TRAINING REGULATIONS

WEB DEVELOPMENT NC III

INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT) SECTOR

TECHNICAL EDUCATION AND SKILLS DEVELOPMENT AUTHORITY
East Service Road, South Superhighway, Taguig City, Metro Manila

Technical Education and Skills Development Act of 1994
(Republic Act No. 7796)

Section 22, “Establishment and Administration of the National Trade Skills Standards” of the RA 7796 known as the TESDA Act mandates TESDA to establish national occupational skills standards. The Authority shall develop and implement a certification and accreditation program in which private industry group and trade associations are accredited to conduct approved trade tests, and the local government units to promote such trade testing activities in their respective areas in accordance with the guidelines to be set by the Authority.

The Training Regulations (TR) serve as basis for the:

1 Competency assessment and certification;
2 Registration and delivery of training programs; and
3 Development of curriculum and assessment instruments.

Each TR has four sections:

Section 1 **Definition of Qualification** – describes the qualification and defines the competencies that comprise the qualification.

Section 2 The **Competency Standards** format was revised to include the Required Knowledge and Required Skills per element. These fields explicitly state the required knowledge and skills for competent performance of a unit of competency in an informed and effective manner. These also emphasize the application of knowledge and skills to situations where understanding is converted into a workplace outcome.

Section 3 **Training Arrangements** - contain information and requirements which serve as bases for training providers in designing and delivering competency-based curriculum for the qualification. The revisions to section 3 entail identifying the Learning Activities leading to achievement of the identified Learning Outcome per unit of competency.

Section 4 **Assessment and Certification Arrangements** - describe the policies governing assessment and certification procedures for the qualification.

TABLE OF CONTENTS

ICT SECTOR

WEB DEVELOPMENT

NATIONAL CERTIFICATE LEVEL III

TRAINING REGULATIONS FOR
WEB DEVELOPMENT NC III

Section 1 WEB DEVELOPMENT NC III QUALIFICATIONS

The **Web Development NC III** Qualification consists of competencies that a person must achieve to develop websites for hosting via intranet or Internet. It includes competencies for web design, content development, client-side/server-side scripting and website security configuration, among other tasks.

This Qualification is packaged from the competency map of the Information and Communication Technology (ICT) Industry as shown in Annex A.

The units of competency comprising this qualification include the following:

UNIT CODE	BASIC COMPETENCIES
500311109	Lead workplace communication
500311110	Lead small teams
500311111	Develop and practice negotiation skills
500311112	Solve problems related to work activities
500311113	Use mathematical concepts and techniques
500311114	Use relevant technologies
500311142	Apply critical thinking and problem solving techniques in the workplace
500311144	Use information creatively and critically
500311145	Work in a diverse environment

UNIT CODE	COMMON COMPETENCIES
ICT315202	Apply quality standards
ICT311203	Perform Computer Operations

UNIT CODE	CORE COMPETENCIES
ICT251301	Utilize Software Methodologies
ICT251302	Develop Responsive Web Design
ICT251303	Create Interactive Websites
ICT251304	Develop Website Backend Systems

A person who has achieved this Qualification is competent to be:

- Web Designer
- Front-end Web Developer
- Backend Web Developer
- Full-stack Web Developer

SECTION 2 COMPETENCY STANDARDS

This section gives the details of the contents of the basic, common and core units of competency required in **WEB DEVELOPMENT NC III.**

BASIC COMPETENCIES

UNIT OF COMPETENCY : LEAD WORKPLACE COMMUNICATION

UNIT CODE : 500311109

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to lead in the dissemination and discussion of ideas, information and issues in the workplace.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Communicate information about workplace processes	1.1. Appropriate ***communication method*** is selected 1.2. Multiple operations involving several topics areas are communicated accordingly 1.3. Questions are used to gain extra information 1.4. Correct sources of information are identified 1.5. Information is selected and organized correctly 1.6. Verbal and written reporting is undertaken when required 1.7. Communication skills are maintained in all situations	1.1. Organization requirements for written and electronic communication methods 1.2. Effective verbal communication methods 1.3. Methods of Communication 1.4. Types of Question 1.5. Communication Tools 1.6. Questioning Techniques	1.1. Organizing information 1.2. Understanding and conveying intended meaning 1.3. Participating in variety of workplace discussions 1.4. Complying with organization requirements for the use of written and electronic communication methods 1.5. Reporting occupational hazards during safety meeting
2. Lead workplace discussions	2.1 Response to workplace issues are sought 2.2 Response to workplace issues are provided immediately 2.3 Constructive contributions are made to workplace discussions on such issues as production, quality and safety 2.4 Goals/objectives and action plan undertaken in the workplace are communicated	2.1. Leading as a management function 2.2. Barriers of communication 2.3. Effective verbal communication methods 2.4. Method/techniques of discussion 2.5. How to lead discussion 2.6. How to solicit response 2.7. Goal setting and action planning	2.1. Communicating effectively 2.2. Consulting the crew on the prepared menu for the month

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Identify and communicate issues arising in the workplace	3.1 Issues and problems are identified as they arise 3.2 Information regarding problems and issues are organized coherently to ensure clear and effective communication 3.3 Dialogue is initiated with appropriate personnel 3.4 Communication problems and issues are raised as they arise	3.1. Types of issues and problems in the workplace 3.2. Written and electronic communication methods 3.3. Communication barriers affecting workplace discussions	3.1. Identifying cause of problems 3.2. Identifying problems and issues 3.3. Organizing information on problems and issues 3.4. Relating problems and issues in the workplace

RANGE OF VARIABLES

VARIABLE	RANGE
1. Methods of communication	1.1. Non-verbal gestures 1.2. Verbal 1.3. Face to face 1.4. Two-way radio 1.5. Speaking to groups 1.6. Using telephone 1.7. Written 1.8. Internet

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Dealt with a range of communication/information at one time 1.2 Made constructive contributions in workplace issues 1.3 Sought workplace issues effectively 1.4 Responded to workplace issues promptly 1.5 Presented information clearly and effectively written form 1.6 Used appropriate sources of information 1.7 Asked appropriate questions 1.8 Provided accurate information
2. Resource Implications	The following resources should be provided: 2.1. Variety of Information 2.2. Communication tools 2.3. Simulated workplace
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Competency in this unit must be assessed through 3.2 Direct Observation 3.3 Interview
4. Context for Assessment	4.1. Competency may be assessed in the workplace or in simulated workplace environment

UNIT OF COMPETENCY : LEAD SMALL TEAMS (Guide and Lead Others/Be Responsible to Others)

UNIT CODE : 500311110

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes to lead small teams including setting and maintaining team and individual performance standards.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Provide team leadership	1.1 **Work requirements** are identified and presented to team members 1.2 Reasons for instructions and requirements are communicated to team members 1.3 **Team members' queries and concerns** are recognized, discussed and dealt with	1.1. Company policies and procedures 1.2. How performance expectations are set 1.3. Methods of Monitoring Performance 1.4. Client expectations 1.5. Team member's duties and responsibilities 1.6. Definition of Team 1.7. Skills and techniques in promoting team building 1.8. Up-to-date dissemination of instructions and requirements to members 1.9. Art of listening and treating individual team members concern	1.1. Communication skills required for leading teams 1.2. Team building skills 1.3. Negotiating skills 1.4. Evaluation skills
2. Assign responsibilities	2.1. Duties and responsibilities are allocated having regard to the skills, knowledge and aptitude required to properly undertake the assigned task and according to company policy 2.2. Duties are allocated having regard to individual preference, domestic and personal considerations, whenever possible	2.1. Concept of delegation 2.2. How to delegate 2.3. Understanding individual differences 2.4. Methods of monitoring performance 2.5. Duties and responsibilities of each team member 2.6. Knowledge in identifying each team member duties and responsibilities	2.1. Delegating skills 2.2. Identifying individual skills, knowledge and attitude as basis for allocating responsibilities 2.3. Identifying each team member duties and responsibilities
3. Set performance expectations for team members	3.1 Performance expectations are established based on client needs and according to assignment requirements	3.1 Definition of performance indicators/ criteria	3.1 Identifying performance indicators 3.2 Evaluating performance

