather data through formal and informal processes • define the technical environment • define the human computer interface • determine site hierarchy • design website • ensure analysis is accurate and complete
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Assessment Methods	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

[TOP](#)

Occupational Standard: Web development and Database administration Level III	
Unit Title	Model Data Object
Unit Code	EIS WDDBA3 02 1221
Unit Descriptor	This unit describes the performance outcomes, skills and knowledge required to understand business operations, identify entities and data, diagrammatically represent their relationships and prepare a data model.

Element	Performance Criteria
1. Identify entities and relationships	<p>1.1 Analyse business data to understand operations</p> <p>1.2 Identify boundaries of the <i>system</i></p> <p>1.3 Identify <i>entities</i>, attributes, <i>data types</i> and <i>relationships</i> of</p>

	data 1.4 Review business rules to determine impact 1.5 Document relationships in an entity relationship diagram
2. Develop normalisation	2.1 Identify suitable business data 2.2 Undertake normalisation of business data and document results 2.3 Compare normalisation results with entity relationship diagram 2.4 Reconcile differences between data
3. Validate model	3.1 Validate data model with client 3.2 Resolve issues or recommendations 3.3 Document completed data model 3.4 Submit to client for final approval

<i>Variable</i>	<i>Range</i>
<i>System</i>	May include but not limited: application service provider applications databases gateways internet service provider (ISP) operating systems servers.
<i>Entities</i>	May include but not limited: concept object person.
<i>Data types</i>	May include but not limited: <ul style="list-style-type: none"> • character large object (CLOB), double-byte character large object (DBCLOB) • character string • date-time and binary string

	<ul style="list-style-type: none"> • double-byte (or graphic) character string • large object (LOB), binary large object (BLOB) • numeric • structured types and reference types • user-defined type (UDT).
Relationships	<p>May include but not limited:</p> <p>many-to-many</p> <p>many-to-one</p> <p>one-to-many</p> <p>one-to-one.</p>

Evidence Guide

Overview of assessment	
Critical aspects for competencies	<p>Evidence of the ability to:</p> <p>model valid data objects</p> <p>normalise the model</p> <p>validate the model.</p>
Underpinning Knowledge	<ul style="list-style-type: none"> • database identifiers and their impact on database usability • normalization rules and processes • type hierarchies, including sub-types, super-types, root-types related to development of structured data types • validation procedures and processes • an approach to data modelling, such as the entity-relationship model, keys, e.g. unique keys, composite keys, primary keys and primary index • time stamps related to the use of keys • user-defined types, structured types, reference types and user-defined functions
Underpin Skill	<ul style="list-style-type: none"> • analytical skills to analyse business data • communication skills to liaise with clients • problem-solving skills to solve problems that arise with the entity relationships • technical skills to: • develop entity-relationship models in tables • relate identifier selection to business domain • relate user specifications to data model • transfer customer requirements into data model.

Resources implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Method of assessment	Competence may be assessed through: <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.

[TOP](#)

Occupational Standard: Web Development and database administration Level IV	
Unit Title	Develop Website Information Architecture
Unit Code	EIS WDDBA3 03 1221
Unit Descriptor	This unit defines the competence required to develop information architecture for a complex website that meets current and future business requirements.

Elements	Performance Criteria
1. Identify content needs	1.1 Strategic intent of website are identified from business <i>requirements</i> and <i>client</i> expectations 1.2 Information requirements are develop based on the website intent, intended audiences, types of client interactions, and long- and short-term goals for the site 1.3 Required information are identified and grouped into business schemes related to the business structure 1.4 Content requirements are determined for each process
2. Plan content structure	2.1 Information and documents are clustered in related topics 2.2 Hierarchy of information is developed and data checked to confirm sequence of hierarchy 2.3 Ensure that labels are clear, consistent, coherent and relatively intuitive for client to access

3. Develop navigation system	<p>3.1 Navigation system for overall website is built based on business requirements</p> <p>3.2 Ease of navigation on the site is ensured and provided different ways of searching, while providing feedback to client</p> <p>3.3 Navigation system is ensured to give users the flexibility to find the information and products they want</p> <p>3.4 Consistent and logical labeling system is develop taking into account client demographics</p>
4. showcase and sign off	<p>4.1 Prototype of information architecture design is constructed</p> <p>4.2 Arrange for a subset of the client to test the prototype for usability to determine if architecture meets client expectations</p> <p>4.3 Site content is ensured to be formatted correctly in the business and client technical environment</p> <p>4.4 Architecture is adjusted based on client feedback</p> <p>4.5 Sign off prototype are met to confirm current and future business requirements</p>
Variable	Range
Requirements	May be in reference to the business, system, application, network or people in the organization
Client	May include but is not limited to internal departments, external organizations, individual people and employees
Content	May include information and interactive features such as product information, organizational information, copyright and disclaimer notices, site map, frequently asked questions, what's new, customer-specific information, customer-only information, error messages, instructions, feedback mechanisms, reference pages, forms, background articles, ratings/rankings/testimonials/quotes from reviews, hyperlink titles

Evidence Guide	
Critical aspects of Competency	<p>Assessment must confirm the ability to –</p> <ul style="list-style-type: none"> develop the information architecture of a complex website that meets current and future business requirements confidently and readily access the information required
Underpinning Knowledge and Attitudes	<p>Demonstrate knowledge of:</p> <ul style="list-style-type: none"> website architecture and business process design and linkages between processes client and requirement understanding and how e-business sites fit

	into corporate strategy <ul style="list-style-type: none"> • implications of technology connectivity and documentation of technical specifications
Underpinning Skills	Demonstrate skills of – <ul style="list-style-type: none"> • website analysis • use of website design software and hardware • user analysis • integrating on-line processes
Resources Implication	The following resources must be provided: <ul style="list-style-type: none"> • E-business website • Business strategy • Client demographics documentation
Assessment Methods	Competence may be assessed through: <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

[TOP](#)

Occupational Standard: Web Development And Database Administration Level III	
Unit Title	Design Program Logic
Unit Code	EIS WDDBA3 04 1221
Unit Descriptor	This unit defines the competency required to describe the various processes in a program to ensure that there is understanding of user and design requirements.

Elements	Performance Criteria
1. Select the program logic design approach	<p>1.1 <i>Design documentation</i> is obtained and the requirements for the programs are reviewed and clarified.</p> <p>1.2 <i>Design approach</i> to be taken in coding and the modules and links required is determined</p>
2. Document the program logic or design	<p>2.1 Diagrams of program flow and modules are structured according to <i>project standards</i></p> <p>2.2 Program scope and limits are documented according to project standards</p> <p>2.3 Special routines or procedures are documented or referenced according to project standards</p> <p>2.4 References for tables, files, inputs, outputs, and other program functionalities are identified and revised according to program requirements</p> <p>2.5 Templates are used as applicable</p>
3. Validate the design	<p>3.1 Program flow, states or conditions are checked for interfaces and compliance to design documentation requirements</p> <p>3.2 Feedback/input is gained from <i>appropriate person</i> as needed</p>

Variable	Range
----------	-------

Design approach	<p>The various program logic design approach may include, but not limited to the use of:</p> <ul style="list-style-type: none"> • pseudo codes • flowcharts • diagrams • ERDs • HIPO Charts • data flow diagrams • data structures • RAD • case tools • prototyping • modular programming
Design documentation	Any form of written documentation of the system or program requirements received by a programmer from the systems analyst, project manager or supervisor.
Appropriate person	<p>This may be the:</p> <ul style="list-style-type: none"> • systems analyst • supervisor • another programmer • teacher • user
Project standards	<p>This may include, but not limited to:</p> <ul style="list-style-type: none"> • Client imposed systems development standards methodologies • Available commercial tools like: Visio, Smart draw, or case tools

Evidence Guide	
Critical Aspects of Competence	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> • Programming and program logic formulation or design skills • Assessment must confirm the ability to meet technical requirements by successfully producing the required program design
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> • Understanding of system specification and requirements • Knowledge of programming or coding • Knowledge of programming using constructs/ modules/ objects • Concepts of various program and system lifecycle options • Knowledge of program design and structure
Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> • Use and application of various design documentation tools • Coding programs • Designing and debugging program logic and flow
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.

Assessment Methods	Competency may be assessed through: <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

[TOP](#)

Occupational Standard: Web Development And Database Administration Level III	
Unit Title	Develop cascading style sheets
Unit Code	EIS WDDBA3 05 1221
Unit Descriptor	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.

Elements	Performance Criteria
1. Determine requirements and develop CSS	1.1 Obtain user requirements for style 1.2 Develop CSS to match user requirements
2. Use CSS techniques to create web pages	2.1 Style elements of a web page using <i>CSS</i> techniques 2.2 Position document elements using CSS 2.3 Apply style sheets to multiple pages in a website
3. Ensure web page and CSS are validated and tested	3.1 Validate CSS against <i>industry standards</i> 3.2 Test website in various <i>browsers</i> 3.3 Rectify browser differences to ensure website is accessible

Variable	Range
<i>CSS</i> may relate to:	<ul style="list-style-type: none"> • application of browser-specific rules • application of layering to achieve desired design • application of transparency • attribute selectors • fluid page layouts • new release of CSS rules.
<i>Industry standards</i>	may include but not limited to: <ul style="list-style-type: none"> • W3C • Web 2.0.
<i>Browsers</i>	include but not limited to <ul style="list-style-type: none"> • Firefox • Google Chrome • Internet Explorer • Konqueror • Lynx • Mozilla • Netscape Navigator • Opera • Safari.

Evidence Guide	
Critical Aspects of Competence	Evidence of the ability to: <ul style="list-style-type: none"> • develop website styled and formatted using CSS • create page layout using CSS • test web pages in a variety of browsers

	<ul style="list-style-type: none"> • validate the CSS against industry standards.
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> • overview knowledge of design principles • hypertext markup language (HTML) and eXtensible hypertext markup language (XHTML) • CSS • hypertext transfer protocol (HTTP) protocol • World Wide Web Consortium (W3C) standards • techniques to correct browser incompatibilities.
Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> • analytical skills to identify appropriate CSS rules to be applied to obtain desired result • initiative and enterprise skills to recommend design features • follow documented instruction from a supplied guide • interpret workplace instructions and other technical documents • document element dimensions • relative and absolute measurements • create the CSS in allocated timeframe • create web pages that will function in a variety of screen resolutions • resolve browser incompatibilities • research skills to identify latest industry guidelines and make recommendations • learning and literacy skills to keep up-to-date with industry guidelines • produce valid accessible web pages • use CSS in the most efficient and effective way.
Resources Implication	<p>Assessment must ensure access to:</p> <ul style="list-style-type: none"> • appropriate learning and assessment support when required • modified equipment for people with special needs • computer • HTML documents to have CSS applied to them • internet access to validate the CSS against the W3C • different browsers.
Assessment Methods	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

[TOP](#)

Occupational Standard: Web Development And Database Administration Level III	
Unit Title	Write Content for Web Page
Unit Code	EIS WDDBA3 06 1221
Unit Descriptor	This unit defines the competence required to write concise, clear and Relevant content for web pages on behalf of a client.

Elements	Performance Criteria
1. Determine site content requirements	<p>1.1 Customer information needs are identified with reference to audience, site functionality and client requirements</p> <p>1.2 Site purpose and functionality is confirmed with reference to client specification.</p> <p>1.3 Content channels and format are identified as part of <i>client requirements</i>.</p> <p>1.4 Relevant templates and style guides are identified according to organizational procedures and client requirements.</p> <p>1.5 Relevant content is identified and analyzed with reference to audience needs, maintenance requirements Information architecture, and site design and functionality.</p> <p>1.6 Alterations to site design are negotiated as required by the content and client requirements.</p>
2. Write site content	<p>2.1 Content is generated in accordance with content and client requirements.</p> <p>2.2 Accessibility, visibility, clarity of information flow and the logical pattern of content is ensured in accordance with client requirements.</p> <p>2.3 Content is edited with reference to audience needs, site functionality, and content and client requirements.</p>
3. Upload content	<p>3.1 Server site is logged using either administrative or anonymous file transfer protocol in preparation for upload.</p> <p>3.2 <i>File transfer protocol client</i> is launched and then navigated to destination directory, either graphically or by using a command line interface.</p>

	3.3 Files are stored and ordered according to logical design and user needs, using accepted file extension scheme.
	3.4 Operation is demonstrated

Variable	Range
Client requirements may be in reference to	<ul style="list-style-type: none"> Business system application style organizational policies network people in the organization
File transfer protocol client may include but is not limited to:	<ul style="list-style-type: none"> commercial software applications; organization-specific software, packaged software in-house customized software

Evidence Guide	
Critical Aspects of Competence	Assessment confirmed that the candidate has developed and uploaded quality content for a website that meets audience and client needs.
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> Content features, such as clarity, ease of viewing (e.g. how much scrolling is required to view the site), readability and how intuitive or logical the navigation is from one content detail to the next The functions and features of micro-content elements (e.g. headings, highlighted words, link text) Relationship between content and site design (e.g. giving the website a look in harmony with or adopting the corporate style) Functions and features of style guides (e.g. using cascading style sheets) Web design and usability (e.g. finding a balance between visual impact elements and speed of downloads) Copyright and intellectual property legislation and application principles (e.g. adopting the Harvard method for content/document referencing or the protocols for seeking permission to use from authors and sources)
Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> determine site content requirements write site content upload site content
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Assessment Methods	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> Interview / Written Test / Oral Questioning

	• Observation / Demonstration
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

[TOP](#)

Occupational Standard: Database Administration Level III	
Unit Title	Use Basic Structured Query Language
Unit Code	EIS WDDBA3 07 1221
Unit Descriptor	This unit defines the competency required to use a basic structured query language (SQL) to define, create and manipulate database structures and associated data in a relational database.