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	3.2 Performance expectations are based on individual team member's duties and area of responsibility 3.3 Performance expectations are discussed and disseminated to individual team members	3.2 Definition of team goals and expectations 3.3 Methods of monitoring performance 3.4 Client expectations 3.5 Team member's duties and responsibilities 3.6 Defining performance expectations criteria	3.3 Setting individual performance target/ expectation indicators
4. Supervise team performance	4.1. **Monitoring of performance** takes place against defined performance criteria and/or assignment instructions and corrective action taken if required 4.2 Team members are provided with feedback, positive support and advice on strategies to overcome any deficiencies 4.3 Performance issues which cannot be rectified or addressed within the team are referenced to appropriate personnel according to employer policy 4.4 Team members are kept informed of any changes in the priority allocated to assignments or tasks which might impact on client/customer needs and satisfaction 4.5 Team operations are monitored to ensure that employer/client needs and requirements are met 4.6 Follow-up communication is provided on all issues affecting the team 4.7 All relevant documentation is completed in accordance with company procedures	4.1 Understanding monitoring of work 4.2 How to undertake corrective action 4.3 Understanding feedback and procedure 4.4 Feedback reporting procedure 4.5 Methods of monitoring performance 4.6 Team member's duties and responsibilities 4.7 Monitoring team operation to ensure client needs and satisfaction	4.1 Monitoring skills 4.2 Setting priorities 4.3 Evaluating performance 4.4 Informal/ formal counseling skills

RANGE OF VARIABLES

VARIABLE	RANGE
1. Work requirements	1.1. Client Profile 1.2. Assignment instructions
2. Team member's concerns	2.1 Roster/shift details
3. Monitor performance	3.1 Formal process 3.2 Informal process
4. Feedback	4.1. Formal process 4.2. Informal process
5. Performance issues	5.1 Work output 5.2 Work quality 5.3 Team participation 5.4 Compliance with workplace protocols 5.5 Safety 5.6 Customer service

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1. Maintained or improved individuals and/or team performance given a variety of possible scenario 1.2. Assessed and monitored team and individual performance against set criteria 1.3. Represented concerns of a team and individual to next level of management or appropriate specialist and to negotiate on their behalf 1.4. Allocated duties and responsibilities, having regard to individual's knowledge, skills and aptitude and the needs of the tasks to be performed 1.5. Set and communicated performance expectations for a range of tasks and duties within the team and provided feedback to team members
2. Resource Implications	The following resources should be provided: 2.1. Access to relevant workplace or appropriately simulated environment where assessment can take place 2.2. Materials relevant to the proposed activity or task
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1. Direct observations of work activities of the individual member in relation to the work activities of the group 3.2. Observation of simulation and/or role play involving the participation of individual member to the attainment of organizational goal 3.3. Case studies and scenarios as a basis for discussion of issues and strategies in teamwork
4. Context for Assessment	4.1. Competency assessment may occur in workplace or any appropriately simulated environment 4.2. Assessment shall be observed while task are being undertaken whether individually or in-group

UNIT OF COMPETENCY : DEVELOP AND PRACTICE NEGOTIATION SKILLS

UNIT CODE : 500311111

UNIT DESCRIPTOR : This unit covers the skills, knowledge and attitudes required to collect information in order to negotiate to a desired outcome and participate in the negotiation.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Plan negotiations	1.1 Information on ***preparing for negotiation*** is identified and included in the plan 1.2 Information on creating ***non-verbal environments*** for positive negotiating is identified and included in the plan 1.3 Information on ***active listening*** is identified and included in the plan 1.4 Information on different ***questioning techniques*** is identified and included in the plan 1.5 Information is checked to ensure it is correct and up-to- date	1.1. Knowledge on Codes of practice and guidelines for the organization 1.2. Knowledge of organizations policy and procedures for negotiations 1.3. Decision making and conflict resolution strategies procedures 1.4. Concept of negotiation	1.1. Communication skills (verbal and listening) 1.2. Active listening 1.3. Setting conflict 1.4. Preparing conflict resolution 1.5. Problem solving strategies on how to deal with unexpected questions and attitudes during negotiation 1.6. Interpersonal skills to develop rapport with other parties
2. Participate in negotiations	2.1 Criteria for successful outcome are agreed upon by all parties 2.2 Desired outcome of all parties are considered 2.3 Appropriate language is used throughout the negotiation 2.4 A variety of questioning techniques are used 2.5 The issues and processes are documented and agreed upon by all parties 2.6 Possible solutions are discussed and their viability assessed 2.7 Areas for agreement are confirmed and recorded 2.8 Follow-up action is agreed upon by all parties	1.1. Outcome of negotiation 1.2. Knowledge on Language 1.3. Different Questioning techniques 1.4. Problem solving strategies on how to deal with unexpected questions and attitudes during negotiation 1.5. Flexibility 1.6. Empathy 1.7. Decision making and conflict resolution strategies procedures	2.1 Negotiating skill 2.2 Communication skills (verbal and listening) 2.3 Observation skills 2.4 Interpersonal skills to develop rapport with other parties 2.5 Applying effective questioning techniques 2.6 Setting conflict

RANGE OF VARIABLES

VARIABLE	RANGE
1. Preparing for negotiation	1.1. Background information on other parties to the negotiation 1.2. Good understanding of topic to be negotiated 1.3. Clear understanding of desired outcome/s 1.4. Personal attributes 1.4.1. self-awareness 1.4.2. self esteem 1.4.3. objectivity 1.4.4. empathy 1.4.5. respect for others 1.5. Interpersonal skills 1.5.1 listening/reflecting 1.5.2 non- verbal communication 1.5.3 assertiveness 1.5.4 behavior labeling 1.5.5 testing understanding 1.5.6 seeking information 1.5.7 self-disclosing 1.6. Analytic skills 1.6.1 observing differences between content and process 1.6.2 identifying bargaining information 1.6.3 applying strategies to manage process 1.6.4 applying steps in negotiating process 1.6.5 strategies to manage conflict 1.6.6 steps in negotiating process 1.6.7 options within organization and externally for resolving conflict
2. Non- verbal environments	2.1. Friendly reception 2.2. Warm and welcoming room 2.3. Refreshments offered 2.4. Lead in conversation before negotiation begins
3. Active listening	3.1. Attentive 3.2. Don't interrupt 3.3. Good posture 3.4. Maintain eye contact 3.5. Reflective listening
4. Questioning techniques	4.1. Direct 4.2. Indirect 4.3. Open-ended

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Demonstrated sufficient knowledge of the factors influencing negotiation to achieve agreed outcome 1.2 Participated in negotiation with at least one person to achieve an agreed outcome
2. Resource Implications	The following resources should be provided: 2.1 Room with facilities necessary for the negotiation process 2.2 Human resources (negotiators)
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Observation/demonstration and questioning 3.2 Portfolio assessment 3.3 Oral and written questioning 3.4 Third party report
4. Context for Assessment	4.1 Competency to be assessed in real work environment or in a simulated workplace setting.