Elements	Performance Criteria
1. Write an SQL statement to retrieve and sort data	<p>1.1 All the data from a table is retrieved following work procedure.</p> <p>1.2 Data from specific columns in a single table is retrieved.</p> <p>1.3 Clause is used to sort query output.</p> <p>1.4 Number of rows restricted is retrieved by placing criteria in the <i>clause</i>.</p> <p>1.5 Number of rows restricted is retrieved by placing specific criteria in the select statement.</p> <p>1.6 <i>Comparison operators</i> in the clause is used to compare numeric, character, string, date and time data</p> <p>1.7 <i>Boolean operators</i> is used with the correct precedence</p> <p>1.8 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</p> <p>1.9 SQL syntax is used to suppress duplicate values from query results</p> <p>1.10 Action is taken to exclude null values from a query result</p>
2. Write SQL statements that use functions	<p>2.1 <i>Arithmetical operators</i> is used with the correct precedence</p> <p>2.2 String functions and operators is used to obtain the required query output</p> <p>2.3 <i>Mathematical functions</i> is used to obtain the required output, where required</p> <p>2.4 Date functions are used to obtain the required output</p> <p>2.5 SQL aggregate functions are used to obtain the required output</p>
3. Write SQL statements that use aggregation	<p>3.1 Clause used to aggregate data by multiple columns</p> <p>3.2 Aggregated data is sorted in the query output</p>

and filtering	3.3 Aggregated data is filtered using the clause
4. Write and execute SQL sub-queries	4.1 Single and nested sub-queries are constructed 4.2 Sub-queries are constructed that return a single row, and multiple rows 4.3 Correlated sub-queries are used to retrieve required data 4.4 Sub-queries are written that use aggregates

Variable	Range
Comparison operators	May include <ul style="list-style-type: none"> • equal to, • not equal to • greater than • less than • greater than or equal to • less than or equal to
Boolean operators	May include <ul style="list-style-type: none"> • the use of AND, OR, NOT
Database	May include but are not limited to <ul style="list-style-type: none"> • python • Oracle • Sybase, • Microsoft SQL Server • SQLite • IBM DB2 • Informix • MySQL • Postgres SQL
Arithmetical operators	May include but not limited to: <ul style="list-style-type: none"> • Addition • Subtraction • Multiplication • Modulus • Division
Mathematical functions	May include but not limited to: <ul style="list-style-type: none"> • COS • log • power • Sine • square root
Clause	Where Order by

	Having
Information requirements	May include but not limited to: <ul style="list-style-type: none"> • reports • Summaries • letters • customer feedback • other business documents required by the organization
Tools and equipment	May include but not limited to: <ul style="list-style-type: none"> • Modeling tools, Computers , DBMS software

Evidence Guide	
Critical aspects of Competence	Assessment must confirm the ability to use a structured query language to create database structures, and store, retrieve and manipulate data in a relational database. An individual demonstrating this competency would be able to: <ul style="list-style-type: none"> • Write an SQL statement to interconnect inter table • Write an SQL statement to retrieve and sort data • Write SQL statements that use functions • Write SQL statements that use aggregation and filtering • Write and execute SQL sub-queries
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: <ul style="list-style-type: none"> • Comprehensive knowledge of data modeling structures • Data analysis, particularly in determining data types, data structures and to query and report design • Run time facilities in relation to implementing live database • DBMS fundamentals
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Assessment Methods	Competency may be assessed through: <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

[TOP](#)

Occupational Standard: Web Development and Database Administration Level III	
Unit Title	Integrate database with a website
Unit Code	EIS WDDBA3 08 1221
Unit Descriptor	This unit defines the competency required to skills and knowledge that define to ensure database is integration with a website

Element	Performance Criteria
1. Connect to database	1.1 Identify site data needs from technical requirements 1.2 Connect to database from web application using a web development language
2. Retrieve data from database and display on web pages	2.1 Retrieve data using structured query language (SQL) 2.2 Display data in the most appropriate control 2.3 Format data so that it is displayed in the most effective way
3. Update database data from user input	3.1 Update existing data stored in the database with user -supplied input 3.2 Insert data in the database with user-supplied input 3.3 Delete data stored in the database 3.4 Include error checking and validation

Variable	Range
Database may include	May include: <ul style="list-style-type: none"> • Access • DB2 • Informix • Ingres • Microsoft SQL (MS SQL) server • Mini SQL (mSQL) • MySQL • Oracle • Sybase. • Python
Language may include:	Not limited May include: <ul style="list-style-type: none"> • ASP • ASP.NET • Coldfusion • Perlscript • PHP.
User may include:	May include: <ul style="list-style-type: none"> • client • external departments • individuals • Internal departments.

Evidence Guide	
Critical Aspects of Competence	<p>Demonstrates a knowledge and skills of:</p> <ul style="list-style-type: none"> • Create a web application, which integrated and accesses a database, displaying and modifying the database data provided by user input.
Required Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <p>detailed knowledge of:</p> <ul style="list-style-type: none"> • database structure • internet technology as it relates to the use of databases • programming control structures, object-oriented programming • SQL • authentication and web security • HTTP • session management • Stateless programming
Required Skills	<p>Demonstrates skills to:</p> <p>analytical skills to:</p> <ul style="list-style-type: none"> • determine functional requirements • identify database access points • identify and rectify website functional problems • identify and resolve bugs in the created code • find solutions to encountered problems • apply hypertext transfer protocol (HTTP) • apply web programming concepts • create hypertext markup language (HTML) or eXtensible hypertext markup language (XHTML) pages • create software in a web development language • create SQL statements • Create aesthetically pleasing web pages.
Resource Implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

[TOP](#)

Occupational Standard: Web development and Database Administration Level	
Unit Title	Monitor and Support Data Conversion
Unit Code	EIS WDDBA 09 1221
Unit Descriptor	This unit defines the competency required to monitor and support data.

Elements	Performance Criteria
1. Monitor data conversion	<p>1.1 Conversion <i>supporting documentation</i> is obtained and applied to conversion process.</p> <p>1.2 Production data is protected by taking action to ensure back-up before conversion.</p> <p>1.3 <i>Requirements</i> of the <i>client</i> are determined and impacted on business operation.</p> <p>1.4 <i>Software, hardware</i> or <i>environmental pre-requisites</i> are identified and confirmed in the conversion plan.</p> <p>1.5 Data accuracy and integrity is validated according to conversion specifications.</p> <p>1.6 Data rejected by conversion <i>tools</i> is identified and actions detailed in conversion plan are carried out.</p> <p>1.7 Data rejection or errant behavior of the conversion process is documented.</p>

2. Support data conversion	<p>2.1 Results are verified based on relevant checklist.</p> <p>2.2 Verified data are presented and have them signed by appropriate persons.</p> <p>2.3 Back-up copies of conversion files are maintained and documented according to <i>requirements</i></p> <p>2.4 Clear and coherent <i>technical documentation</i> is developed</p>
----------------------------	--

Variable	Range
Supporting documentation	May include data conversion plan, conversion specifications and documentation guidelines
Requirements	May be in reference to the business, system, platform, application, database, network or people in the organization
Client	May include but is not limited to internal departments, external organizations, clubs, individual people and internal employees
Hardware	May include but is not limited to workstations, personal computers, modems and other connectivity devices, networks, remote sites, servers, DSL modems
Software	May include but is not limited to commercial software applications; organization-specific software, packaged software, in-house or customized software.
Environmental pre-requisites	May consist of but is not limited to dust, heat, extreme cold, temperature stability, air circulation and moisture.
Technical documentation	May include project specifications, reports, help references, technical manuals, training materials and self-paced tutorials, on-line help, user guides, brochures.
Tools and equipment	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • Tools that analyze data quality • Tools for extraction and transformation • Tools for cleansing data (identifying invalid field entries and forcing to legal values) • Data management tools

Evidence Guide	
Critical Aspects of Competence	<p>Demonstrates ability to:</p> <ul style="list-style-type: none"> • achieve a physical transfer or transformation of data • migrate data from the legacy systems to the staging area (if necessary) • data conditioning, cleaning, transformation, and integration in the staging area • storing, updating and exporting converted data • data loading and indexing on the production server • ensuring data quality throughout the data conversion process • ensure data is complete and valid

	<ul style="list-style-type: none"> • ensure sound structural integrity of both the legacy system and the new database/data warehouse • ensure data reflects and works with the business rules and data standards • monitor and support data conversion
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> • inherent data requirements of both old and upgraded or new systems • Broad knowledge of data conversion from legacy systems • Broad knowledge of current industry data conversion tools • Current industry-accepted hardware and software products, • with broad knowledge of general features and • capabilities and detailed knowledge in some areas • Broad knowledge of current data modeling methodologies
Underpinning Skills	<ul style="list-style-type: none"> • data conditioning, cleaning, transformation, and integration in the staging area • storing, updating and exporting converted data • data loading and indexing on the production server • ensuring data quality throughout the data conversion process • monitor and support data conversion
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Assessment Methods	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

[TOP](#)

Occupational Standard: Web Development and database administration Level IV	
Unit Title	Evaluate and select a web hosting service
Unit Code	EIS WDDBA3 10 1221
Unit Descriptor	This unit describes the performance outcomes, skills and knowledge required to evaluate and select an appropriate hosting service for current and future business needs.

Element	Performance
1. Select ISP	1.1 Review comparable <i>characteristics</i> of a range of hosting services 1.2 Review client usage and ensure that email and mailing list services are flexible enough to meet current and future business needs 1.3 Review support service standards to ensure they meet business needs 1.4 Ensure ISP hosting service has sufficient data capacity to cover partial outages 1.5 Determine availability of <i>security technologies</i> 1.6 Determine availability of <i>scripting languages</i> 1.7 Evaluate optional <i>server applications</i> for advanced web business functions 1.8 Confirm client selection criteria and select ISP hosting service that best matches the criteria
2. Ensure guarantee of permanent online presence	2.1 Establish that web-hosting service has systems in place to monitor <i>server</i> performance and availability 2.2 Negotiate escalation procedures and performance standards

	<p>with ISP</p> <p>2.3 Establish that security and backup procedures are articulated and meet business needs</p>
3. Ensure that web host meets technical requirements	<p>3.1 Take action to ensure that <i>operating system</i> supports the preferred business development software, applications, extensions and <i>databases</i></p> <p>3.2 Establish that web-host servers support dynamic websites using the preferred business technologies</p> <p>3.3 Establish that web host provides current and future disk space requirements</p> <p>3.4 Establish that site-analysis reports are available and flexible enough to meet business needs</p> <p>3.5 Establish that security systems and payment technologies meet business and customer expectations and requirements</p>
4. Benchmark performance and test against specified criteria	<p>4.1 Test performance of the ISP during on and off-peak times and record outcomes</p> <p>4.2 Establish that email and mailing services have backup procedures in place and are protected from damage, erasure or unwanted damage</p> <p>4.3 Take action to ensure support services perform according to business needs</p>
5. Assess quality of service delivered	<p>5.1 Services delivered are <i>checked</i> against organization <i>quality standards</i> and specifications</p> <p>5.2 Service delivered are evaluated using the appropriate evaluation <i>parameters</i> and in accordance with organization standards.</p> <p>5.3 Causes of any identified faults are identified and corrective actions are taken in accordance with organization policies and procedures</p>

Evidence Guide

Critical aspects of Competency	<p>Assessment must confirm the ability to –</p> <ul style="list-style-type: none"> • develop the information architecture of a complex website that meets current and future business requirements • confidently and readily access the information required
Underpinning Knowledge and	<p>Demonstrate knowledge of:</p> <ul style="list-style-type: none"> • different web hosting service provision options and their

Attitudes	scalability <ul style="list-style-type: none"> • internet security issues • operating systems used by ISPs • performance expectations from customers and end users • server technologies • web hosting services and performance benchmarks.
Underpinning Skills	Demonstrate skills of – <ul style="list-style-type: none"> • analytical skills to: • determine appropriate pricing and services plan for the business • evaluate and compare web-hosting services • communications skills to: • establish client requirements • negotiate escalation procedures and performance standards with ISP • numeracy skills to assess pricing plans • planning skills to identify future business needs • technical skills to assess security systems and technical requirements • integrating on-line processes
Resources Implication	The following resources must be provided: <ul style="list-style-type: none"> • E-business website • Business strategy • Client demographics documentation
Assessment Methods	Competence may be assessed through: <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting
Variables	Range
Characteristics	may include not limited: <ul style="list-style-type: none"> - data transfer - functionality - hosting plans, such as: <ul style="list-style-type: none"> • common gateway interface (CGI) access • dedicated servers • e-business hosting • scripts - level of service

	<ul style="list-style-type: none"> - pricing plans - web-hosting facilities.
<i>Security technologies</i>	May include but not limited : <ul style="list-style-type: none"> • payment gateways • public key infrastructure (PKI) • secure socket layer (SSL).
<i>Scripting languages</i>	May include but not limited: <ul style="list-style-type: none"> • PHP and Python • VB.NET • JavaScript
<i>Server applications</i>	May include but not limited not limited: <ul style="list-style-type: none"> • database and data warehousing • directory services • file sharing • messaging • network and remote access • printer sharing • web services.
<i>Server</i>	May include but not limited: <ul style="list-style-type: none"> • Apache HTTP server • email servers • FTP servers • WebSphere • Lotus Domino • Microsoft Internet Information Server
<i>Operating system</i>	May include but not limited <ul style="list-style-type: none"> • Linux • Windows.
<i>Databases</i>	May include but not limited: <ul style="list-style-type: none"> • Microsoft SQL (MS SQL) server • MySQL • Oracle • Postgre Structured Query Language (Postgre SQL)
Quality check	<ul style="list-style-type: none"> • Check against specifications • Visual inspection of final output • Physical inspection of service
Quality standards	<ul style="list-style-type: none"> • materials • components • process

Quality parameters	<ul style="list-style-type: none"> • standard specifications • procedures • materials
--------------------	--

Evidence guide	
Critical aspects of Competency	<p>Evidence of the ability to:</p> <ul style="list-style-type: none"> • assess client needs and select ISP that meets the current and future needs of the business • evaluate web hosting service: • ensure price meets client's budgetary requirements • ensure security systems and technical requirements of the business are met • monitor the performance of the ISP during on and off peak times. • Investigated causes of deviations of services against standard
Underpinning Knowledge and Attitudes	<ul style="list-style-type: none"> • Assessment must ensure access to: • hosting plans, prices and service agreements • use of current technology underpinning the ISP and services offered • criteria for selecting an ISP • business plan outlining future directions for the business • appropriate learning and assessment support when required. • Where applicable, physical resources should include equipment modified for people with special needs. • Relevant evaluation techniques and quality checking procedures
Underpinning Skills	<p>A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:</p> <ul style="list-style-type: none"> • Communicate effectively within defined workplace procedures • direct observation of candidate: • evaluating web-hosting services • benchmarking and testing ISP • user requirements recording • review of reports prepared by candidate showing the results of ISP testing.
Method of assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	<p>Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information</p>

	on workplace practices and OHS practices.
--	---

NTQF Level II

Occupational Standard	Web Development and Database Administration Level II
Unit Title	Operate Database Application
Unit Code	<u>EIS WDDBA2 01 1221</u>
Unit Descriptor	This unit defines the competency required to operate database applications and perform basic operations.