UNIT OF COMPETENCY : SOLVE PROBLEMS RELATED TO WORK ACTIVITIES

UNIT CODE : 500311112

UNIT DESCRIPTOR : This unit of covers the knowledge, skills and attitudes required to solve problems in the workplace including the application of problem solving techniques and to determine and resolve the root cause of problems.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify the problem	1.1. Variances are identified from normal operating parameters; and product quality 1.2. Extent, cause and nature are of the problem are defined through observation, investigation and ***analytical techniques*** 1.3. ***Problems*** are clearly stated and specified	1.1. Competence includes a thorough knowledge and understanding of the process, normal operating parameters, and product quality to recognize non-standard situations 1.2. Competence to include the ability to apply and explain, sufficient for the identification of fundamental cause, determining the corrective action and provision of recommendations 1.3. Relevant equipment and operational processes 1.4. Enterprise goals, targets and measures 1.5. Enterprise quality, OSH and environmental requirement 1.6. Enterprise information systems and data collation 1.7. Industry codes and standards 1.8. Normal operating parameters and product quality	1.1. Use range of formal problem solving techniques 1.2. Identify and clarify the nature of the problem 1.3. Evaluate the effectiveness of a present process in the galley 1.4. Apply analytical techniques
2. Determine fundamental causes of the problem	2.1. Possible causes are identified based on experience and the use of problem solving tools / analytical techniques. 2.2. Possible cause statements are developed based on findings	2.1 Relevant equipment and operational processes 2.2 Enterprise goals, targets and measures 2.3 Enterprise quality, OHS and environmental requirements	2.1 Analysis of root causes

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	2.3. Fundamental causes are identified per results of investigation conducted	2.4 Enterprise information systems and data collation 2.5 Industry codes and standards	
3. Determine corrective action	3.1. All possible options are considered for resolution of the problem 3.2. Strengths and weaknesses of possible options are considered 3.3. Corrective actions are determined to resolve the problem and possible future causes 3.4. ***Action plans*** are developed identifying measurable objectives, resource needs and timelines in accordance with safety and operating procedures	3.1. Understanding the procedure in undertaking corrective action 3.2. Principles of decision making strategies and techniques 3.3. Enterprise information systems and data collation 3.4. Action planning	3.1. Identifying and clarifying the nature of the problem 3.2. Devising the best solution 3.3. Evaluating the solution 3.4. Implementing developed plan to rectify the problem 3.5. Implementing corrective and preventive actions based on root cause analysis
4. Provide recommendations to manager	4.1. Report on recommendations are prepared 4.2. Recommendations are presented to appropriate personnel. 4.3. Recommendations are followed-up, if required	4.1 How to make a report and recommendation	4.1 Writing report and recommend-ations

RANGE OF VARIABLES

VARIABLE	RANGE
1. Analytical techniques	1.1. Brainstorming 1.2. Intuitions/Logic 1.3. Cause and effect diagrams 1.4. Pareto analysis 1.5. SWOT analysis 1.6. Gant chart, Pert CPM and graphs 1.7. Scattergrams
2. Problem	2.1. Non – routine process and quality problems 2.2. Equipment selection, availability and failure 2.3. Teamwork and work allocation problem 2.4. Safety and emergency situations and incidents
3. Action plans	3.1. Priority requirements 3.2. Measurable objectives 3.3. Resource requirements 3.4. Timelines 3.5. Co-ordination and feedback requirements 3.6. Safety requirements 3.7. Risk assessment 3.8. Environmental requirements

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1. Identified the problem 1.2. Determined the fundamental causes of the problem 1.3. Determined the correct / preventive action 1.4. Provided recommendation to manager These aspects may be best assessed using a range of scenarios / case studies / what ifs as a stimulus with a walk through forming part of the response. These assessment activities should include a range of problems, including new, unusual and improbable situations that may have happened.
2. Resource Implications	2.1. Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios / case studies / what ifs will be required as well as bank of questions which will be used to probe the reason behind the observable action.
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1. Case studies on solving problems in the workplace 3.2. Observation The unit will be assessed in a holistic manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations, which will include disruptions to normal, smooth operation. Simulation may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual workplace and will include walk through of the relevant competency components.
4. Context for Assessment	4.1. In all workplace, it may be appropriate to assess this unit concurrently with relevant teamwork or operation units.

UNIT OF COMPETENCY : USE MATHEMATICAL CONCEPTS AND TECHNIQUES
UNIT CODE : 500311113
UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required in application of mathematical concepts and techniques.

ELEMENTS	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify mathematical tools and techniques to solve problem	1.1 Problem areas are identified based on given condition 1.2 ***Mathematical techniques*** are selected based on the given problem	1.1. Fundamental operation (addition, subtraction, division, multiplication) 1.2. Units of measurement and its conversion 1.3. Fundamental of units 1.4. Standard formulas 1.5. Basic measuring tools/devices 1.6. Measurement system 1.7. Basic measuring tools/devices 1.8. Steps in solving problem	1.1. Identifying and selecting different measuring tools 1.2. Applying different formulas in solving problems 1.3. Describing the units of measurement and fundamental units 1.4. Stating arithmetic calculations involving the following; addition, subtraction, division, multiplication 1.5. Applying theory into actual application on shipboard catering processes
2. Apply mathematical procedure/ solution	2.1 Mathematical techniques are applied based on the problem identified 2.2 Mathematical computations are performed to the level of accuracy required for the problem 2.3 Results of mathematical computation are determined and verified based on job requirements	2.1. Problem-based questions 2.2. Estimation 2.3. Use of mathematical tools and standard formulas 2.4. Mathematical techniques	2.1. Solving mathematical computations 2.2. Converting Metric to English 2.3. Selecting and using appropriate and efficient techniques and strategies to solve problems
3. Analyze results	3.1 Results of application are reviewed based on expected and required specifications and outcome 3.2 ***Appropriate action*** is applied in case of error	3.1. Techniques in analyzing the results 3.2. Process in reviewing the results 3.3. Precision and accuracy 3.4. Four fundamental operations 3.5. Steps in solving problem 3.6. Standard formulas 3.7. Conversion measurement	3.1. Analyzing the result based on the specified requirements 3.2. Interpreting and communicating the results of the analysis

RANGE OF VARIABLES

VARIABLES	RANGE
1. Mathematical techniques	May include: 1.1 Four fundamental operations 1.2 Measurements 1.3 Use/Conversion of units of measurements 1.4 Use of standard formulas
2. Appropriate action	May include: 2.1. Review in the use of mathematical techniques (e.g. recalculation, re-modeling) 2.2. Report error to immediate superior for proper action

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Identified, applied and reviewed the use of mathematical concepts and techniques to workplace problems
2. Resource Implications	The following resources should be provided: 2.1 Calculator 2.2 Basic measuring tools 2.3 Case Problems
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Authenticated portfolio 3.2 Written Test 3.3 Interview/Oral Questioning 3.4 Demonstration
4. Context for Assessment	4.1 Competency may be assessed in the work place or in a simulated work place setting

UNIT OF COMPETENCY : USE RELEVANT TECHNOLOGIES
(Apply technology effectively)

UNIT CODE : 500311114

UNIT DESCRIPTOR : This unit of competency covers the knowledge, skills, and attitude required in selecting, sourcing and applying appropriate and affordable technologies in the workplace.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Study/select appropriate technology	1.1 Usage of different ***technologies*** is determined based on job requirements 1.2 Appropriate technology is selected as per work specification	1.1 Awareness on technology and its function 1.2 Operating instructions 1.3 Communication techniques 1.4 Health and safety procedure 1.5 Company policy in relation to relevant technology	1.1. Relevant technology application/ implementation 1.2. Basic communication skills 1.3. Software applications skills
2. Apply relevant technology	2.1 Relevant technology is effectively used in carrying out function 2.2 Applicable software and hardware are used as per task requirement 2.3 ***Management concepts*** are observed and practiced as per established industry practices	2.1. Knowledge on operating instructions 2.2. Understanding software and hardware system 2.3. Communication techniques 2.4. Health and safety procedure 2.5. Company policy in relation to relevant technology 2.6. Different management concepts 2.7. Technology adaptability 2.8. Office technology 2.9. Industrial technology 2.10. System technology 2.11. Training technology 2.12. Different software/ hardware 2.13. 5S (Proper housekeeping)	2.1 Applying relevant technology 2.2 Communicating skills 2.3 Using software applications skills 2.4 Conducting risk assessment
3. Maintain/ enhance relevant technology	3.1 Maintenance of technology is applied in accordance with the ***industry standard operating procedure***, ***manufacturer's operating guidelines*** and ***occupational health and safety procedure*** to ensure its operative ability	3.1 Awareness on technology and its function 3.2 Repair and maintenance procedure 3.3 Health and safety procedure 3.4 Company policy in relation to relevant technology 3.5 Upgrading of technology 3.6 Organizational set-up/work flow	3.1 Performing basic troubleshooting skills 3.2 Identifying failures or defects 3.3 Communication skills 3.4 Applying corrective and