Elements	Performance Criteria
1. Create database objects	1.1 Database application is opened and designed incorporating basic <i>design principles</i> 1.2 Database object is created according to database usage, as well as user requirements 1.3 Database object is modified as required 1.4 Data in a table are added and modified according to information requirements 1.5 Records are added, modified and deleted as required 1.6 Database objects are saved and compiled
2. Customize basic settings	2.1 <i>Page layout</i> is adjusted to meet user requirements 2.2 Different <i>toolbars</i> are opened and viewed 2.3 <i>Font</i> is formatted as appropriate for the purpose of the database entries
3. Create reports	3.1 Reports are designed to present data in a logical sequence or manner 3.2 Reports are modified to include/exclude additional requirements 3.3 Reports are distributed to <i>appropriate person</i> in a approved format
4. Create forms	4.1 Wizard used to create a simple form 4.2 Existing database opened and records through a simple form modified 4.3 <i>Objects</i> within the form rearranged to accommodate information requirements
5. Retrieve information	5.1 Existing database is accessed and required records located 5.2 Simple query is created and required information retrieved 5.3 Query with multiple criteria is developed and required information retrieved 5.4 Data are selected and appropriately displayed

Variable	Range
Occupational Health & Safety (OH&S)	<ul style="list-style-type: none"> • Correct posture, lighting, and type of desk, type of monitor, style of chair, typing position, repetitive strain injury prevention, ventilation, light position, correct lifting method, and length of time in front of computer. • May also include physical safety considerations such as general electrical safety and cabling, power supply and leads as they apply to computer and peripheral installations.
Design principles	May include <ul style="list-style-type: none"> • naming conventions • data layout • formatting
Page layout	May include <ul style="list-style-type: none"> • landscape • portrait
Toolbars	May can contain <ul style="list-style-type: none"> • buttons • menus or a combination of both
Font	May include <ul style="list-style-type: none"> • The combination of typeface and other attributes, such as size, pitch, and spacing character or symbol.
Appropriate person	May include <ul style="list-style-type: none"> • a supervisor • teacher • authorized business representative or client
Objects	May include <ul style="list-style-type: none"> • buttons • checkboxes • option buttons • text boxes • drop down lists
Tools and equipment	May include but not limited to: <ul style="list-style-type: none"> • Computers, DB applications, DBMS

Evidence Guide	
Critical Aspects of Competence	<p>Assessment must ensure candidate has the ability –</p> <ul style="list-style-type: none"> • to design and develop a simple database using a standard database package • to add data, use queries, and create forms and reports • create and format documents • customize basic settings to meet page layout conventions
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> • basic database design • basic settings and context • relationships between tables (cardinality) • forms, reports and queries for retrieving and displaying information
Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> • create database objects • customize basic settings • retrieve information
Resources Implication	<p>Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.</p>
Assessment Methods	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	<p>Competency may be assessed in the work place or in a simulated work place setting</p>

Occupational Standard:	Web Development and Database Administration Level II
Unit Title	Build simple websites using commercial programs
Unit Code	<u>EIS WDDBA2 02 1221</u>
Unit Descriptor	This unit describes the performance outcomes, skills and knowledge required to use web authoring tools to create, modify and test simple web pages and websites.

Elements	Performance Criteria
1. Identify authoring requirements	1.1 Select preferred <i>web authoring tool</i> according to <i>client</i> requirements 1.2 Set preferences for the <i>web authoring tool</i> , 1.3 select and install <i>web authoring tool</i>
2. Create and save files	2.1 Create files and save in correct location or directory 2.2 Navigate the web authoring tool environment or workspace 2.3 Access and use a range of features in the web authoring tool 2.4 Maintain suitable directory structure for the site 2.5 Save in appropriate directory structure
3. Add content to web pages	3.1 Insert and format text content according to client <i>requirements</i> 3.2 Insert <i>images</i> , data tables and simple forms 3.3 Access <i>markup language</i> and make basic modifications to code
4. Create simple navigation	4.1 Create links between pages to reflect content structure using both text and images 4.2 Create frame using <i>markup language</i> 4.3 create form using <i>markup language</i>
5. Test website	5.1 Test elements of website content across a number of different <i>browsers</i> and 5.2 browser versions to ensure consistency of presentation and performance 5.3 Test that website meets client requirements

Variable	Range
Web authoring tool may include:	May include <ul style="list-style-type: none"> • Dreamweaver for Windows • Edit Pad • Edit Plus • Front Page • Notepad <ul style="list-style-type: none"> • Sublime text editor • Atomic • Visual Studio code
Client may include:	<ul style="list-style-type: none"> • external organisations • individuals <ul style="list-style-type: none"> • Internal departments.
Requirements may include:	<ul style="list-style-type: none"> • Application • business or organisational • individuals • network • people in the organisation <ul style="list-style-type: none"> • system.
Images may include:	<ul style="list-style-type: none"> • animations • backgrounds • banners • clip art • content-related images • decorative elements • logos • Photos.
Markup language may include:	<ul style="list-style-type: none"> • hypertext markup language (HTML)
Browsers may include:	<ul style="list-style-type: none"> • Firefox • Google Chrome • Internet Explorer • Opera

Evidence Guide

Critical Aspects of Competence	<p>Assessment must ensure candidate has the ability –</p> <ul style="list-style-type: none"> ➤ select and use a web authoring tool to create web pages ➤ insert text and image elements in a web page ➤ modify existing markup language ➤ test web page content for consistency
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> • Create files and save in correct location or directory • Navigate the web authoring tool environment or workspace • Access and use a range of features in the web authoring tool • Maintain suitable directory structure for the site • Save in appropriate directory structure
Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> • Insert and format text content according to client <i>requirements</i> • Insert <i>images</i>, data tables and simple forms • Access <i>markup language</i> and make basic modifications to code
Resources Implication	<ul style="list-style-type: none"> • computer hardware and software • web authoring tools • website • storage media
Assessment Methods	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> • direct questioning and interview to assess knowledge of web publishing, markup language, uploading and testing procedures • observation of candidate performing tasks related to creating web pages • Review of a newly created website.
Context of Assessment	<p>Competency may be assessed in the work place or in a simulated work place setting</p>

Occupational Standard:	Web Development and Database Administration Level II
Unit Title	Administrate Network and Hardware Peripherals
Unit Code	<u>EIS WDDBA2 03 1221</u>
Unit Descriptor	This unit defines the competence required to connect, install, configure, maintain and troubleshoot local area network and peripherals

Elements	Performance Criteria
1. Confirm requirements of client	<p>1.1 <i>Client peripheral</i> requirements are Identified and confirmed in accordance with <i>organizational standards</i>.</p> <p>1.2 Client requirements and peripherals needed are documented in line with organizational standards and report findings to the <i>appropriate person</i>.</p> <p>1.3 Client requirements are verified with appropriate person in line with organizational standards and reporting procedures.</p> <p>1.4 Action taken to ensure client support expectations are covered by vendor warranty and support services.</p>
2. Obtain required peripherals	<p>2.1 Peripherals are obtained under instruction from appropriate person.</p> <p>2.2 Peripherals are entered into <i>equipment</i> inventory according to organizational standards.</p> <p>2.3 Contents of delivered components and physical contents that match the packing list are validated and resolved discrepancies if necessary.</p> <p>2.4 Peripherals are stored according to vendor/manual guidelines.</p>
3. Connect hardware peripherals	<p>3.1 Timeframe for installation schedule is verified with the client requirement.</p> <p>3.2 Old peripherals are removed if they are being replaced with minimal disruption to clients, taking into account <i>environmental considerations</i> and <i>OHS standards</i>.</p> <p>3.3 New peripherals are connected with minimum disruption to <i>clients</i>, taking into account <i>operating system</i> procedures.</p> <p>3.4 The computer configured to accept the new peripherals based on business requirement</p> <p>3.5 Hardware peripherals are tested and confirmed to client satisfaction, pay particular attention to possible impact on other systems and make adjustments as required.</p>

4. Install peripherals to a network	<p>4.1 Location of peripherals are planned to provide appropriate services to users and to take into consideration OHS standards.</p> <p>4.2 Peripherals are connected to network, using vendor approved method and technology.</p> <p>4.3 Peripherals are connected to computers in the network using parallel, serial or other direct connection methods appropriate for the job order.</p> <p>4.4 Peripherals are tested for correct operation based on client's specifications.</p>
5. Configure peripheral services	<p>5.1 Required software is installed to manage local and network-connected peripherals according to business requirement software peripherals according to business requirement.</p> <p>5.2 Meaningful names are used for peripherals and control queues</p> <p>5.3 Security and access are configured to allow appropriate users to make use of peripherals.</p> <p>5.4 Workstation for peripherals is configured to allow applications to work with peripherals.</p>
6. Administer and support peripheral services	<p>6.1 Priority is assigned to control queues based on organizational requirement.</p> <p>6.2 Settings on the network is configured to create maintenance schedules, usage logs, and cost center usage statistics</p> <p>6.3 Methods are demonstrated to the user for using peripheral services from their application or workstation</p>
7. Maintain peripherals and fix common problems	<p>7.1 A regular maintenance schedule is established and followed as recommended by peripheral manufacturer.</p> <p>7.2 Consumables and components are replaced when required.</p> <p>7.3 Peripheral mishaps (unfortunate accident) and malfunctions are fixed based on procedure.</p> <p>7.4 Peripheral usage and traffic is monitored and recommend additional peripherals if needed.</p> <p>7.5 Failures of peripheral services or devices are determined and rectify as required.</p>

8. Use and maximize operating system	<p>8.1 Operating system is configured to suit the working environment, including but not limited to setting variables.</p> <p>8.2 Application software is installed, upgraded and uninstalled to suit the working environment.</p> <p>8.3 Both graphical user interface and the command line interface are used to perform basic tasks based on clients.</p> <p>8.4 Operating system and third-party utilities are used based system requirement.</p> <p>8.5 Graphical user interface is customized based on clients.</p>
9. Support input and output devices	<p>9.1 Input and output devices are set up and checked functionality based on requirement.</p> <p>9.2 Drivers are installed as appropriate and checked functionality based vendor manuals.</p> <p>9.3 Drivers are ensured to be properly working</p>

Variable	Range
Client	May include but is not limited to internal departments, external organizations, individual people and employees
Peripherals	<ul style="list-style-type: none"> • May include but are not limited to: • Printers, scanners, Toner cartridges • Speakers, multimedia kits • Personal computer, modems ,hub • Input equipment may include mouse, touch pad, keyboard,
Organizational Standards	May include but are not limited to personal use of emails and internet access, content of emails, downloading information and accessing particular websites, opening mail with attachments, virus risk (MS windows OS and Mac OS only), dispute resolution, document procedures and templates, communication methods and financial control mechanisms
Appropriate person	May include a supervisor, teacher, authorized business representative or client
Equipment	May include but is not limited to workstations, personal computers, modems or other connectivity devices, printers, hard drives, monitors, switches, hubs, and other peripheral devices OH&S standards May include correct posture, lighting, type of desk, type of monitor, style of chair, typing position, repetitive strain injury prevention, ventilation, light position, correct lifting method, and length of time in front of computer.
Environmental considerations	May include disposal of packaging (e.g. cardboard, polystyrene, paper, plastic) and redundant hardware (e.g. hard drives, circuit boards).

Occupational Health and Safety (OHS)	<p>OHS precautions and measures may include against:</p> <ul style="list-style-type: none"> • Physical hazards – impact, illumination, pressure, noise, vibration, temperature, radiation • Chemical hazards – dusts, fibers, mists, fumes, smoke, gasses, vapors • Ergonomics • Psychological factors – over exertion/ excessive force, awkward/static positions, fatigue, direct pressure, varying metabolic cycles • Physiological factors – monotony, personal relationship, work out cycle • Burglary • Fire • Power accidents
Operating system	May include Win 7 and above, Mac OS X, Linux
User	May include a person within a department, a department within the organization or a third party
Network	May include but is not limited to large and small LANs, WANs, VPNs, the internet, private lines, data and voice.
Software	May include but is not limited to commercial, in-house, packaged or customized software
Applications	May include database programs, word processors, email programs, internet browsers, system browsers and spreadsheets
Consumables	May include but is not limited to ink cartridges, toner cartridges, ribbons, floppy disks, CD-R, CD-RW
Network operating system	May include but is not limited to any operating system that has multi-user ability, Linux, Mac OS, Windows 7 and above.
Tools and Equipment	<ul style="list-style-type: none"> • Hardware peripherals and workstation • Crimper • Cables UTP • RJ-45 • Network operating system • Soft wares • Toolkit • Cable tester • Printer

Evidence Guide

Critical aspects of Competence	<p>Assessment must confirm knowledge of</p> <ul style="list-style-type: none"> • peripheral technologies and how network peripherals (hardware and software) are installed and configured • ability to maintain networked peripherals in working order • ability to safely connect hardware peripherals according to vendor instructions with a minimum of down time to the system
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> • current peripheral devices, such as scanners, multi-use devices, external modems • how to configure peripherals for network use, with drivers and cable connections • organizational guidelines relating to external suppliers and vendors • general understanding of technical systems • general knowledge of operating systems • general knowledge of help desk and maintenance practices • current industry-accepted hardware and software products • broad knowledge of input/output devices
Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> • connect hardware peripherals • use operating system • configure peripheral Services to manage peripherals
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Assessment Methods	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

[TOP](#)

Occupational Standard:	Web Development and Database Administration Level II
Unit Title	Maintain Equipment and Consumables
Unit Code	<u>EIS WDDBA2 04 1221</u>
Unit Descriptor	This unit defines the competence required to set up maintenance procedures to keep equipment and software operating effectively and efficiently.

Elements	Performance Criteria
-----------------	-----------------------------

1. Identify and analyze IT system components to be maintained	<p>1.1 Warranty status of components and/or software is determined and documented according to vendor, project or organizational requirements.</p> <p>1.2 System architecture and configuration documentation are reviewed for currency status.</p> <p>1.3 Critical components and/or software are identified and recommendations are documented regarding possible service arrangements.</p>
2. Apply maintenance procedures	<p>2.1 Preventative maintenance schedule is created based on cost, business and service-level agreements requirements</p> <p>2.2 Specific and appropriate maintenance procedure is identified and applied based on cost, business and service-level agreements requirements</p> <p>2.3 Recommended procedures are documented and submitted for approval in accordance with organizational requirements and service-level agreement</p> <p>2.4 Implementing staff are oriented on the procedures and ensured to follow the maintenance schedule</p> <p>2.5 OHS is observed throughout the process</p>
3. Clean equipment	<p>3.1 Cleaning supplies are accessed and verified for usability on the selected equipment</p> <p>3.2 Maintenance actions undertaken are recorded and documented according to organizational procedures</p> <p>3.3 Equipment <i>are</i> cleaned as per manufacturer specifications and in line with organizational manuals</p>
4. Replace and maintain consumables and supplies	<p>4.1 Access consumables from storage points and record usage information in line with organizational procedures</p> <p>4.2 Replace consumables when needed and log the action undertaken</p> <p>4.3 Dispose of consumables following environmental guidelines</p> <p>4.4 Test equipment to ensure it is in working order at set time periods and in line with organizational procedures</p>
5. Maintain equipment	<p>5.1 Equipment are identified which requires maintenance</p> <p>5.2 Equipment <i>is</i> maintained as required by organizational guidelines and manufacturer specifications.</p> <p>5.3 Maintenance procedures are documented as required by organizational guidelines.</p> <p>5.4 Care is exercised to prevent interruption of business activities during maintenance procedures</p> <p>5.5 Unused equipment devices are stored in line with</p>

	manufacturer specifications and organizational guidelines
--	---

Variable	Range
Systems Architecture	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • Operating system: Novell NetWare 5 or above or operating system that has multi-user ability, Linux, Mac OS, Windows 7 or above • Database software: Oracle, Sybase, Microsoft SQL server, Ingres, DB2, Informix, MSQl, MySQL, SQL server <p>Configuration: small memory model, large memory model, requests per second</p>
Tools and Equipment	<ul style="list-style-type: none"> • Hardware and Software • Toolkit • Blower • Static wrist strap • Cleaning agents(alcohol, • Multi meter contact cleaner)
Consumables	May include disks, ribbons, printer toner, paper, cartridges, cleaners and tape
Equipment	May include but is not limited to workstations, personal computers, modems and other connectivity devices, printers, hard drives, monitors,ADSL modems, switches, hubs, and other peripheral devices
Occupational Health and Safety (OHS)	<p>OHS precautions and measures may include against:</p> <ul style="list-style-type: none"> • Physical hazards – impact, illumination, pressure, noise, vibration, temperature, radiation • Chemical hazards – dusts, fibers, mists, fumes, smoke, gasses, vapors • Ergonomics <ul style="list-style-type: none"> Psychological factors – over exertion/ excessive force, awkward/static positions, fatigue, direct pressure, varying metabolic cycles Physiological factors – monotony, personal relationship, work out cycle • Burglary, Fire and Power accidents • Environmental guidelines - recycling, safe disposal of packaging (e.g. cardboard, polystyrene, paper, plastic) and correct disposal of redundant hardware (e.g. motherboards, hard drives, circuit boards) by an authorized body

Evidence Guide

Critical Aspects of Competence	Assessment must confirm the ability to maintain equipment in working order and to replace equipment and consumables.
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: <ul style="list-style-type: none"> • OHS principles and concept • Equipment and consumables uses and characteristics • Maintenance procedures and techniques • Chemical storage, control and disposal • Basic understanding of organizational systems, in relation to storage and retrieval of information and equipment • Basic knowledge of current industry-accepted hardware and software and manufacturer maintenance guides
Underpinning Skills	Demonstrates skills to: <ul style="list-style-type: none"> • clean equipment • maintain equipment • interpreting manufacturer's instructions • writing maintenance reports
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Assessment Methods	Competency may be assessed through: <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

[TOP](#)

Occupational Standard:	Web Development and Database Administration Level II
Unit Title	Configure and Access Internet Service
Unit Code	EIS WDDBA2 05 1221
Unit Descriptor	This unit defines the competence required to access internet and complete basic web search tasks. It includes finding required information.