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	3.2 Updating of technology is maintained through continuing education or training in accordance with job requirement 3.3 Technology failure/ defect is immediately reported to the concern/responsible person or section for ***appropriate action***		preventive maintenance

RANGE OF VARIABLES

VARIABLE	RANGE
1. Technology	May include: 1.1 Office technology 1.2 Industrial technology 1.3 System technology 1.4 Information technology 1.5 Training technology
2. Management concepts	May include: 2.1. Real Time Management 2.2. KAIZEN or continuous improvement 2.3. 5 S 2.4. Total Quality Management 2.5. Other management/productivity tools
3. Industry standard operating procedure	3.1 Written guidelines relative to the usage of office technology/equipment 3.2 Verbal advise/instruction from the co-worker
4. Manufacturer's operating guidelines/ instructions	4.1 Written instruction/manuals of specific technology/ equipment 4.2 General instruction manual 4.3 Verbal advise from manufacturer relative to the operation of equipment
5. Occupational health and safety procedure	5.1 Relevant statutes on OSH 5.2 Company guidelines in using technology/equipment
6. Appropriate action	6.1 Implementing preventive maintenance schedule 6.2 Coordinating with manufacturer's technician

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Studied and selected appropriate technology consistent with work requirements 1.2 Applied relevant technology 1.3 Maintained and enhanced operative ability of relevant technology
2. Resource Implications	The following resources should be provided: 2.1 Relevant technology 2.2 Interview and demonstration questionnaires 2.3 Assessment packages
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1. Interview 3.2. Actual demonstration 3.3. Authenticated portfolio (related certificates of training/seminar)
4. Context for Assessment	4.1 Competency may be assessed in actual workplace or simulated environment

UNIT OF COMPETENCY : APPLY CRITICAL THINKING AND PROBLEM SOLVING TECHNIQUES IN THE WORKPLACE
UNIT CODE : 500311142
UNIT DESCRIPTOR : This unit of covers the knowledge, skills and attitudes required to solve problems in the workplace including the application of problem solving techniques and to determine and resolve the root cause of problems

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify the problem	1.1. Variances are identified from normal operating parameters; and product quality 1.2. Extent, cause and nature are of the problem are defined through observation, investigation and ***analytical techniques*** 1.3. ***Problems*** are clearly stated and specified	1.1. Planning and preparing task/activity 1.2. Competence includes a thorough knowledge and understanding of the process, normal operating parameters, and product quality to recognize nonstandard situations 1.3. Competence to include the ability to apply and explain, sufficient for the identification of fundamental cause, determining the corrective action and provision of recommendations 1.3.1. Relevant equipment and operational processes 1.3.2. Enterprise goals, targets and measures 1.3.3. Enterprise quality, OHS and environmental requirement 1.3.4. Enterprise information systems and data collation 1.3.5. Industry codes and standards	1.1. Using range of formal problem solving techniques 1.2. Identifying and clarifying the nature of the problem
2. Determine fundamental causes of the problem	2.1. Possible causes are identified based on experience and the use of problem solving tools / analytical techniques 2.2. Possible cause statements are developed based on findings 2.3. Fundamental causes are identified per results of investigation conducted	2.1. Competence includes a thorough knowledge and understanding of the process, normal operating parameters, and product quality to recognize nonstandard situations 2.2. Competence to include the ability to apply and explain, sufficient for the identification of fundamental cause, determining the corrective action and provision of recommendations 2.2.1. Relevant equipment and operational processes	2.1. Using range of formal problem solving techniques 2.2. Identifying and clarifying the nature of the problem

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		2.2.2. Enterprise goals, targets and measures 2.2.3. Enterprise quality, OHS and environmental requirement 2.2.4. Enterprise information systems and data collation 2.2.5. Industry codes and standards	
3. Determine corrective action	3.1. All possible options are considered for resolution of the problem 3.2. Strengths and weaknesses of possible options are considered 3.3. Corrective actions are determined to resolve the problem and possible future causes 3.4. ***Action plans*** are developed identifying measurable objectives, resource needs and timelines in accordance with safety and operating procedures	3.1. Competence includes a thorough knowledge and understanding of the process, normal operating parameters, and product quality to recognize non-standard situations 3.2. Competence to include the ability to apply and explain, sufficient for the identification of fundamental cause, determining the corrective action and provision of recommendations 3.2.1. Relevant equipment and operational processes 3.2.2. Enterprise goals, targets and measures 3.2.3. Enterprise quality, OHS and environmental requirement 3.2.4. Principles of decision making strategies and techniques 3.2.5. Enterprise information systems and data collation 3.2.6. Industry codes and standards	3.1. Using range of formal problem solving techniques 3.2. Identifying and clarifying the nature of the problem 3.3. Devising the best solution 3.4. Evaluating the solution 3.5. Implementation of a developed plan to rectify the problem
4. Provide recommend-ation/s to manager	4.1. Report on recommendations are prepared 4.2. Recommendations are presented to appropriate personnel. 4.3. Recommendations are followed-up, if required	4.1. Competence includes a thorough knowledge and understanding of the process, normal operating parameters, and product quality to recognize nonstandard situations 4.2. Competence to include the ability to apply and explain, sufficient for the identification of fundamental cause, determining the corrective	4.1. Using range of formal problem solving techniques 4.2. Identifying and clarifying the nature of the problem 4.3. Devising the best solution 4.4. Evaluating the solution

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		action and provision of recommendations 4.1.1. Relevant equipment and operational processes 4.1.2. Enterprise goals, targets and measures 4.1.3. Enterprise quality, OHS and environmental requirement 4.1.4. Principles of decision making strategies and techniques 4.1.5. Enterprise information systems and data collation 4.1.6. Industry codes and standards	4.5. Implementation of a developed plan to rectify the problem

RANGE OF VARIABLES

VARIABLE	RANGE
1. Analytical techniques	May include: 1.1. Brainstorming 1.2. Intuitions/Logic 1.3. Cause and effect diagrams 1.4. Pareto analysis 1.5. SWOT analysis 1.6. Gant chart, Pert CPM and graphs 1.7. Scattergrams
2. Problem	May include: 2.1. Non – routine process and quality problems 2.2. Equipment selection, availability and failure 2.3. Teamwork and work allocation problem 2.4. Safety and emergency situations and incidents
3. Action plans	May include: 3.1. Priority requirements 3.2. Measurable objectives 3.3. Resource requirements 3.4. Timelines 3.5. Co-ordination and feedback requirements 3.6. Safety requirements 3.7. Risk assessment 3.8. Environmental requirements

EVIDENCE GUIDE

1. Critical aspect of competency	Assessment requires evidence that the candidate: 1.1. Identified the problem 1.2. Determined the fundamental causes of the problem 1.3. Determined the correct / preventive action 1.4. Provided recommendation to manager These aspects may be best assessed using a range of scenarios / case studies / what ifs as a stimulus with a walk through forming part of the response. These assessment activities should include a range of problems, including new, unusual and improbable situations that may have happened.
2. Method of assessment	Competency in this unit may be assessed through: 2.1. Case studies on solving problems in the workplace 2.2. Observation The unit will be assessed in a holistic manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations, which will include disruptions to normal, smooth operation. Simulation may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual workplace and will include walk through of the relevant competency components.
3. Resource Implication	3.1. Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios / case studies / what ifs will be required as well as bank of questions which will be used to probe the reason behind the observable action.
4. Context of Assessment	4.1. In all workplace, it may be appropriate to assess this unit concurrently with relevant teamwork or operation units

UNIT OF COMPETENCY: USE INFORMATION CREATIVELY AND CRITICALLY
UNIT CODE : 500311144
UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to use technical information system and information technology, and apply information technology (IT).

ELEMENT	PERFORMANCE CRITERIA *Italicized* **terms are elaborated in the Range of Variables**	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Use technical information systems and information technology	1.1. Collate and organize ***information*** into a suitable form for reference and use 1.2. Classify stored information so that it can be quickly identified and retrieved when needed 1.3. Advise and offer guidance to people who need to find and use information 1.4. Operate the ***technical information*** system using agreed procedures 1.5. Operate appropriate and valid procedures for inputting, maintaining and archiving information	1.1. Application in collating information 1.2. Procedures for inputting, maintaining and archiving information 1.3. Guidance to people who need to find and use information 1.4. Organize information 1.5. Classify stored information for identification and retrieval 1.6. Operate the technical information system by using agreed procedures	1.1. Collating information 1.2. Operating appropriate and valid procedures for inputting, maintaining and archiving information 1.3. Advising and offering guidance to people who need to find and use information 1.4. Organizing information into a suitable form for reference and use 1.5. Classifying stored information for identification and retrieval 1.6. Operating the technical information system by using agreed procedures
2. Apply information technology (IT)	2.1. Utilize the ***software and IT systems*** that are required to execute the project activities 2.2. Handle, edit, format and check information and data obtained from a range of internal and external ***sources*** 2.3. Extract, enter, and process information to produce the outputs required by ***customers*** 2.4. Share your own skills and understanding to help others 2.5. Implement the specified ***security measures*** to protect the confidentiality and integrity of project data held in IT systems	2.1. Attributes and limitations of available software tools 2.2. Procedures and work instructions for the use of IT 2.3. Operational requirements for IT systems 2.4. Sources and flow paths of data 2.5. Security systems and measures that can be used 2.6. Extract data and format reports 2.7. Methods of entering and processing information 2.8. WWW enabled applications	2.1. Identifying attributes and limitations of available software tools 2.2. Using procedures and work instructions for the use of IT 2.3. Describing operational requirements for IT systems 2.4. Identifying sources and flow paths of data 2.5. Determining security systems and measures that can be used 2.6. Extracting data and format reports 2.7. Describing methods of entering and processing information

ELEMENT	PERFORMANCE CRITERIA *Italicized* terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
			2.8. Using WWW applications
3. Edit, format and check information	3.1. Basic editing techniques is used 3.2. Accuracy of documents are check 3.3. Editing and formatting tools and techniques are used for more complex documents 3.4. Proof reading techniques is used to check that documents look professional	3.1. Basic file-handling techniques 3.2. Techniques in checking documents 3.3. Techniques in editing and formatting 3.4. Proof reading techniques	3.1. Using basic file-handling techniques is used for the software 3.2. Using different techniques in checking documents 3.3. Applying editing and formatting techniques 3.4. Applying proof reading techniques

RANGE OF VARIABLES

VARIABLE	RANGE
1. Information	May include: 1.1 Property 1.2 Organizational 1.3 Technical reference
2. Technical information	May include: 2.1 Paper based 2.2 Electronic
3. Software and IT systems	May include: 3.1 Spreadsheets 3.2 Databases 3.3 Word processing 3.4 Presentation
4. Sources	May include: 4.1 Other IT system 4.2 Manually created 4.3 Within own organization 4.4 Outside own organization 4.5 Geographically remote
5. Customers	May include: 5.1 Colleagues 5.2 Company and project management 5.3 Clients
6. Security measures	May include: 6.1 Access rights to input; 6.2 Passwords; 6.3 Access rights to outputs; 6.4 Data consistency and back-up; 6.5 Recovery plans

EVIDENCE GUIDE

1. Critical aspect of competency	Assessment requires evidence that the candidate: 1.1. Used technical information systems and information technology 1.2. Applied information technology (IT) 1.3. Edited, formatted and checked information
2. Resource implication	The following resources should be provided: 2.1. Computers 2.2. Software and IT system
3. Method of assessment	Competency in this unit may be assessed through: 3.1. Direct observation 3.2. Oral interview and written test
4. Context of Assessment	4.1. Competency may be assessed individually in the actual workplace or through accredited institution

UNIT OF COMPETENCY: WORK IN A DIVERSE ENVIRONMENT
UNIT CODE : 500311145
UNIT DESCRIPTOR : This unit of covers the knowledge, skills and attitudes required to work effectively in a workplace characterized by diversity in terms of religions, beliefs, races, ethnicities and other differences.

ELEMENT	PERFORMANCE CRITERIA *Italicized* terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Develop an individual's cultural awareness and sensitivity	1.1. Individual differences with clients, customers and fellow workers are recognized and respected in accordance with enterprise policies and core values. 1.2. Differences are responded to in a sensitive and considerate manner 1.3. ***Diversity*** is accommodated using appropriate verbal and nonverbal communication. 1.4. Actions/decisions are maintained consistent with legislative requirements and enterprise guidelines.	1.1. Understanding cultural diversity in the workplace 1.2. Awareness of individual cultures and world geography 1.3. Norms of behavior for interacting and dialogue with specific groups (e.g., Muslims and other non-Christians, non-Catholics, tribes/ethnic groups, foreigners) 1.4. Different methods of verbal and non-verbal communication in a multicultural setting 1.5. Enterprise policies on workplace diversity (Workplace Diversity Policy)	1.1. Cross-cultural communication skills (i.e. different business customs, beliefs, communication strategies) 1.2. Communication skills – reading, writing, conversational skills 1.3. Affective skills – establishing rapport and empathy, understanding, etc. 1.4. Active Listening 1.5. Openness and flexibility in communication 1.6. Giving/receiving feedback 1.7. Identifying/ Recognizing diverse groups in the workplace and community as defined by divergent culture, religion, traditions and practices
2. Work effectively in an environment that acknowledges and values cultural diversity	2.1. Knowledge, skills and experiences of others are recognized and documented in relation to team objectives. 2.2. Fellow workers are encouraged to utilize and share their specific qualities, skills or backgrounds with other team members and clients to enhance work outcomes. 2.3. Relations with customers and clients are maintained to show that diversity is valued by the business.	2.1. Recognizing and explaining the value of diversity in the economy and society in terms of Workforce development 2.2. The country's place in the global economy 2.3. Innovation 2.4. Social justice 2.5. Recognizing the importance of inclusiveness in a diverse environment	2.1. Cross-cultural communication skills 2.2. Communication skills – reading, writing, conversational skills 2.3. Affective skills – establishing rapport and empathy, understanding, etc. 2.4. Active Listening 2.5. Openness and flexibility in communication 2.6. Giving/receiving feedback 2.7. Identifying/ Recognizing diverse groups in the workplace and

ELEMENT	PERFORMANCE CRITERIA *Italicized* terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		2.6. Developing a shared vision and understanding of and commitment to team, departmental, and organizational goals and objectives 2.7. Strategies for customer service excellence	community as defined by divergent culture, religion, traditions and practices 2.8. Teamwork and collaboration skills 2.9. Intercultural relations and mutual acceptance 2.10. Customer service excellence
3. Identify common issues in a multicultural and diverse environment	3.1. Diversity-related conflicts within the workplace are effectively addressed and resolved. 3.2. Discriminatory behavior towards customers/ stakeholders are minimized and addressed accordingly. 3.3. Change management policies are in place within the organization.	3.1. Understanding, valuing, and leveraging cultural diversity 3.2. Promoting inclusivity and conflict resolution 3.3. Addressing workplace harassment 3.4. Managing change and overcoming resistance to change 3.5. Advanced strategies for customer service excellence 3.6. Enterprise policies on workplace diversity (Workplace Diversity Policy)	3.1. Cross-cultural communication skills 3.2. Communication skills – reading, writing, conversational skills 3.3. Affective skills – establishing rapport and empathy, understanding, etc. 3.4. Active Listening 3.5. Openness and flexibility in communication 3.6. Giving/receiving feedback 3.7. Teamwork and collaboration skills 3.8. Intercultural relations and mutual acceptance 3.9. Advanced customer service excellence skills 3.10. Conflict management and resolution skills 3.11. Assertiveness and Negotiation