Elements	Performance Criteria
1. Manage internet	1.1 Internet browser is opened and a home page of personal choice set up by setting internet options 1.2 Display/view modes is adjusted to suit personal requirements 1.3 Toolbar is modified to meet user and browsing needs

	<p>1.4 Particular site is accessed and retrieved data</p> <p>1.5 Images are loaded or not loaded depending on modem speed, computer and browser capabilities</p> <p>1.6 URL is opened to obtain data and browse link</p> <p>1.7 Cookies and history of internet browser are deleted as precaution from virus infection</p>
2. Search internet	<p>2.1 Search engines are opened and search requirements defined using a range of search parameters</p> <p>2.2 Search results are saved and presented as a report according to the information required</p> <p>2.3 Bookmarks are created for required web page and saved in associated bookmark folder</p> <p>2.4 Page set up options is modified and web page or the required information printed</p> <p>2.5 Browser is shut down and exited</p> <p>2.6 OHS and netiquette principles are observed through the process</p>
3. Work as a team member	<p>3.1. Effective and appropriate forms of communications used and interactions undertaken with team members who contribute to known team activities and objectives</p> <p>3.2. Effective and appropriate contributions made to complement team activities and objectives, based on individual skills and competencies and workplace context</p> <p>3.3. Observed protocols in reporting using standard operating procedures</p> <p>3.4. Contribution is made to the development of team work plans based on understanding of team's role and objectives and individual competencies of the members.</p>

Variable	Range
Internet browser	<ul style="list-style-type: none"> • Netscape Navigator • Internet Explorer • Firefox Mozilla • Opera • Google chrome

Internet options	<ul style="list-style-type: none"> • configuring of the following options: home page, location of temporary files, privacy level, security level, type of connection and history
Toolbar	<ul style="list-style-type: none"> • buttons • menus • a combination of both
Search engine	<ul style="list-style-type: none"> • Google • Metacrawler • Alta Vista • Excite • Infoseek • Findlink • Lycos • Northern • Light • AOL Netfind • Hotbot • LookSmart • Yahoo • Netscape • Open Text • WebCrawler • Meta Search • Go To Dot Com • Beaucoup • Search.com • Go2Network • Savvy Search • Profusion • Metagopher
Search parameters	<ul style="list-style-type: none"> • key words • Logical operators
OHS	<ul style="list-style-type: none"> • As per company, statutory and vendor requirements. Ergonomic and environmental factors must be considered during the demonstration of this competency • Occupational Health and Safety guidelines related to use of screen based equipment, computing equipment and peripherals, and ergonomic work stations; security procedures; customization requirements
Netiquette	<ul style="list-style-type: none"> • Is sometimes referred to as web etiquette and is an informal code of manners governing online conduct which may include but is not limited to the use of upper and lower case letters in messages, not spamming other users, not posting commercial messages to newsgroups, learning to lurk before posting,

	respect for other's time, privacy and bandwidth
Workplace context	<p>Work procedures and practices</p> <p>Conditions of work environments</p> <p>Legislation and industrial agreements</p> <p>Standard work practice including the storage, safe handling and disposal of chemicals</p> <p>Safety, environmental, housekeeping and quality guidelines</p>

Evidence Guide	
Critical aspects of Competence	<p>Assessment must ensure the ability to – •</p> <p>browse the internet</p> <ul style="list-style-type: none"> • search for information • download files

Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> • General OHS principles and responsibilities • Makeup and structure of web addresses • Basic technical terminology in relation to reading help files and prompts • Logging procedures relating to accessing a PC • Modem speed, traffic loads in relation to times of accessing the internet • Evaluating and assessing the authority, reliability and authenticity of information • Organizational guidelines on internet and webettique/netiquette • Security, viruses, privacy legislation, copyright • Different types of search engines • Types of software
Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> • Basic analysis in relation to a limited range of routine areas • Low level decision making in relation to a limited range of routine areas • Problem solving skills in known areas during normal routine • Reading and writing at a level where basic workplace documents are understood • Communication is clear and precise • Interpretation of user manuals • Cultural understanding
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Assessment Methods	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

[TOP](#)

Occupational Standard:	Web Development and Database Administration Level II
Unit Title	Operate Presentation Package

Unit Code	<u>EIS WDDBA2 06 1221</u>
Unit Descriptor	This unit describes the performance outcomes, skills and knowledge required to operate presentation applications and perform basic operations, including creating, formatting and adding effects to presentations.

Elements	Performance Criteria
1. Create presentations	1.1 Open a presentation package application and create a simple design for a presentation according to organisational requirements 1.2 Open a blank presentation and add text and graphics 1.3 Apply existing styles within a presentation 1.4 Use presentation template and slides to create a presentation 1.5 Use various <i>tools</i> to improve the look of the presentation 1.6 Save presentation to directory
2. Customise basic settings	2.1 Adjust display to meet <i>user requirements</i> 2.2 Open and view different <i>toolbars</i> to view options 2.3 Ensure <i>font settings</i> are appropriate for the purpose of the presentation 2.4 View multiple slides at once
3. Format presentations	3.1 Use and incorporate organisational charts and bulleted lists, and modify as required 3.2 Add <i>objects</i> and manipulate to meet presentation purposes 3.3 Import objects and modify for presentation purposes 3.4 Modify slide layout, including text and colours, to meet presentation requirements 3.5 Use <i>formatting tools</i> as required within the presentation 3.6 Duplicate slides within and across a presentation 3.7 Reorder the sequence of slides and delete slides for presentation purposes 3.8 Save presentation in another <i>format</i> 3.9 Save and close presentation to <i>storage device</i>
4. Add slide show effects	4.1 Incorporate present animation and multimedia effects into presentation as required to enhance the presentation 4.2 Add slide transition effects to presentation to ensure smooth progression through the presentation

	4.3 Test presentation for overall effect 4.4 Use onscreen navigation tools to start and stop slide show or move between different slides as required
5. Print presentation and notes	5.1 Select appropriate <i>print format</i> for presentation 5.2 Select preferred slide orientation 5.3 Add notes and slide numbers 5.4 Preview slides and run spell check before presentation 5.5 Print the selected slides and submit presentation to <i>appropriate person</i> for feedback

Variable	Range
<i>Tools</i> may include:	<ul style="list-style-type: none"> ➤ available templates ➤ help ➤ search and replace ➤ simple formatting tools ➤ spell check.
<i>User requirements</i> may refer to:	appearance and type of: <ul style="list-style-type: none"> ➤ application ➤ computer ➤ desktop ➤ document.
<i>Toolbars</i> can contain:	<ul style="list-style-type: none"> ➤ buttons ➤ menus ➤ a combination of both.
<i>Font settings</i> may include:	<ul style="list-style-type: none"> ➤ colour ➤ size ➤ type.
<i>Objects</i> may include:	<ul style="list-style-type: none"> ➤ animations ➤ other documents ➤ pictures ➤ sound ➤ tables.
<i>Formatting tools</i> may include:	menu commands within the application: <ul style="list-style-type: none"> • copy • cut • help • paste • search and replace

	<ul style="list-style-type: none"> • spell check • undo
Format may include:	saving the presentation as another type of document: <ul style="list-style-type: none"> ➤ comma separated values or text ➤ HTML
Storage device may include:	disks: <ul style="list-style-type: none"> • CD • DVD ➤ external hard drive, such as universal serial bus (USB) flash drive ➤ internal hard drive
Print format may include:	<ul style="list-style-type: none"> ➤ colour or black and white ➤ layout ➤ thumbnails ➤ number of copies ➤ quality.
Appropriate person may include:	<ul style="list-style-type: none"> ➤ authorised business representative ➤ client ➤ Supervisor.

Evidence Guide	
Critical Aspects of Competence	Assessment must ensure candidate has the ability – <ul style="list-style-type: none"> ➤ create, format and prepare presentations for distribution and display ➤ customise basic settings ➤ Add slide show effects.
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: <ul style="list-style-type: none"> • effect of design features on readability and appearance of electronic presentations • presentation pitfalls • Use of suitable presentation effects for different audiences.

Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> • Create presentations • Customize basic settings • Format presentations • Add slide show effects
Resources Implication	<ul style="list-style-type: none"> ➤ use of PC and printer ➤ use of presentation software currently used in industry ➤ documents detailing organisational style guide and policy ➤ Appropriate learning and assessment support when required.
Assessment Methods	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> • verbal or written questioning to assess candidate's knowledge of presentation software functions • direct observation of candidate creating and formatting presentations
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

Occupational Standard:	Web Development and Database Administration Level II
Unit Title	Record Client Support Requirements
Unit Code	<u>EIS WDDBA2 07 1221</u>
Unit Descriptor	This unit defines the competence required to record, prioritize and escalate client support requests.

Elements	Performance Criteria
1. Log requests for support	1.1 Client support requests and requirements are recorded according to organizational standards 1.2 Client support history and details are reviewed 1.3 The information is checked and requested for accuracy and urgency according to organizational standards
2. Prioritize support requests with appropriate personnel	2.1 Relevant guidelines are identified for prioritizing or rating client requests 2.2 Client requests are prioritized based on its criticality or impact on the business 2.3 Requests are referred to an appropriate person or department for assistance 2.4 Appropriate persons involved with client support are to be communicated
3. Participate in workplace meetings and discussions	3.1 Team meetings are attended on time as scheduled. 3.2 Own opinions are clearly expressed and those of others are listened to without interruption. 3.3 Meeting inputs are consistent with the meeting purpose and established protocols . 3.4 Workplace interactions are conducted in a courteous manner.

Variable	Range
Client	May include but not limited to: <ul style="list-style-type: none"> • internal departments, external organizations, individual people and employees
Organizational standards	May include but not limited to: <ul style="list-style-type: none"> • Variables may include but are not limited to: • Security procedures • Logged call procedures • Client liaison policy • Escalation procedures • Preventative maintenance and diagnostic policy • Roles and technical responsibilities in the IT department • Vendor and product service-level support agreements
Appropriate person	May include but not limited to: <ul style="list-style-type: none"> • a supervisor, teacher, vendor business representative, help desk person or subject matter expert
Workplace interactions	Face to face Telephone Electronic and two way radio Written including electronic, memos, instruction and forms, non-verbal including gestures, signals, signs and diagrams

Evidence Guide	
Critical aspects of Competence	Assessment must confirm the ability to: <ul style="list-style-type: none"> • accurately log calls and record, • prioritize and escalate client support requests according to organizational policy and procedures
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: <ul style="list-style-type: none"> • organizational procedures for rating and prioritizing client requests • broad knowledge of escalation procedures • roles and responsibilities of it division • broad knowledge of maintenance procedures • business scheduling requirements • current business practices in relation to preparing reports and documents • broad knowledge of diagnostic tools basic analytical concepts for questioning and gathering information

Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> • log requests for support • perform questioning and active listening in clarifying client requirements and gathering important information • customer service skills in relation to receiving requests for support • skills in handling difficult clients in relation to receiving requests for support • conflict resolution skills in relation to receiving requests for support <p>writing reports and workplace documentation</p>
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Assessment Methods	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning <p>Observation / Demonstration</p>
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

[TOP](#)

Occupational Standard:	Web Development and Database Administration Level II
Unit Title	Update and Document Operational Procedures
Unit Code	<u>EIS WDDBA2 08 1221</u>
Unit Descriptor	This unit defines the competence required to assess, update and document the operational procedures required to use the system.

Elements	Performance Criteria
1. Assess technical and user documentation	<p>1.1 Current version of <i>technical and user documentation</i> is reviewed based on the latest operational procedures.</p> <p>1.2 Accuracy of technical and user documentation is compared with current <i>system</i> functionality.</p> <p>1.3 Inaccuracies are identified and documented for future reference.</p>
2. Update procedures	<p>2.1 Operational procedure requirements are determined using review outcomes.</p> <p>2.2 Operating procedures are developed / updated for the system.</p> <p>2.3 Proposed operating procedures are submitted to <i>appropriate person</i>.</p>
3. Update documentation	<p>3.1 Feedback is reviewed and appropriate changes are made as needed.</p> <p>3.2 Technical and user documentation are updated to incorporate changes.</p> <p>3.3 Technical and user documentation are submitted to appropriate person for final approval.</p> <p>3.4 Technical and user documentation are distributed as agreed with appropriate person.</p>

\

Variable	Range
Occupational Health & Safety (OH&S)	<p>OHS precautions and measures may include against:</p> <ul style="list-style-type: none"> • Physical hazards – impact, illumination, pressure, noise, vibration, temperature, radiation • Chemical hazards – dusts, fibers, mists, fumes, smoke, gasses, vapors • Ergonomics <ul style="list-style-type: none"> ➤ Psychological factors – over exertion/ excessive force, awkward/static positions, fatigue, direct pressure, varying metabolic cycles ➤ Physiological factors – monotony, personal relationship, work out cycle ➤ Burglary ➤ Fire ➤ Power accidents
Tools and Equipment	<ul style="list-style-type: none"> • Documentation and manuals • Soft wares
Types and Sources of Information	<ul style="list-style-type: none"> • Internet • System or project related documentation • Staffing resources • Technical and user documentation • Operational procedure
Technical and user documentation	May include system or project specifications, system design, system functionality, reports, help references, technical manuals, operational procedures, training materials and self-paced tutorials, on-line help, user guides and brochures.
System	May include but is not limited to networks, software, databases, applications, servers, operating systems, gateways.
Appropriate person	May include a supervisor, teacher, authorized business representative or client

Evidence Guide	
Critical aspects of Competence	Assessment must confirm the ability to manage the production of clear, easy-to-read procedures conforming to required standards for the utilization of the specified system.
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> • documentation standards and tools • client business domain • role of stakeholders and the degree of stakeholder involvement • current industry-accepted hardware and software products • current business practices in relation to preparing reports

Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> • review and update technical and user documentation • update procedures • update documentation
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Assessment Methods	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

Occupational Standard: Web Development and Database Administration Level II	
Unit Title	Prevent and Eliminate MUDA
Unit Code	EIS WDDBA2 09 1221
Unit Descriptor	This unit covers the knowledge, skills and attitude required by a worker to prevent and eliminate MUDA/wastes in his/her workplace by applying scientific problem-solving techniques and tools to enhance quality, productivity and other kaizen elements on continual basis It covers responsibility for the day-to-day operation of the work and ensures Kaizen Elements are continuously improved and institutionalized.