RANGE OF VARIABLES

VARIABLE	RANGE
1. Diversity	This refers to diversity in both the workplace and the community and may include divergence in – 1.1 Religion 1.2 Ethnicity, race or nationality 1.3 Culture 1.4 Gender, age or personality 1.5 Educational background

EVIDENCE GUIDE

1. Critical aspect of competency	Assessment requires evidence that the candidate: 1.1. Adjusted language and behavior as required by interactions with diversity 1.2. Identified and respected individual differences in colleagues, clients and customers 1.3. Applied relevant regulations, standards and codes of practice
2. Resource implication	The following resources should be provided: 2.1. Access to workplace and resources 2.2. Manuals and policies on Workplace Diversity
3. Method of assessment	Competency in this unit may be assessed through: 3.1. Demonstration or simulation with oral questioning 3.2. Group discussions and interactive activities 3.3. Case studies/problems involving workplace diversity issues 3.4. Third-party report 3.5. Written examination 3.6. Role Plays
4. Context of Assessment	4.1. Competency assessment may occur in workplace or any appropriately simulated environment

COMMON COMPETENCIES

UNIT TITLE : APPLY QUALITY STANDARDS
UNIT CODE : ICT315202
UNIT DESCRIPTOR : This unit covers the knowledge, skills, attitudes and values needed to apply quality standards in the workplace. The unit also includes the application of relevant safety procedures and regulations, organization procedures and customer requirements.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Assess quality of received materials	1.1. Work instruction is obtained and work is carried out in accordance with standard operating procedures. 1.2. Received ***materials*** are checked against workplace standards and specifications. 1.3. Faulty materials related to work are identified and isolated. 1.4. ***Faults*** and any identified causes are recorded and/or reported to the supervisor concerned in accordance with workplace procedures. 1.5. Faulty materials are replaced in accordance with workplace procedures.	1.1. Relevant production processes, materials and products 1.2. Characteristics of materials, software and hardware used in production processes 1.3. Quality checking procedures 1.4. Quality Workplace procedures 1.5. Identification of faulty materials related to work	1.1. Reading skills required to interpret work instruction 1.2. Critical thinking 1.3. Interpreting work instructions
2. Assess own work	2.1. ***Documentation*** relative to quality within the company is identified and used. 2.2. Completed work is checked against workplace standards relevant to the task undertaken. 2.3. ***Errors*** are identified and isolated. 2.4. Information on the quality and other indicators of production performance are recorded in accordance with workplace procedures. 2.5. In cases of deviations from specific ***quality standards***, causes are documented and reported in accordance with the workplace' s standards operating procedures.	2.1. Safety and environmental aspects of production processes 2.2. Fault identification and reporting 2.3. Workplace procedure in documenting completed work 2.4. Workplace Quality Indicators	2.1. Carry out work in accordance with OHS policies and procedures

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Engage in quality improvement (Produce)	3.1. Process improvement procedures are participated in relative to workplace assignment. 3.2. Work is carried out in accordance with process improvement procedures. 3.3. Performance of operation or quality of product of service to ensure customer satisfaction is monitored.	3.1. Quality improvement processes 3.2. Company customers defined	3.1. Solution providing and decision-making 3.2. Practice company process improvement procedure

RANGE OF VARIABLES

VARIABLE	RANGE
1 Materials	1.1 Materials may include but not limited to: 1.1.1. Manuals 1.1.2. Job order 1.1.3. Instructional videos
2 Faults	2.1 Faults may include but not limited to: 2.1.1. Materials not to specification 2.1.2. Materials contain incorrect/outdated information 2.1.3. Hardware defects 2.1.4. Materials that do not conform with any regulatory agencies
3 Documentation	3.1 Organization work procedures 3.2 Manufacturer's instruction manual 3.3 Customer requirements 3.4 Forms
4 Errors	4.1 Errors may be related but not limited to the following: 4.1.1. Deviation from the requirements of the client 4.1.2. Deviation from the requirement of the organization
5 Quality standards	5.1 Quality standards may be related but not limited to the following: 5.1.1. Materials 5.1.2. Hardware 5.1.3. Final product 5.1.4. Production processes 5.1.5. Customer service
6 Customer	6.1 Co-worker 6.2 Supplier/Vendor 6.3 Client 6.4 Organization receiving the product or service

EVIDENCE GUIDE

1 Critical aspect of competency	Assessment must show that the candidate: 1.1 Carried out work in accordance with the company's standard operating procedures 1.2 Performed task according to specifications 1.3 Reported defects detected in accordance with standard operating procedures 1.4 Carried out work in accordance with the process improvement procedures
2 Method of assessment	The assessor must select two of the following to objectively evaluate the candidate: 2.1 Demonstration observation with oral questioning 2.2 Practical demonstration 2.3 Interview
3 Resource implication	Materials, software and hardware to be used in a real or simulated situation
4 Context of Assessment	Assessment may be conducted in the workplace or in a simulated environment

UNIT TITLE : **PERFORM COMPUTER OPERATIONS**
UNIT CODE : **ELC311203**
UNIT DESCRIPTOR : This unit covers the knowledge, skills, (and) attitudes and values needed to perform computer operations which include inputting, accessing, producing and transferring data using the appropriate hardware and software

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Plan and prepare for task to be undertaken	1.1. Requirements of task are determined according to job specifications 1.2. Appropriate ***hardware*** and ***software*** are selected according to task assigned and required outcome 1.3. Task is planned to ensure ***OH&S guidelines*** and procedures are followed 1.4. Client -specific guidelines and procedures are followed. 1.5. Required data security guidelines are applied in accordance with existing procedures.	1.1. Main types of computers and basic features of different operating systems 1.2. Main parts of a computer 1.3. Information on hardware and software 1.4. Data security guidelines	1.1. Reading and comprehension skills required to interpret work instruction and to interpret basic user manuals. 1.2. Communication skills to identify lines of communication, request advice, follow instructions and receive feedback. 1.3. Interpreting user manuals and security guidelines
2. Input data into computer	2.1. Data are entered into the computer using appropriate program/application in accordance with company procedures 2.2. Accuracy of information is checked and information is saved in accordance with standard operating procedures 2.3. Inputted data are stored in ***storage media*** according to requirements 2.4. Work is performed within ***ergonomic guidelines***	2.1. Basic ergonomics of keyboard and computer user 2.2. Storage devices and basic categories of memory 2.3. Relevant types of software	2.1. Technology skills to use equipment safely including keyboard skills. 2.2. Entering data
3. Access information using computer	3.1. Correct program/application is selected based on job requirements 3.2. Program/application containing the information required is accessed according to company procedures	3.1. General security, privacy legislation and copyright 3.2. Productivity Application 3.3. Business Application	3.1. Accessing information 3.2. Searching and browsing files and data

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	3.3. ***Desktop icons*** are correctly selected, opened and closed for navigation purposes 3.4. Keyboard techniques are carried out in line with OH&S requirements for safe use of keyboards		
4. Produce/ output data using computer system	4.1. Entered data are processed using appropriate software commands 4.2. Data printed out as required using computer hardware/peripheral devices in accordance with standard operating procedures 4.3. Files, data are transferred between compatible systems using computer software, hardware/ peripheral devices in accordance with standard operating procedures	4.1. Computer application in printing, scanning and sending facsimile 4.2. Types and function of computer peripheral devices	4.1. Computer data processing 4.2. Printing of data 4.3. Transferring files and data
5. Maintain computer equipment and systems	5.1. Systems for cleaning, minor ***maintenance*** and replacement of consumables are implemented 5.2. Procedures for ensuring security of data, including regular back-ups and virus checks are implemented in accordance with standard operating procedures 5.3. Basic file maintenance procedures are implemented in line with the standard operating procedures	5.1 Computer equipment/system basic maintenance procedures 5.2 Viruses 5.3 OH&S principles and responsibilities 5.4 Calculating computer capacity 5.5 System Software 5.6 Basic file maintenance procedures	5.1 Removing computer viruses from infected machines 5.2 Making backup files