Element	Performance Criteria
1. Prepare for work.	1.1. Work instructions are used to determine job requirements, including method, material and equipment. 1.2. Job specifications are read and interpreted following working manual. 1.3. OHS requirements , including dust and fume collection, breathing apparatus and eye and ear personal protection needs are observed throughout the work. 1.4. Appropriate material is selected for work. 1.5. Safety equipment and tools are identified and checked for safe and effective operation.
2. Identify MUDA and problem	2.1 Plan of MUDA and problem identification is prepared and implemented. 2.2 Causes and effects of MUDA are discussed. 2.3 All possible problems related to the process /Kaizen elements are listed using statistical tools and techniques . 2.4 All possible problems related to kaizen elements are identified and listed on Visual Management Board/Kaizen Board. 2.5 Tools and techniques are used to draw and analyze current situation of the work place. 2.6 Wastes/MUDA are identified and measured based on relevant procedures . 2.7 Identified and measured wastes are reported to relevant personnel.
3. Analyze causes of a problem.	3.1 All possible causes of a problem are listed. 3.2 Cause relationships are analyzed using 4MIE . 3.3 Causes of the problems are identified. 3.4 The root cause which is most directly related to the problem is selected. 3.5 All possible ways are listed using creative idea generation to eliminate the most critical root cause.

	<p>3.6 The suggested solutions are carefully tested and evaluated for potential complications.</p> <p>3.7 Detailed summaries of the action plan are prepared to implement the suggested solution.</p>
4. Eliminate MUDA and Assess effectiveness of the solution.	<p>4.1. Plan of MUDA elimination is prepared and implemented by medium KPT members.</p> <p>4.2. Necessary attitude and the ten basic principles for improvement are adopted to eliminate waste/MUDA.</p> <p>4.3. Tools and techniques are used to eliminate wastes/MUDA based on the procedures and OHS.</p> <p>4.4. Wastes/MUDA are reduced and eliminated in accordance with OHS and organizational requirements.</p> <p>4.5. Tangible and intangible results are identified.</p> <p>4.6. Tangible results are compared with targets using various types of diagrams.</p> <p>4.7. Improvements gained by elimination of waste/MUDA are reported to relevant bodies.</p>
5. Prevent occurrence of wastes and sustain operation.	<p>5.1. Plan of MUDA prevention is prepared and implemented.</p> <p>5.2. Standards required for machines, operations, defining normal and abnormal conditions, clerical procedures and procurement are discussed and prepared.</p> <p>5.3. Occurrences of wastes/MUDA are prevented by using visual and auditory control methods.</p> <p>5.4. Waste-free workplace is created using 5W and 1H sheet.</p> <p>5.5. The completion of required operation is done in accordance with standard procedures and practices.</p> <p>5.6. The updating of standard procedures and practices is facilitated.</p> <p>5.7. The capability of the work team that aligns with the requirements of the procedure is ensured and trained on the new Standard Operating Procedures (SOPs).</p>

Variable	Range
OHS requirements	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • Are to be in accordance with legislation/ regulations/codes of practice and enterprise safety policies and procedures. This may include protective clothing and equipment, use of tooling and equipment, workplace environment and safety, handling of material, use of fire fighting equipment, enterprise first aid, hazard control and hazardous materials and substances. • PPE are to include that prescribed under legislation/regulations/codes of practice and workplace policies and practices.

	<ul style="list-style-type: none"> • Safe operating procedures are to include, but are not limited to the conduct of operational risk assessment and treatments associated with workplace organization. • Emergency procedures related to this unit are to include but may not be limited to emergency shutdown and stopping of equipment, extinguishing fires, enterprise first aid requirements and site evacuation.
Safety equipment and tools	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • Dust masks/goggles • Glove • Working cloth • First aid and • Safety shoes
Statistical tools and techniques	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • 7 QC tools May include, but not limited to: <ul style="list-style-type: none"> ➤ Stratification ➤ Pareto Diagram ➤ Cause and Effect Diagram ➤ Check Sheet ➤ Control Chart/Graph ➤ Histogram and Scatter Diagram • QC techniques May include, but not limited to: <ul style="list-style-type: none"> ➤ Brain storming ➤ Why analysis ➤ What if analysis ➤ 5W1H
Tools and techniques	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • Plant Layout • Process flow • Other Analysis tools • Do time study by work element • Measure Travel distance • Take a photo of workplace • Measure Total steps • Make list of items/products, who produces them and who uses them & those in warehouses, storages etc. • Focal points to Check and find out existing problems • 5S • Layout improvement • Brainstorming • Andon • U-line

	<ul style="list-style-type: none"> • In-lining • Unification • Multi-process handling & Multi-skilled operators • A.B. control (Two point control) • Cell production line • TPM (Total Productive Maintenance)
Relevant procedures	May include, but not limited to: <ul style="list-style-type: none"> • Make waste visible • Be conscious of the waste • Be accountable for the waste and measure the waste.
4M1E	May include, but not limited to: <ul style="list-style-type: none"> • Man • Machine • Method Material and Environment
Creative idea generation	May include, but not limited to: <ul style="list-style-type: none"> • Brainstorming • Exploring and examining ideas in varied ways • Elaborating and extrapolating • Conceptualizing
Medium KPT	May include, but not limited to: <ul style="list-style-type: none"> • 5S • 4M (Machine, Method, Material and Man) • 4p (Policy, Procedures, People and Plant) • PDCA cycle Basics of IE tools and techniques
The ten basic principles for improvement	May include, but not limited to: <ul style="list-style-type: none"> • Throw out all of your fixed ideas about how to do things. • Think of how the new method will work- not how it won. • Don't accept excuses. Totally deny the status quo. • Don't seek perfection. A 50 percent implementation rate is fine as long as it's done on the spot. • Correct mistakes the moment they are found. • Don't spend a lot of money on improvements. • Problems give you a chance to use your brain. • Ask "why?" At least five times until you find the ultimate cause. • Ten people's ideas are better than one person's. • Improvement knows no limits.
Tangible and intangible results	May include, but not limited to: <ul style="list-style-type: none"> • Tangible result may include quantifiable data • Intangible result may include qualitative data

various types of diagrams.	May include, but not limited to: <ul style="list-style-type: none"> • Line graph • Bar graph • Pie-chart • Scatter diagrams • Affinity diagrams
Visual and auditory control methods	May include, but not limited to: <ul style="list-style-type: none"> • Red Tagging • Sign boards • Outlining • Add ones • Kanban, etc.
5W and 1H	May include, but not limited to: <ul style="list-style-type: none"> • Who • What • Where • When • Why and • How
Standard Operating Procedures (SOPs).	May include, but not limited to: <ul style="list-style-type: none"> • The customer demands • The most efficient work routine (steps) • The cycle times required to complete work elements • All process quality checks required to minimize defects/errors • The exact amount of work in process required

Evidence Guide

Critical Aspects of Competence	Demonstrate knowledge and skills to: <ul style="list-style-type: none"> • Discuss why wastes occur in the workplace • Discuss causes and effects of wastes/MUDA in the workplace • Analyze the current situation of the workplace by using appropriate tools and techniques • Identify, measure, eliminate and prevent occurrence of wastes by using appropriate tools and techniques • Use 5W and 1H sheet to prevent • Detect non-conforming products/services in the work area • Apply effective problem-solving approaches/strategies. • Implement and monitor improved practices and procedures • Apply statistical quality control tools and techniques.
Underpinning Knowledge and	Demonstrate knowledge of: <ul style="list-style-type: none"> • Targets of customers and manufacturer/service provider

Attitude	<ul style="list-style-type: none"> • Traditional and kaizen thinking of price setting • Kaizen thinking in relation to targets of manufacturer/service provider and customer • value • The three categories of operations • the 3“MU” • wastes occur in the workplace • The 7 types of MUDA • QC story/PDCA cycle/ • QC story/ Problem solving steps • QCC techniques • 7 QC tools • The Benefits of identifying and eliminating waste • Causes and effects of 7 MUDA • Procedures to identify MUDA • Necessary attitude and the ten basic principles for improvement • Procedures to eliminate MUDA • Prevention of wastes • Methods of waste prevention • Definition and purpose of standardization • Standards required for machines, operations, defining normal and abnormal conditions, clerical procedures and procurement • Methods of visual and auditory control • TPM concept and its pillars. • Relevant OHS and environment requirements • Method and Lines of communication • Methods of making/recommending improvements. • Reporting procedures • Workplace procedures associated with the candidate's regular technical duties • organizational structure of the enterprise
Underpinning Skills	<p>Demonstrate skills to:</p> <ul style="list-style-type: none"> • Draw & analyze current situation of the work place • Use measurement apparatus (stop watch, tape, etc.) • Calculate volume and area • Apply statistical analysis tools • Use and follow checklists to identify, measure and eliminate wastes/MUDA • Identify and measure wastes/MUDA in accordance with

	<p>OHS and procedures</p> <ul style="list-style-type: none"> • Use tools and techniques to eliminate wastes/MUDA in accordance with OHS procedure. • Apply 5W and 1H sheet • Update and use standard procedures for completion of required operation • Apply Visual Management Board/Kaizen Board. • Detect non-conforming products or services in the work area • Work with others • Read and interpret documents • Observe situations • Solve problems • Communicate information • Gather evidence by using different means • Report activities and results using report formats • Implement and monitor improved practices and procedures
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: <ul style="list-style-type: none"> • Interview/Written Test • Observation/Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Evidence Guide

Critical Aspects of Competence	<p>Demonstrate knowledge and skills to:</p> <ul style="list-style-type: none"> • Discuss why wastes occur in the workplace • Discuss causes and effects of wastes/MUDA in the workplace • Analyze the current situation of the workplace by using appropriate tools and techniques • Identify, measure, eliminate and prevent occurrence of wastes by using appropriate tools and techniques • Use 5W and 1H sheet to prevent • Detect non-conforming products/services in the work area • Apply effective problem-solving approaches/strategies. • Implement and monitor improved practices and procedures • Apply statistical quality control tools and techniques.
Underpinning Knowledge and Attitude	<p>Demonstrate knowledge of:</p> <ul style="list-style-type: none"> • Targets of customers and manufacturer/service provider • Traditional and kaizen thinking of price setting • Kaizen thinking in relation to targets of manufacturer/service

	<p>provider and customer</p> <ul style="list-style-type: none"> • value • The three categories of operations • the 3“MU” • wastes occur in the workplace • The 7 types of MUDA • QC story/PDCA cycle/ • QC story/ Problem solving steps • QCC techniques • 7 QC tools • The Benefits of identifying and eliminating waste • Causes and effects of 7 MUDA • Procedures to identify MUDA • Necessary attitude and the ten basic principles for improvement • Procedures to eliminate MUDA • Prevention of wastes • Methods of waste prevention • Definition and purpose of standardization • Standards required for machines, operations, defining normal and abnormal conditions, clerical procedures and procurement • Methods of visual and auditory control • TPM concept and its pillars. • Relevant OHS and environment requirements • Method and Lines of communication • Methods of making/recommending improvements. • Reporting procedures • Workplace procedures associated with the candidate's regular technical duties • organizational structure of the enterprise
Underpinning Skills	<p>Demonstrate skills to:</p> <ul style="list-style-type: none"> • Draw & analyze current situation of the work place • Use measurement apparatus (stop watch, tape, etc.) • Calculate volume and area • Apply statistical analysis tools • Use and follow checklists to identify, measure and eliminate wastes/MUDA • Identify and measure wastes/MUDA in accordance with OHS and procedures • Use tools and techniques to eliminate wastes/MUDA in accordance with OHS procedure.

	<ul style="list-style-type: none"> • Apply 5W and 1H sheet • Update and use standard procedures for completion of required operation • Apply Visual Management Board/Kaizen Board. • Detect non-conforming products or services in the work area • Work with others • Read and interpret documents • Observe situations • Solve problems • Communicate information • Gather evidence by using different means • Report activities and results using report formats • Implement and monitor improved practices and procedures
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: <ul style="list-style-type: none"> • Interview/Written Test • Observation/Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

NQTF Level I

Page 134	Ministry of Science and Higher Education Copyright	Web Development and Database Administration Ethiopian Occupational Standard	Version 2 Dec 2011
----------	--	---	-----------------------

Occupational Standard:	Web Development and Database Administration Level I
Unit Title	Operate Personal Computer
Unit Code	<u>EIS WDDBA1 01 1221</u>
Unit Descriptor	This unit defines the competence required to operate a personal computer, including starting the PC, logging in, using and understanding desktop icons and their links to underlying programs, navigating a directory structure, saving work, printing, closing down the PC and word processing.

Elements	Performance Criteria
1. Start the computer	1.1 <i>Peripheral device</i> connections for correct position are checked 1.2 Input voltage for the device based on the <i>OHS standards</i> are checked 1.3 Power at both the power point and <i>computer</i> are switched on
2. Access basic system information	2.1 User name and password are inserted as prompted and noted access, privacy, security and related conditions of use displayed on introductory screens 2.2 <i>Operating system</i> are navigated to access <i>system information</i> to identify system configuration and application versions in operation 2.3 <i>On-line help functions</i> are used as required
3. Navigate and Manipulate desktop environment	3.1 Desktop icons are created and customized 3.2 Desktop icons are selected, opened and closed to access <i>application programs</i> 3.3 Application windows are manipulated and desktop returned to original conditions
4. Organize basic directory/ folder structure and files	4.1 Directories and subdirectories are created and named 4.2 <i>Attributes</i> of directories are identified 4.3 Subdirectories between directories are moved 4.4 Directories as required are renamed 4.5 Directories and subdirectories are accessed via different paths

5. Organize files for user and/or organization requirements	<p>5.1 <i>System browser</i> are used to search drives for specific files</p> <p>5.2 Most commonly used types of files in the directories are accessed</p> <p>5.3 Groups of files are selected, opened and renamed as required</p> <p>5.4 Files between directories are moved</p> <p>5.5 Files to <i>disks</i> are copied</p> <p>5.6 Deleted files are restored as necessary</p> <p>5.7 Disks are erased and formatted as necessary</p>
6. Printer installing	<p>6.1 Printers are added if required and ensured to have correct <i>printer settings</i></p> <p>6.2 Default printer are changed if appropriate</p> <p>6.3 Information is printed from an installed printer</p>

Variable	Range
Peripheral device	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • mouse, keyboard, visual display unit, monitor and printer <p>Scanner, Audio devices</p>
OHS standards	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • correct posture, lighting, type of desk, type of monitor, style of chair, typing position, repetitive strain injury prevention, ventilation, light position, correct lifting method, and length of time in front of computer • may also include physical safety considerations such as general electrical safety and cabling, power supply and leads as they apply to computer and peripheral installations
Computer	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • laptops and workstations
Operating System	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • Linux 7.0 or above, Windows 7 or above, Apple OS X or above
System information	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • hardware and software components that run a computer
On-line help functions	<ul style="list-style-type: none"> • Instruction manual or a portion of the manual, integrated into the program.