RANGE OF VARIABLES

VARIABLE	RANGE
1. Hardware and peripheral devices	1.1. Personal computers 1.2. Networked systems 1.3. Communication equipment 1.4. Printers 1.5. Scanners 1.6. Keyboard 1.7. Mouse
2. Software	Software includes the following but not limited to: 2.1. Word processing packages 2.2. Data base packages 2.3. Internet 2.4. Spreadsheets
3. OH & S guidelines	3.1. OHS guidelines 3.2. Enterprise procedures
4. Storage media	Storage media include the following but not limited to: 4.1. CDs/DVDs 4.2. zip disks 4.3. hard disk drives, local and remote 4.4. USB drives 4.5. Cloud-based
5. Ergonomic guidelines	5.1 Types of equipment used 5.2 Appropriate furniture 5.3 Seating posture 5.4 Lifting posture 5.5 Visual display unit screen brightness
6. Desktop icons	Icons include the following but not limited to: 6.1 directories/folders 6.2 files 6.3 network devices 6.4 recycle bin
7. Maintenance	7.1 Creating more space in the hard disk 7.2 Reviewing programs 7.3 Deleting unwanted files 7.4 Backing up files 7.5 Checking hard drive for errors 7.6 Using up to date anti-virus programs 7.7 Cleaning dust from internal and external surfaces

EVIDENCE GUIDE

1. Critical aspect of competency	Assessment requires evidence that the candidate: 1.1. Selected and used hardware components correctly and according to the task requirement 1.2. Identified and explain the functions of both hardware and software used, their general features and capabilities 1.3. Produced accurate and complete data in accordance with the requirements 1.4. Used appropriate devices and procedures to transfer files/data accurately 1.5. Maintained computer system
2. Method of assessment	2.1. The assessor may select two of the following assessment methods to objectively assess the candidate: 2.1.1. Observation 2.1.2. Questioning 2.1.3. Practical demonstration
3. Resource implication	3.1. Computer hardware with peripherals 3.2. Appropriate software
4. Context of Assessment	Assessment may be conducted in the workplace or in a simulated work environment

CORE COMPETENCIES

UNIT TITLE : UTILIZE SOFTWARE METHODOLOGIES
UNIT CODE : ICT 251301
UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitude required to utilize software methodologies.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify project requirements and software methodologies	1.1 ***Project requirements*** are discussed and determined with other ***relevant personnel***. 1.2 ***Resources*** are identified based on the project requirements 1.3 Software development methodologies are assessed based on project required 1.4 Appropriate type of ***software development methodology*** is selected based on the project requirements 1.5 Methodologies are tailored to the project requirements	1.1. Oral communication 1.2. Written communication 1.3. Project planning 1.4. Copyright laws and regulation 1.5. Data and user privacy law 1.6. Office application software 1.7. Project management tools 1.8. Internet literacy 1.9. Software development methodologies 1.10. Software Development Life Cycle	1.1. Effective Communication skills 1.2. Leadership and management skills 1.3. Presentation skills 1.4. Computer operation skills 1.5. Planning and organizational skills 1.6. Software design and planning skills 1.7. Budget and scheduling skills
2. Apply software methodologies	2.1. Project plan/sub-plan is created based on software methodology 2.2. Project ***component breakdown*** is developed based on software methodology 2.3. Project effort and duration are estimated based on software methodology 2.4. ***Project schedule*** is created based on software methodology 2.5. Tasks are determined and allocated based on component breakdown 2.6. Schedule controls are established based on tasks and project schedule 2.7. Project flow is monitored based on project schedule	2.1. Oral communication 2.2. Written communication 2.3. Project planning and scheduling 2.4. Office application software 2.5. System development methodologies 2.6. Project component breakdowns 2.7. Project management tools 2.8. Internet literacy 2.9. Software Development Life Cycle 2.10. Basic mathematics	2.1. Effective Communication skills 2.2. Presentation skills 2.3. Planning Skills 2.4. Teamwork Skills 2.5. Computer operation skills 2.6. Analytical Skills 2.7. Research Skills 2.8. Problem-solving Skills 2.9. Time management skills 2.10. Project monitoring skills

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Utilize code versioning tools	3.1 ***Code versioning tools*** are assessed and identified based on project requirements 3.2 Code versioning tool is selected and installed based on the preference of the development team 3.3 Code versioning tool is used in web development process.	3.1 Oral communication 3.2 Written communication 3.3 Office application software 3.4 Code versioning tools 3.5 Internet literacy 3.6 Software Development Life Cycle	3.1 Effective Communication skills 3.2 Analytical Skills 3.3 Problem-solving skills 3.4 Using command line interface 3.5 Using FTP or other server access programs
4. Conduct testing	4.1 Testing requirements and objectives are determined based on the project 4.2 Testing timeline are developed and resources are allocated based on the project 4.3 Test objectives and schedule are documented and distributed to relevant personnel according to the test procedures 4.4 Feedback are obtained and incorporated to relevant changes 4.5 Necessary codes are copied into the testing environment 4.6 Alterations or changes are administered to the code 4.7 Code are integrated into the production environment 4.8 Full system test is administered to ensure suitability of the system 4.9 Outcomes of the system test are documented for use in subsequent development phases 4.10 Results of the system test are evaluated to determine acceptability of the system	4.1. Oral communication 4.2. Written communication 4.3. Project planning 4.3.1. Organizational Procedures 4.4. Office application software 4.5. Automated test tools 4.6. System requirements 4.7. Understanding of system applications 4.8. Basic knowledge in programming 4.9. Internet literacy 4.10. Software Development Life Cycle	4.1. Effective Communication skills 4.2. Planning Skills 4.3. Teamwork Skills 4.4. HTML and CSS coding skills 4.5. Analytical Skills 4.6. Problem-solving skills 4.7. Research Skills 4.8. Basic programming skills 4.9. Server side scripting skills 4.10. Using command line interface 4.11. Using FTP or other server access programs

RANGE OF VARIABLES

VARIABLE	RANGE	
1. Project requirements	May include: 1.1 Branding and style 1.2 Functionality 1.3 Web and Cloud server platforms 1.4 Operating Systems 1.5 Database Servers 1.6 Web Servers 1.7 Server Side Scripting	1.8 Languages 1.9 Security Requirements 1.10 Up-time requirements (Service Level Agreement-SLA) 1.11 Performance requirements 1.12 Budget and schedule
2. Resources	May include: 2.1. Manpower 2.2. Equipment 2.3. Software	
3. Relevant personnel	May include: 3.1. Manager 3.2. Team leader 3.3. Team members 3.4. Senior developers 3.5. Client	
4. Software development methodology	May include: 4.1. Waterfall Method 4.2. Rapid Application Development 4.3. Agile Development 4.4. Iterative	
5. Component breakdown	May Include: 5.1. Feature 5.2. Product 5.3. Sprint 5.4. Work	
6. Project schedule	May Include: 6.1. Allocated Resources and their Respective Responsibilities 6.2. Bar Charts 6.3. Gantt Charts 6.4. Table of Matrices 6.4.1. Activities or Products required to be delivered as part of the project 6.4.2. Milestones 6.4.3. Anticipated Timeframes and dependencies between these elements	
7. Code versioning tools	May Include: 7.1. Subversion 7.2. Bazaar and Launchpad 7.3. Mercurial and BitBucket 7.4. Git and GitHub 7.5. Tortoise	

EVIDENCE GUIDE

1. Critical Aspect of Competency	Assessment requires evidence that the candidate: 1.1 Determined project requirements and develop a project plan 1.2 Assessed and identified which software methodology to use 1.3 Assessed and identified which code versioning tools to use 1.4 Conducted testing
2. Method of Assessment	Competency in this unit may be assessed through: 2.1 Demonstration with oral questioning 2.2 Written Exam
3. Resource Implication	The following resources should be provided: 3.1. Appropriate supplies and materials 3.2. Applicable equipment 3.3. Applicable software 3.4. Workplace/Assessment area
4. Context of Assessment	4.1 Competency maybe assessed in actual workplace or at the designated TESDA Accredited Assessment Center.