Application programs	May include but not limited to: <ul style="list-style-type: none"> • database programs, word processors, email programs, internet browsers, system browsers and spreadsheets
Attributes	May include but not limited to: <ul style="list-style-type: none"> • Indicates several properties of the directory, for example, they indicate whether the directory is read-only, whether it needs to be backed up, and whether it is visible or hidden
System browser	May include but is not limited to Windows explorer
Disks	May include but not limited to: <ul style="list-style-type: none"> • CDs, CD-RW (compact disks-read write), DVD RW
Printer settings	May include but not limited to: <ul style="list-style-type: none"> • layout, paper size, paper tray, cartridge type, number of copies, orientation

Evidence Guide	
Critical aspects of Competence	<ul style="list-style-type: none"> • Must confirm the ability to use software, navigate around the desktop, use system features to perform tasks, and save results of work • Must ensure the ability to create open and retrieve documents, customize basic settings, format documents, create tables, add objects and images, and save and print documents
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> • Organizational benchmarks for minimum typing skills, including speed and accuracy • Creating and opening documents • Formatting documents • Inserting tables and images • Saving, printing and closing documents • Basic keyboarding skills • Computer functions • Basic parts of a computer and various hardware components • Storage devices and basic categories • Basic software operation
Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> • Access basic system information • Operate application software

Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace and OHS practices.
Assessment Methods	Competency may be assessed through: <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

Occupational Standard:	Web Development and Database Administration Level I
Unit Title	Connect Hardware Peripherals
Unit Code	EIS WDDBA1 02 1221
Unit Descriptor	This unit defines the competence required to connect hardware peripherals according to instructions and a workstation or networked computer to the internet.

Elements	Performance Criteria
1. Confirm requirements of client	<p>1.1 <i>Client peripherals</i> are identified requirements and confirmed in accordance with <i>organizational standards</i></p> <p>1.2 Client requirements and peripherals needed are documented in line with organizational standards and findings are reported to the appropriate person</p> <p>1.3 Client requirements are verified with appropriate person in line with organizational standards and reporting procedures</p> <p>1.4 Action must be taken to ensure client support expectations are covered by vendor warranty and support services</p>
2. Obtain required peripherals	<p>2.1 Peripherals are obtained under instruction from appropriate person</p> <p>2.2 Peripherals are entered into equipment inventory according to organizational standards</p> <p>2.3 Validate that contents of delivered components and physical contents match the packing list and resolve discrepancies, if necessary</p> <p>2.4 Peripherals are stored according to vendor/manual guidelines</p>

3. Connect hardware peripherals	<p>3.1 Timeframe for installation schedule is verified with the client in accordance with the organization requirements</p> <p>3.2 Old peripherals are removed and/or replaced with minimum disruption to clients taking into account environmental considerations and <i>OHS standards</i></p> <p>3.3 New peripherals are connected with minimum disruption to clients and taking into account the operating system procedures</p> <p>3.4 The computer is configured to accept the new peripherals</p> <p>3.5 Hardware peripherals are tested and confirm client satisfaction, particular attention must be paid to possible impact on other systems and adjustments are made as required</p>
4. Connect workstation to the internet	<p>4.1 <i>Workstations</i> are connected to the internet through the existing internet connection and functionality confirmed</p> <p>4.2 Internet browser software is launched to enable access to the internet and functionality confirmed</p>

Variable	Range
Occupational Health & Safety (OH&S)	May include but not limited to: Occupational health and Safety aspects of relevant organizational activities must be considered May include correct posture, lighting, type of desk, type of monitor, style of chair, typing position, repetitive strain injury prevention, ventilation, light position, correct lifting method, and length of time in front of computer. May also include licensing related and physical safety considerations such as general electrical safety and cabling, power supply and leads as they apply to computer and peripheral installations
Peripherals	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • printers, scanners, Toner cartridges • speakers, multimedia kits • personal computer, modems, hub • input equipment may include mouse, touch pad, keyboard, • mobile phones, palmtops and personal digital assistants (PDAs), laptops, and desktop computers • Bluetooth devices, universal serial bus (USB)

Organizational standards	<ul style="list-style-type: none"> personal use of emails and internet access, content of emails, downloading information and accessing particular websites, virus risk (MS windows OS and Mac OS only), dispute resolution, document procedures and templates, communication methods and financial control mechanisms
Appropriate person	supervisor, teacher, authorized business representative or client
Operating system	May include but not limited to: <ul style="list-style-type: none"> Window7, 8.1,10 and 11, Mac OS X, Linux
Client	May include but not limited to: <ul style="list-style-type: none"> internal departments, external organizations, individual people and employees
Equipment	May include but not limited to: <ul style="list-style-type: none"> workstations, personal computers, modems or other connectivity devices, printers, hard drives, monitors, switches, hubs, personal digital assistant (PDA) and other peripheral devices
OHS standards	May include but not limited to: <ul style="list-style-type: none"> correct posture, lighting, type of desk, type of
Internet connection	May include but not limited to: <ul style="list-style-type: none"> cable, broadband or Wi-Fi and hotspot
Business requirements	May include but not limited to: <ul style="list-style-type: none"> speed of access, money available, technical support required and other specific internet needs
Features	May include but not limited to: <ul style="list-style-type: none"> May be in relation to cost, connectivity, services, connection type and support
Workstation	May include but not limited to: <ul style="list-style-type: none"> personal computers, networked computers, laptops
Software	May include but not limited to: <ul style="list-style-type: none"> commercial, in-house, packaged or customized software
Connection device	May include but not limited to: <ul style="list-style-type: none"> ADSL modem, cable
Vendor instructions	user manual, written instructions from meetings, verbal request or help desk
Operating system	May include but not limited to: <ul style="list-style-type: none"> Linux 7.0 or above, Windows 7 or above, Apple OS X or above
Internet browser software	May include but not limited to: <ul style="list-style-type: none"> Netscape Navigator, Internet Explorer, Mozilla, Opera.

Internet	An interconnected system of networks that connects computers around the world via TCP/IP or FTP protocols
Tools and equipment	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • Organization's hardware blueprint • Vendor support staff (on call if assessment is a live activity) • Additional staff if required to support the assessment • Hardware peripherals and workstation • Personal computer • Internet connection • Modem or other connectivity device • Network tool kits

Evidence Guide	
Critical aspects of Competence	<p>Demonstrates skills and knowledge in:</p> <ul style="list-style-type: none"> • safely connect hardware peripherals according to vendor instructions with a minimum of down time to the system (competence is required in the connection of five different peripherals) • ability to interpret vendor manuals in relation to the storage and connection of hardware peripherals • application of OHS regulations relating to working with electrical equipment • ability to connect a workstation or networked computers to the internet
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> • OHS procedures for electrical equipment • inventory procedures • organizational guidelines relating to external suppliers and vendors • technical systems • operating systems • creating communication with ISP and telecom service organizations • help desk and maintenance practices • current industry-accepted hardware and software products, with broad knowledge of general features and capabilities and detailed knowledge in some areas • input/output devices the range of internet service providers (ISPs) and the varying plans, technologies and services they offer

Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> • Connect hardware peripherals • Connect workstation to the internet
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace and OHS practices.
Methods of Assessment	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

[TOP](#)

Occupational Standard:	Web Development and Database Administration Level I
Unit Title	Install Software Application
Unit Code	<u>EIS WDDBA1 03 1221</u>
Unit Descriptor	This unit defines the competence required to install or upgrade basic software applications using a commercial applications program.

Elements	Performance Criteria
1. Determine software and upgrade requirements	<p>1.1 <i>Client</i> requirements are documented and reported to appropriate person in accordance with the workplace standard</p> <p>1.2 Act on instructions to meet client requirements in line with organizational requirements</p>
2. Obtain software or software upgrade	<p>2.1 <i>Application program</i> that best conforms to requirements and organizational policies are investigated and selected</p> <p>2.2 Application program under instruction is obtained from appropriate person</p> <p>2.3 <i>Licensing requirements</i> and record are determined in line with organizational guidelines</p> <p>2.4 Target <i>computer</i> is ensured to conform with the minimum <i>hardware</i> and <i>operating system</i> requirements of the application program</p>
3. Install or upgrade software	<p>3.1 New or upgraded <i>software</i> are installed in accordance with appropriate person or organizational instructions</p> <p>3.2 Installation process is completed efficiently and effectively with minimal disruption</p> <p>3.3 Testing and acceptance are carried out in line with corporate guidelines, paying particular attention to possible <i>impact</i> on other systems</p> <p>3.4 Ensure client requirements are satisfied in accordance with the <i>organizational standard</i></p> <p>3.5 Outstanding client issues are referred to appropriate person as necessary</p>

Variable	Range
Client	May include but not limited to: • internal departments, external organizations, individual people and internal employees
Application program	May include but not limited to: • database programs, word processors, email programs, internet browsers ,Anti -virus, Adobe reader, spreadsheets, etc..
Licensing requirements	May include but not limited to: • type of license, cost of license, support provided, and number of licenses required
Computer	May include but not limited to: • laptops, workstations
Hardware	May include but not limited to: workstations, personal computers
Operating System	May include but not limited to: • Linux 7.0 or above, Windows 7 or above, Apple OS X or above.
Software	May include but not limited to: • commercial software applications; organization-specific software
Impact	May be in relation to installation time, effect on normal business, problems and data entry.
Organizational requirements	May include but not limited to: • guidelines, corporate purchasing, licensing arrangements and budget
Occupational Health and Safety (OHS)	May include but not limited to: correct posture, lighting, and type of desk, type of monitor, style of chair, typing position, repetitive strain injury prevention, ventilation, light position, correct lifting method, and length of time in front of computer licensing-related and physical safety considerations such as general electrical safety and cabling, power supply and leads as they apply to computer and peripheral installations
Tools and equipment	May include but not limited to: basic computer maintenance tool kit computer, antivirus software , recovery software, safety tools

Evidence Guide

Page 145	Ministry of Science and Higher Education Copyright	Web Development and Database Administration Ethiopian Occupational Standard	Version 2 Dec 2011
----------	--	--	-----------------------

Critical aspects of Competence	Assessment must confirm the ability to install software applications through operating system instructions and to configure computer to accept new software or upgrade.
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: <ul style="list-style-type: none"> • organizational guidelines for purchasing • licensing arrangements and responsibilities • software copyright responsibilities • operating systems supported by the organization • hardware storage devices • input/output devices • client business domain • technical writing and reporting
Underpinning Skills	Demonstrates skills to: <ul style="list-style-type: none"> • determine software or software upgrade requirements • provide general customer service • perform decision making in a limited range of options • problem solving of known problems in routine procedures • plain English literacy and communication skills in relation to the presentation of information • report writing skills for business requiring some analysis and evaluation of information in a defined range of areas
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Assessment Methods	Competency may be assessed through: <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

[TOP](#)

Occupational Standard:	Web Development and Database Administration Level 1
Unit Title	Protect Application or System Software
Unit Code	<u>EIS WDDBA1 04 1221</u>
Unit Descriptor	This unit defines the competence required to keep application or system software working effectively. It includes detecting and removing destructive software

Elements	Performance Criteria
1. Ensure user accounts are controlled	<p>1.1 Modify default user settings to ensure that they conform to security policy</p> <p>1.2 Previously created user settings are modified to ensure they conform to updated security policy</p> <p>1.3 Ensure legal notices displayed at logon are appropriate</p> <p>1.4 Appropriate utilities are used to check strength of passwords and consider tightening rules for password complexity</p> <p>1.5 information services are accessed to identify security gaps and take appropriate action using hardware and software or patches</p>
2. Detect and remove destructive software	<p>2.1 Common types of <i>destructive software</i> are defined and identified</p> <p>2.2 <i>Virus protection and Scheduling</i> compatible with the <i>operating system</i> in use are selected and installed</p> <p>2.3 Advanced systems of protection are described in order to understand further options</p> <p>2.4 <i>Software updates</i> on a regular basis are installed</p> <p>2.5 Software security settings are configured to prevent destructive software from infecting computer</p> <p>2.6 Virus protection software are run and/or scheduled on a regular basis</p> <p>2.7 Detected destructive software are reported to appropriate person and remove the destructive software</p>

3. Identify and take action to stop spam	<p>3.1 Common types of spam are defined and identified</p> <p>3.2 Appropriate action is taken in order to protect unauthorized access of spammers</p> <p>3.3 Spam filters are configured and used</p> <p>3.4 Spams are reported and documented to identify the security threats and be able to perform recommended action</p>
4. Perform workplace duties following written notices	<p>4.1 Written notices and instructions are read and interpreted correctly in accordance with organizational guidelines</p> <p>4.2 Routine written instruction are followed in sequence</p> <p>4.3 Feedback is given to workplace supervisor based on the instructions/information received</p>

Variable	Range
Destructive Software	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • Viruses, File viruses, System sector viruses, Macro viruses, Worms, Trojans, Logic bombs and Spy ware
Virus protection	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • There are various antivirus software applications available. Some include: F-Secure, McAfee, Panda Antivirus, Protector Plus Antivirus, Symantec's Norton Antivirus, Command Antivirus, Vet. AMI virus, Avast Antivirus
Operating system	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • Linux 6.0, 7.0 or above, Windows 7 and above, Apple OS 8 or above
Software Updates	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • Service packs and service releases, Security patches, Automatic online updates, and Virus scanning engine Updates and Virus definition updates
Spam	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • unsolicited commercial electronic messaging, where electronic messaging covers emails
Appropriate action	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • Delete the virus • Scheduling the Antivirus • Delete the spam • Block the sender by configuring spam filter.

Maintenance	May include but not limited to: • on-site response, remote diagnostics or return to depot
Tools and equipment	May include but not limited to: • appropriate software, anti-virus and diagnostic tools • computer hardware • records and reports
Organizational Guidelines	May include: <ul style="list-style-type: none"> • Information documentation procedures Company policies and procedures • Organization manuals • Service Manual

Evidence Guide	
Critical aspects of Competence	Assessment must ensure the ability to establish : <ul style="list-style-type: none"> • safe work practices, • siting requirements for system hardware and associated peripheral devices, • maintenance practices and determine appropriate hardware quality standards • Assessment must confirm the ability to identify, isolate and protect a system from destructive software by installing virus protection and software updates and to identify
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: <ul style="list-style-type: none"> • General OH&S principles and responsibilities • OH&S principles specific to equipment powered by mains electricity • Viruses, worms and other security issues • System hardware and associated peripherals functions • Potential environmental effects of common types of hardware • Importance of maintenance • Handling of high-impedance devices • Communication skills • Span of quality levels in common hardware • Software related to hardware operations • Basic knowledge of identification of virus intrusions and appropriate remedial action • Broad general knowledge of operating systems supported by the organization • Broad general knowledge of computer hardware • Basic knowledge types protective applications used against viruses

Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> • Establish location requirements for hardware and peripherals • Establish maintenance practices
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OH&S practices.
Assessment Methods	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

[TOP](#)

Occupational Standard	Web Development and Database Administration Level 1
Unit Title	Maintain Inventories of Hardware and Software Documentation
Unit Code	EIS WDDBA1 05 1221
Unit Descriptor	This unit defines the competence required to record and store details of software, hardware and technical documentation.

Elements	Performance Criteria
1. Document and update inventory	<p>1.1 <i>Hardware inventory</i> is maintained that creates a profile or description of each piece of <i>Hardware</i></p> <p>1.2 <i>Software inventory</i> and licenses are maintained and updated, as required, particularly when upgrading software</p> <p>1.3 Storage of user documentation or technical manuals are recorded and organized</p>
2. Store technical documentation	<p>2.1 Action is taken to ensure software, hardware and equipment not in use, stored in a manner as recommended by technical manuals</p> <p>2.2 Ensure technical documentation is stored securely</p> <p>2.3 Technical documentation are accessed and disseminated as required by clients</p>
3. Assess quality of receive articles	<p>3.1 Received materials, articles or final product are <i>checked</i> against workplace standards.</p> <p>3.2 Materials, articles or products are measured using the appropriate measuring instruments in accordance with workplace procedures</p> <p>3.3 Causes of any identified faults are identified and corrective actions are taken in accordance with workplace procedures</p>

Variable	Range
Occupational Health & Safety (OH&S)	May include but not limited to: Correct posture, lighting, and type of desk, type of monitor, style of chair, typing position, repetitive strain injury prevention, ventilation, light position, correct lifting method, and length of time in front of computer. May also include licensing-related and physical safety considerations such as general electrical safety and cabling, power supply and leads as they apply to computer and peripheral installations.

Hardware inventory	<ul style="list-style-type: none"> • list of personal computers specification, networked systems, personal organizers, communications equipment • peripherals may include printers, scanners, tape cartridges, speakers, multimedia kits; keyboard equipment, including mouse, touch pad, keyboard
Equipment	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • workstations, personal computers, modems or other connectivity devices, printers, hard drives, monitors, switches, hubs, personal digital assistants and other peripheral devices
Software inventory	list of commercial software applications; organization-specific webpage or customized software; word processing, spreadsheet, database, graphic, mail, internet browsers; and presentation functionalities
Quality check	<p>Visual inspection</p> <p>Physical output/outcome</p> <p>Check against design/specifications</p>

Evidence Guide	
Critical aspects of Competence	<p>Assessment must confirm the ability to:</p> <ul style="list-style-type: none"> • accurately and regularly update and maintain the software, equipment and technical documentation inventory according • identify storage and retrieval policy and procedures • software licensing requirements are adhered to according to vendor specifications • inventories are regularly accessed and kept up-to-date • demonstrate workplace documentation and maintenance of technical manual
Underpinning Knowledge and Attitudes	<p>Demonstrates:</p> <ul style="list-style-type: none"> • Basic understanding of software licensing requirements • Broad knowledge of inventory principles and procedures • Storage of equipment and software • Inventory principles and concept; techniques and procedures
Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> • perform inventory activities • document and update inventory • store technical documentation • writing reports and documentation • literacy skills in regard to workplace documentation and technical manuals

Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Assessment Methods	Competency may be assessed through: <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

Occupational Standard	Web Development and Database Administration Level I
Unit Title	Operate Word- Processing Application
Unit Code	<u>EIS WDDBA1 06 1221</u>
Unit Descriptor	This unit describes the performance outcomes, skills and knowledge required to operate word-processing applications and perform basic operations, including creating and formatting documents, creating tables and printing labels.

Elements	Performance Criteria
1. Apply OHS practices	1.1 Use workplace <i>ergonomic work practices</i> and strategies 1.2 Organise work area ensuring an <i>ergonomic work environment</i>
2. Create documents	2.1 Open word-processing application, create document and add data according to <i>information requirements</i> 2.2 Use document templates as required 2.3 Use simple <i>formatting tools</i> when creating the document 2.4 Save document to directory
3. Customize basic settings to meet page layout conventions	3.1 Adjust page layout to meet information requirements 3.2 Open and view different toolbars 3.3 Change <i>font format</i> to suit the purpose of the document 3.4 Change alignment and line spacing according to document information requirements 3.5 Modify margins to suit the purpose of the document 3.6 Open and switch between several documents
4. Format documents	4.1 Use <i>formatting features</i> and styles as required 4.2 Highlight and copy text from another area in the document or from another active document 4.3 Insert headers and footers to incorporate necessary data 4.4 Save document in another <i>file format</i> 4.5 Save and close document to <i>a storage device</i>
5. Create tables	5.1 Insert standard table into document 5.2 Change cells to meet information requirements 5.3 Insert and delete columns and rows as necessary

	5.4 Use formatting tools according to style requirements
6. Add images	6.1 Insert appropriate <i>images</i> into document and customise as necessary 6.2 Position and resize images to meet document formatting needs 6.3 Images and use mail merge are added
7. Print documents	7.1 Preview document in print preview mode 7.2 Select basic <i>print settings</i> 7.3 Print document or part of document from printer

Variable	Range
<i>Ergonomic work practices</i> may include:	<ul style="list-style-type: none"> ➤ pause exercises ➤ personal strategies: ➤ chair height ➤ footrests ➤ monitor and keyboard alignment ➤ monitor reflection angle ➤ task and postural variety.
<i>Ergonomic work environment</i> may relate to:	<ul style="list-style-type: none"> ➤ air quality ➤ furniture and storage ➤ lighting ➤ noise ➤ temperature.
<i>Information requirements</i> may include:	<ul style="list-style-type: none"> ➤ agendas ➤ letters ➤ memos ➤ minutes ➤ other business documents required by the organization.
<i>Formatting tools</i> may include:	menu commands within the application: <ul style="list-style-type: none"> ➤ borders ➤ copy, cut and paste ➤ help ➤ find and replace ➤ shading ➤ spell check ➤ undo.

Font format may include:	combination of typeface and other attributes: <ul style="list-style-type: none"> ➤ pitch and spacing ➤ size.
Formatting features may include:	<ul style="list-style-type: none"> ➤ bold ➤ hyphenation ➤ italics ➤ underline.
File format may include:	<ul style="list-style-type: none"> ➤ CSV files ➤ doc files ➤ HTML pages ➤ PDF files ➤ text files.
Storage device may include:	<ul style="list-style-type: none"> ➤ CD ➤ DVD ➤ external hard drive, including universal serial bus (USB) flash drive ➤ internal hard drive
Images may include:	<ul style="list-style-type: none"> ➤ clip art ➤ graphics ➤ pictures.
Print settings may include:	<ul style="list-style-type: none"> ➤ layout ➤ number of copies ➤ orientation ➤ paper size ➤ sides.

Evidence Guide	
Critical Aspects of Competence	<p>Assessment must ensure candidate has the ability –</p> <ul style="list-style-type: none"> ➤ follow OHS requirements ➤ create, open and retrieve documents ➤ customise basic settings ➤ format documents ➤ create tables ➤ add text, objects and images ➤ use a keyboard to enter text and numerical data. ➤ save and print documents.
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> ➤ formatting styles and their effect on formatting, readability and appearance of documents

	<ul style="list-style-type: none"> ➤ organisational requirements for ergonomics, such as work periods and breaks ➤ organisational style guide ➤ purpose, use and function of word-processing software.
Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> ➤ create, open and retrieve documents ➤ customise basic settings ➤ format documents ➤ create tables ➤ add text, objects and images ➤ use a keyboard to enter text and numerical data. ➤ save and print documents.
Resources Implication	<p>Assessment must ensure access to:</p> <ul style="list-style-type: none"> ➤ personal computer and printer ➤ word-processing software currently used in industry ➤ documents detailing organisational style guide or policy and OHS requirements ➤ data suitable for use with word-processing packages ➤ appropriate learning and assessment support when required.
Assessment Methods	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> ➤ verbal or written questioning to assess candidate's knowledge of word-processing operations ➤ direct observation of candidate creating and formatting documents ➤ review of documents prepared by candidate demonstrating word-processing skills, including formatting, tables and images.
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

[TOP](#)

Occupational Standard	Web Development and Database Administration Level I
Unit Title	Operate Spreadsheet Application
Unit Code	EIS WDDBA1 07 1221
Unit Descriptor	This unit describes the performance outcomes, skills and knowledge required to operate spreadsheet applications and perform basic operations, including creating and formatting spreadsheet data, incorporating charts and objects, and customising and printing spreadsheets.

Elements	Performance Criteria
1. Create spreadsheets	<p>1.1 Open spreadsheet application, create spreadsheet files and enter numbers, text and symbols into cells according to information requirements</p> <p>1.2 Enter <i>simple formulas and functions</i> using cell referencing where required</p> <p>1.3 Correct formulas when error messages occur</p> <p>1.4 Use a range of common tools during spreadsheet development</p> <p>1.5 Edit columns and rows within the spreadsheet</p> <p>1.6 Use the auto-fill function to increment data where required</p> <p>1.7 Save spreadsheet to directory or folder</p>
2. Customize basic settings	<p>2.1 Adjust page <i>layout</i> to meet user requirements or special needs</p> <p>2.2 Open and view different <i>toolbars</i></p> <p>2.3 Change <i>font settings</i> so that they are appropriate for the purpose of the document</p> <p>2.4 Change <i>alignment</i> options and line spacing according to spreadsheet <i>formatting features</i></p> <p>2.5 <i>Format</i> cell to display different styles as required</p> <p>2.6 Modify margin sizes to suit the purpose of the spreadsheets</p> <p>2.7 View multiple spreadsheets concurrently</p>
3. Format spreadsheet	<p>3.1 Use formatting features as required</p> <p>3.2 Copy selected formatting features from another cell in the spreadsheet or from another active spreadsheet</p>

	3.3 Use <i>formatting tools</i> as required within the spreadsheet 3.4 Align information in a selected cell as required 3.5 Insert headers and footers using formatting features 3.6 Save spreadsheet in another format 3.7 Save and close spreadsheet to <i>storage device</i>
4. Incorporate object and chart in spreadsheet	4.1 Import an object into an active spreadsheet 4.2 Manipulate imported <i>object</i> by using formatting features 4.3 Create a chart using selected data in the spreadsheet 4.4 Display selected data in a different chart 4.5 Modify chart using formatting features
5. Print spreadsheet	5.1 Preview spreadsheet in print preview mode 5.2 Select basic printer options 5.3 Print spreadsheet or selected part of spreadsheet 5.4 Submit the spreadsheet to <i>appropriate person</i> for approval or feedback

Variable	Range
<i>Simple formulas and functions</i> may include:	<ul style="list-style-type: none"> ➤ Addition ➤ division ➤ multiplication ➤ subtraction ➤ application of the above to a series of cells.
<i>Tools</i> may include:	<ul style="list-style-type: none"> ➤ help ➤ search and replace ➤ simple formatting tools ➤ spell check ➤ undo.
<i>Edit</i> may relate to:	<ul style="list-style-type: none"> ➤ adding ➤ copying ➤ deleting ➤ moving ➤ pasting ➤ selecting.
<i>Data</i> may include:	<ul style="list-style-type: none"> ➤ symbols added to the document ➤ text added to the document.

Layout may include:	<ul style="list-style-type: none"> ➤ display modes ➤ orientation ➤ size.
Toolbars may contain:	<ul style="list-style-type: none"> ➤ buttons ➤ menus ➤ a combination of both.
Font settings may include:	<ul style="list-style-type: none"> ➤ colour ➤ size ➤ type.
Alignment may refer to:	<ul style="list-style-type: none"> ➤ centred ➤ justified ➤ left ➤ right.
Formatting features may include:	<ul style="list-style-type: none"> ➤ bold ➤ hyphenation ➤ italics ➤ underline.
Format may refer to:	saving the spreadsheet as another type of document: <ul style="list-style-type: none"> ➤ comma separated values or text ➤ HTML
Formatting tools may include:	menu commands within the application: <ul style="list-style-type: none"> ➤ copy ➤ cut ➤ help ➤ paste ➤ search and replace ➤ spell check ➤ undo.
Storage device may include:	<ul style="list-style-type: none"> • disks: <ul style="list-style-type: none"> • CD • DVD • external hard drive, such as universal serial bus (USB) flash drive • internal hard drive
Object may include:	items that can be inserted into the spreadsheet, such as: <ul style="list-style-type: none"> ➤ other documents ➤ pictures ➤ sound.

Appropriate person may include:	<ul style="list-style-type: none"> ➤ authorised business representative ➤ client ➤ supervisor.
Tools and equipment	May include : • Excel or Spreadsheet

Evidence Guide	
Critical Aspects of Competence	Assessment must ensure candidate has the ability – <ul style="list-style-type: none"> ➤ create spreadsheets ➤ customise basic settings ➤ format spreadsheets ➤ create basic formulas ➤ work with objects and charts in spreadsheets ➤ save and print spreadsheets.
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: <ul style="list-style-type: none"> ➤ basic technical terminology related to reading help files and prompts ➤ formatting styles and their effect on formatting, readability and appearance of spreadsheets ➤ log-in procedures relating to accessing a PC ➤ purpose, use and function of spreadsheet application.
Underpinning Skills	Demonstrates skills to: <ul style="list-style-type: none"> ➤ numeracy skills to enter simple formulas into spreadsheet ➤ problem-solving skills to address common operational problems when using spreadsheet applications ➤ technical skill for create spreadsheets, customise basic settings and use a keyboard to enter text and numerical data.
Resources Implication	Assessment must ensure access to: <ul style="list-style-type: none"> ➤ use of PC and printer ➤ use of spreadsheet software currently used in industry ➤ documents detailing organisational style guide and policy ➤ documents or information containing data suitable for creating spreadsheets ➤ appropriate learning and assessment support when required.
Assessment Methods	Competency may be assessed through: <ul style="list-style-type: none"> ➤ verbal or written questioning to assess candidate’s knowledge of spreadsheet operations ➤ direct observation of candidate creating and formatting spreadsheets ➤ review of spreadsheets, including formatting, formulas, objects and images.

Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting
-----------------------	---

Occupational Standard:	Web Development and Database Administration Level I
Unit Title	Create a simple markup language document
Unit Code	<u>EIS WDDBA1 08 1221</u>
Unit Descriptor	This unit describes the performance outcomes, skills and knowledge required to design, create and save a basic markup language document using a text editor.

Elements	Performance Criteria
1. Review requirements	1.1 Review the requirements of the document 1.2 Select the appropriate <i>markup language</i> based on organizational standards 1.3 Review document structure
2. Create document structure	2.1 Create and assign the basic elements of the document 2.2 Markup sections of the document to depict the <i>structure</i> 2.3 write simple markup language
3. Validate documents	3.1 Validate markup language document against requirements 3.2 Validate markup language document in different <i>browsers</i> 3.3 Validate simple markup language document

Variable	Range
<i>Markup language</i> may include:	hypertext markup language (HTML)
<i>Structure</i> may include elements describing:	<ul style="list-style-type: none"> ➤ Headings ➤ lists ➤ Paragraphs.
<i>Browsers</i> may include:	<ul style="list-style-type: none"> ➤ Firefox ➤ Google chrome ➤ Internet Explorer ➤ Opera

Evidence Guide	
Critical Aspects of Competence	<p>Assessment must ensure candidate has the ability –</p> <ul style="list-style-type: none"> ➤ create and save a markup language document ➤ Use a markup language without the automated generation of code.
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> ➤ markup language and associated standards ➤ features and limitations of range of available browsers ➤ web accessibility.
Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> ➤ problem-solving skills to use markup language and troubleshoot problems ➤ technical skills to use a markup language to create the required web page.
Resources Implication	<ul style="list-style-type: none"> ➤ organisational style guide or policy ➤ document specification ➤ text editor ➤ range of browsers ➤ internet access to validate markup ➤ appropriate learning and assessment support when required
Assessment Methods	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> ➤ evaluation of web pages prepared by candidate using a text editor ➤ Evaluation of candidate's validated markup code results in commonly used browsers.
Context of Assessment	<p>Competency may be assessed in the work place or in a simulated work place setting</p>

Occupational Standard	Web Development and Database Administration Level I
Unit Title	Access Database Application
Unit Code	EIS WDDBA1 09 1221
Unit Descriptor	This unit defines the competency required to access Database Application and perform basic operations.

Elements	Performance Criteria
1. Create database objects	1.1 Database application is opened and designed incorporating basic <i>design principles</i> 1.2 Database object is created according to database usage, as well as user requirements 1.3 Database object is modified as required 1.4 Creating Relationship with tables
2. Add record on table	2.1 Data in a table are added and modified according to information requirements 2.2 Records are added, modified and deleted as required 2.3 Database objects are saved and compiled
3. Customize basic settings	3.1 <i>Page layout</i> is adjusted to meet user requirements 3.2 Different <i>toolbars</i> are opened and viewed 3.3 <i>Font</i> is formatted as appropriate for the purpose of the database entries

Variable	Range
Occupational Health & Safety (OH&S)	<ul style="list-style-type: none"> • Correct posture, lighting, and type of desk, type of monitor, style of chair, typing position, repetitive strain injury prevention, ventilation, light position, correct lifting method, and length of time in front of computer. • May also include physical safety considerations such as general electrical safety and cabling, power supply and leads as they apply to computer and peripheral installations.
Design principles	May include <ul style="list-style-type: none"> • naming conventions • data layout • formatting

Page layout	May include <ul style="list-style-type: none"> • landscape • portrait
Toolbars	May can contain <ul style="list-style-type: none"> • buttons • menus or a combination of both
Appropriate person	May include <ul style="list-style-type: none"> • a supervisor • teacher • authorized business representative or client
Tools and equipment	May include but not limited to: <ul style="list-style-type: none"> • Computers, DB applications, DBMS

Evidence Guide	
Critical Aspects of Competence	Assessment must ensure candidate has the ability :- <ul style="list-style-type: none"> • to design and develop a simple database using a standard database package • to add data, use queries, and create forms and reports • create and format documents • customize basic settings to meet page layout conventions
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: <ul style="list-style-type: none"> • basic database design • basic settings and context • relationships between tables (cardinality)
Underpinning Skills	Demonstrates skills to: <ul style="list-style-type: none"> • create database objects • customize basic settings
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Assessment Methods	Competency may be assessed through: <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

[TOP](#)

Occupational Standard:	Web Development and Database Administration Level I
Unit Title	Apply 5S Procedures
Unit Code	<u>EIS WDDBA1 10 1221</u>
Unit Descriptor	This unit covers the knowledge, skills and attitude required to apply 5S techniques to his/her workplace. It covers responsibility for the day-to-day operations of the workplace and ensuring that continuous improvements of Kaizen elements are initiated and institutionalized.

Elements	Performance Criteria
1. Prepare for work.	<p>1.1. Work instructions are used to determine job requirements, including method, material and equipment.</p> <p>1.2. Job specifications are read and interpreted following working manual.</p> <p>1.3. OHS requirements, including dust and fume collection, breathing apparatus and eye and ear personal protection needs are observed throughout the work.</p> <p>1.4. Tools and equipment are prepared and used to implement 5S.</p> <p>1.5. Safety equipment and tools are identified and checked for safe and effective operation.</p> <p>1.6. Kaizen Board (Visual Management Board) is prepared and used in harmony with different workplace contexts.</p>
2. Sort items.	<p>2.1. Plan is prepared to implement sorting activities.</p> <p>2.2. Cleaning activities are performed.</p> <p>2.3. All items in the workplace are identified following the appropriate procedures.</p> <p>2.4. Necessary and unnecessary items are listed using the appropriate format.</p> <p>2.5. Red tag strategy is used for unnecessary items.</p> <p>2.6. Unnecessary items are evaluated and placed in an appropriate place other than the workplace.</p> <p>2.7. Necessary items are recorded and quantified using appropriate format.</p> <p>2.8. Performance results are reported using appropriate formats.</p> <p>2.9. Necessary items are regularly checked in the workplace.</p>
3. Set all items in order.	<p>3.1. Plan is prepared to implement set in order activities.</p> <p>3.2. General cleaning activities are performed.</p> <p>3.3. Location/Layout, storage and indication methods for items are decided.</p> <p>3.4. Necessary tools and equipment are prepared and used for setting in order activities.</p>

	<p>3.5. Items are placed in their assigned locations.</p> <p>3.6. After use, the items are immediately returned to their assigned locations.</p> <p>3.7. Performance results are reported using appropriate formats.</p> <p>3.8. Each item is regularly checked in its assigned location and order.</p>
4. Perform shine activities.	<p>4.1 Plan is prepared to implement shine activities.</p> <p>4.2 Necessary tools and equipment are prepared and used for shining activities.</p> <p>4.3 Shine activity is implemented using appropriate procedures.</p> <p>4.4 Performance results are reported using appropriate formats.</p> <p>4.5 Regular shining activities are conducted.</p>
5. Standardize 5S.	<p>5.1. Plan is prepared and used to standardize 5S activities.</p> <p>5.2. Tools and techniques to standardize 5S are prepared and implemented based on relevant procedures.</p> <p>5.3. Checklists are followed for standardize activities and reported to relevant personnel.</p> <p>5.4. The workplace is kept to the specified standard.</p> <p>5.5. Problems are avoided by standardizing activities.</p>
6. Sustain 5S.	<p>6.1. Plan is prepared and followed to sustain 5S activities.</p> <p>6.2. Tools and techniques to sustain 5S are discussed, prepared and implemented based on relevant procedures.</p> <p>6.3. Workplace is inspected regularly for compliance to specified standard and sustainability of 5S techniques.</p> <p>6.4. Workplace is cleaned up after completion of job and before commencing next job or end of shift.</p> <p>6.5. Situations are identified where compliance to standards is unlikely and actions specified in procedures are taken.</p> <p>6.6. Improvements are recommended to lift the level of compliance in the workplace.</p> <p>6.7. Checklists are followed to sustain activities and report to relevant personnel.</p> <p>6.8. Problems are avoided by sustaining activities.</p>

Variable	Range
OHS requirements	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • Legislation/Regulations/Codes of practice and enterprise safety policies and procedures. This may include protective clothing and equipment, use of tooling and equipment, workplace environment and safety, handling of material, use of fire fighting equipment, enterprise first aid, hazard

	<p>control and hazardous materials and substances.</p> <ul style="list-style-type: none"> • Personal protective equipment is to include that prescribed under legislation/regulations/codes of practice and workplace policies and practices. • Safe operating procedures are to include, but are not limited to the conduct of operational risk assessment and treatments associated with workplace organization. • Emergency procedures related to this unit are to include but may not be limited to emergency shutdown and stopping of equipment, extinguishing fires, enterprise first aid requirements and site evacuation.
Tools and equipment	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • Paint • Hook • Sticker • Signboard • Nails • Shelves • Chip wood • Sponge • Broom • Pencil • Shadow board/Tools board
Safety equipment and tools	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • Dust masks/goggles • Glove • Working cloth • First aid and safety shoes
Items	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • Tools • Jigs/Fixtures • Materials/components • Machine and equipment • Manuals • Documents • Personal items (e.g. Bags, lunch boxes and posters) • Safety equipment and personal protective equipment • Other items which happen to be in the work area
The appropriate procedures	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • Steps for implementing 5S (sort, set in order and shine) activities.

	<ul style="list-style-type: none"> • Written, verbal and computer based or in some other format.
Unnecessary items	<p>Are not needed for current production or administrative operation and include but not limited to:</p> <ul style="list-style-type: none"> • Defective or excess quantities of small parts and inventory • Out dated or broken jigs and dies • Worn-out bits • Out dated or broken tools and inspection gear • Old rags and other cleaning supplies • Electrical equipment with broken cords • Out dated posters, signs, notices and memos • Some locations where unneeded items tend to accumulate • In rooms or areas not designated for any particular purpose • In corners next to entrances or exists • Along interior and exterior walls • Next to partitions and behind pillars • Under the eaves of warehouses • Under desks and shelves and in desk and cabinet drawers • Near the bottom of tall stacks of items • On unused management and production schedule boards • In tools boxes that are not clearly sorted
Appropriate format	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • All items, necessary and unnecessary items.
Red tag	<p>A format prepared with a red color paper or card which is filled and attached temporarily on the unnecessary items until decision is made. The red tag catch people's attention because red is a color that stands out. So to fill and attach red tag on items, asks the following three questions:</p> <ul style="list-style-type: none"> • Is this item needed? • If it is needed, is it needed in this quantity? • If it is needed, does it need to be located here?
Necessary items	<p>Are required in the workplace for current production or administrative operation in the amount needed.</p>
Shine activity	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • Inspection • Cleaning • Minor maintenance May include, but not limited to: <ul style="list-style-type: none"> ➤ Tightening bolts ➤ Lubrication and Replacing missing parts
Tools and techniques to standardize 5S	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • 5S Job Cycle Charts • Visual 5S • The Five Minute 5S

	<ul style="list-style-type: none"> • Standardization level checklist • 5S checklist • The five Whys and one How approach(5W1H) • Suspension • Incorporation and Use Elimination • 5S slogans • 5S posters • 5S photo exhibits and storyboards • 5S newsletter • 5S maps • 5S pocket manuals • 5S department/benchmarking tours • 5S months • 5S audit • Awarding system • Big cleaning day • Patrolling system May include, but not limited to: <ul style="list-style-type: none"> ➤ Top management Patrol ➤ 5S Committee members and Promotion office Patrol ➤ Mutual patrol ➤ Self-patrol • Checklist and Camera patrols
Relevant procedures	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • Assign 5S responsibilities • Integrate 5S duties into regular work duties • Check on 5S maintenance level • OHS measures such as signage, symbols / coding and labelling of workplace and equipment • Creating conditions to sustain your plans • Roles in implementation
Reporting	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • Verbal responses • Data entry into enterprise database • Brief written reports using enterprise report formats
Relevant personnel	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • Supervisors, managers and quality managers • Administrative, laboratory and production personnel • Internal/external contractors, customers and suppliers

Evidence Guide

Critical Aspects of Competence	<p>Demonstrates skills and knowledge to:</p> <ul style="list-style-type: none"> • Discuss how to organize KPT. • Describe the pillars of 5S. • Discuss the relationship between Kaizen elements. • Implement 5S in own workplace by following appropriate procedures and techniques.
Required Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> • Kaizen principle, pillars and concept • Key characteristic of Kaizen • Elements of Kaizen • Wastes/MUDA • Basics of KPT • Aims, benefits and principles of KPT • Stages of KPT • Structure and role of the components of Junior KPT • Concept and parts of Kaizen board • Concept and benefits of 5S • The pillars of 5S • Three stages of 5S application • Benefits and procedure of sorting activities • The concept and application of Red Tag strategy • Relevant Occupational Health and Safety (OHS) and environment requirements • Benefits and procedure of set in order activities • Set in order methods/techniques • Benefits and procedure of shine activities • Inspection methods • Planning and reporting methods • Method of Communication • Benefits of standardizing and sustaining 5S • Tools and techniques to sustain 5S • Ways to improve Kaizen elements • Benefits of improving kaizen elements • Relationship between Kaizen elements
Required Skills	<p>Demonstrates skills of:</p> <ul style="list-style-type: none"> • Participating actively in KPT • Technical drawing • Communication skills • Planning and reporting own tasks in implementation of 5S • Following procedures to implement 5S in own workplace • Using sorting formats to identify necessary and unnecessary

	<p>items</p> <ul style="list-style-type: none"> • Improving workplace layout following work procedures • Preparing labels, slogans, etc. • Reading and interpreting documents • Observing situations • Gathering evidence by using different means • Recording activities and results using prescribed formats • Working with others • Solving problems by applying 5S • Preparing and using kaizen board • Preparing and using tools and equipment to implement and sustain 5S • Improving Kaizen elements by applying 5S • Standardizing and sustaining procedures and techniques to avoid problems • Procedures to standardizing 5S activities • Analysing and preparing shop layout of the workplace • Standardizing and sustaining checklists
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> • Interview/Written Test • Observation/Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Acknowledgement

We wish to extend thanks and appreciation to the many representatives of business, industry, academe and government agencies who donated their time and expertise to the development of this occupational standard.

We would like also to express our appreciation to the Staff and Experts of MoFED, Ministry of Education (MoE) and Engineering Capacity Building Program (ecbp) who made the development of this occupational standard possible.

This occupational standard was revised and finalized on December 2021 Adama, Ethiopia.

Page 173	Ministry of Science and Higher Education Copyright	Web Development and Database Administration Ethiopian Occupational Standard	Version 2 Dec 2011
----------	--	---	-----------------------

1.Web Development and Database Administration

Experts who participating the Occupational Standard

No	Name In English	Phone Number	E-mail Address	Region/City
1	Endashaw Girma Dukamo	0926103773	endumulu2009@gmail.com	SNNPR
2	Mululem Wordofa Regasa	0912042074	jimpowerdire@gmail.com	Addis Abeba
3	Abinet Ermias Gobena	0911731227	abinet.erm@gmail.com	SNNPR
4	Amante Tadesse Waldamariam	0923104465	Amantetaddese432@gmail.com	Assela/Oromia
5	Tewodros Sileshi Degesew	0923319916	shurakoyooo@gmail.com	SNNPR
6	Akfete Assefa Hurrisa	0912494821	dirake2121@gmail.com	Adama/Oromia
7	Israel Kifle Addise	0922860138	israelkifle2@gmail.com	Adama/Oromia
8	Edris Fedlu Muzemil	0922976864	edrisfedlu@gmail.com	Addis Abeba
9	Mohammedamin Kabirhussein Abdo	0920081070	mo430ka@gmail.com	Assela/Oromia
10	Yitayal Admie Goshu	0918096684	yitay2007@gmail.com	Addis Abeba