UNIT TITLE : DEVELOP RESPONSIVE WEB DESIGN
UNIT CODE : ICT 251302
UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitude required to develop responsive web design. It also includes competencies to create solid responsive webpages compatible with different screen resolutions. The CMS included this unit is ready-made.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Perform research and analytics	1.1. Information gathering is performed through data provided by ***client*** and social media insights 1.2. Lists of relevant and most important topics are prepared based on business ***noise and branding*** 1.3. ***Recommendation documents*** are presented to ***relevant personnel*** for approval	1.1. Oral communication 1.2. Written communication 1.3. Principles of Design 1.4. Project plans 1.5. Analysis of data 1.6. Copyright laws and regulation 1.7. Data and user privacy law 1.8. Types of web platforms 1.9. Office application software 1.10. Internet literacy	1.1. Effective communication skills 1.2. Presentation skills 1.3. Computer operation skills 1.4. Planning and organizational skills
2. Identify and prepare design requirements	2.1. ***Client specifications and requirements*** are determined based on the project 2.2. ***Resources*** are identified based on the project 2.3. ***Budget*** and ***schedule*** are determined according to the scope of the project and client's requirements 2.4. Client's goals are listed and matched with the research and analysis 2.5. Wireframe is developed with content creations, photos and graphics 2.6. Sitemap and moodboards are developed based on design 2.7. Content assets are compiled using a Spreadsheet for project planning	2.1. Oral communication 2.2. Written communication 2.3. Principles of Design 2.4. Project plans 2.5. Copyright laws and regulation 2.6. Data and user privacy law 2.7. Types of web platforms 2.8. Graphics software 2.9. Office application software 2.10. Internet literacy 2.11. Basic Mathematics MDAS	2.1. Effective communication skills 2.2. Presentation skills 2.3. Computer operation skills 2.4. Photo editing skills 2.5. Planning and organizational skills
3. Design and develop user-friendly responsive web interface	3.1 ***Design tools*** are identified and utilized based on project requirements 3.2 Draft ***mockups*** are prepared based on the project 3.3 ***User interface components*** are applied to the mockups based on project requirements	3.1 Oral communication 3.2 Written communication 3.3 Principles of Design 3.4 Drawing principles 3.5 Types of web platforms 3.6 Design tools 3.7 Office application software	3.1 Effective communication skills 3.2 Presentation skills 3.3 Computer operation skills 3.4 Planning and organizational skills

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	3.4 ***User experience principles*** are applied to the brand guidelines based on the project requirements 3.5 Mockups are finalized and approved by relevant personnel 3.6 Revisions are made based on client's requests, comments and suggestions	3.8 Internet literacy 3.9 User interface components 3.10 User experience principles 3.11 Basic Geometry 3.12 Behavioral science	3.5 Drafting/ Sketching skills
4. Develop HTML/CSS website	4.1 Slicing of mockups are performed based on approved design 4.2 HTML pages are created based on approved design 4.3 CSS are created based on approved design 4.4 Navigation menu and hyperlinks are enabled in the pages 4.5 ***Website contents*** are added to the pages based on the approved design. 4.6 HTML/CSS are validated based on W3C standards 4.7 HTML/CSS website is submitted to relevant personnel for checking and approval 4.8 Revisions are implemented based on relevant personnel feedback 4.9 Final HTML/CSS website is prepared for publishing 4.10 ***File Transfer Protocol (FTP) Program*** is utilized to upload final HTML/CSS website	4.1 Oral communication 4.2 Written communication 4.3 Principles of Design 4.4 HTML and CSS 4.5 Types of web platforms 4.6 Graphics/Photo-editing software 4.7 Office application software 4.8 Internet literacy 4.9 User interface components 4.10 User experience principles 4.11 File Transfer Protocol (FTP) 4.12 Basic Geometry	4.1 Effective communication skills 4.2 Presentation skills 4.3 Computer operation skills 4.4 HTML and CSS coding skills 4.5 Graphics/Photo editing skills 4.6 Using FTP programs
5. Use/Deploy website content management system (CMS)	5.1 ***Content management system (CMS)*** is identified based on project requirements 5.2 CMS is installed to client server using FTP 5.3 Ready-made template is selected based on project requirements 5.4 Website contents are uploaded to CMS based on project requirements 5.5 Readymade plugins are incorporated to CMS 5.6 Website with CMS is submitted to relevant	5.1 Oral communication 5.2 Written communication 5.3 Principles of Design 5.4 CMS principles 5.5 Types of CMS 5.6 HTML and CSS 5.7 Types of web platforms 5.8 Office application software 5.9 File Transfer Protocol (FTP) 5.10 Basic Geometry	5.1. Effective communication skills 5.2. Presentation skills 5.3. HTML and CSS coding skills 5.4. Basic programming skills 5.5. Using FTP programs

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	personnel for checking and approval 5.7 Revisions are implemented based on relevant personnel feedback 5.8 Client is trained on usage of CMS 5.9 Final website with CMS is published based on approved design		
6. Perform search engine optimization (SEO)	6.1 List of ***keywords*** are finalized based on research and analytics 6.2 Website is checked thoroughly to make sure that it conforms to the latest ***SEO standards***. 6.3 ***Search engine tools*** are added to the website for tracking and measurement 6.4 Social media and website housekeeping is performed based on project requirements 6.5 Reports and analytics are submitted to client on a ***regular basis***	6.1 Oral communication 6.2 Written communication 6.3 Principles of SEO Design 6.4 Copyright laws and regulation 6.5 Data and user privacy law 6.6 Types of web platforms 6.7 Office application software 6.8 Internet literacy 6.9 Types of search engines 6.10 SEO Standards 6.11 HTML	6.1 Effective communication skills 6.2 Presentation skills 6.3 HTML and CSS coding skills

RANGE OF VARIABLES

VARIABLE	RANGE
1. Client	May include: 1.1 Stakeholder 1.2 Project owner 1.3 End-user 1.4 Trainer/instructor 1.5 Supervisor/manager
2. Noise and branding	May include: 2.1. Editorial Plans 2.2. Scheduling 2.3. Sources of Traffic 2.4. Customer 2.5. Competitors 2.6. Care
3. Recommendation documents	May include: 3.1. PowerPoint 3.2. Graphs
4. Relevant personnel	May include: 4.1. Manager 4.2. Team leader 4.3. Senior developer 4.4. Client
5. Client specifications and requirements	May include: 5.1. Branding and style 5.2. Software 5.3. Platform 5.4. Functionality
6. Resources	May include: 6.1. Manpower 6.2. Equipment 6.3. Software 6.4. Budget
7. Budget	May include: 7.1. Currency 7.2. Hours 7.3. Manpower
8. Schedule	May include: 8.1. Kanban 8.2. Project Management Plan 8.3. Google checklist 8.4. 535 (5 tasked done, 3 recommendations and questions, 5 task will be done)

VARIABLE	RANGE
9. Design tools	May include: 9.1. Adobe Photoshop 9.2. Gimp 9.3. Adobe Illustrator 9.4. Adobe Premiere 9.5. Microsoft Word
10. Mockups	May include: 10.1. Sketches 10.2. Digital images/ photographs 10.3. Storyboard 10.4. Wireframe 10.5. Logo placement 10.6. Place holder text
11. User interface components	May include: 11.1. Typography 11.2. Design styles 11.3. Color schemes
12. User experience principles	May include: 12.1. User flow 12.2. User behavior 12.3. User interaction 12.4. Accessibility
13. Website contents	May include: 13.1. Text 13.2. Images 13.3. Video 13.4. Animation 13.5. interactive content
14. File Transfer Protocol (FTP) Program	May include: 14.1. Filezilla 14.2. Cyberduck 14.3. WinSCP 14.4. CuteFTP 14.5. WSFTP
15. Content management system (CMS)	May include: 15.1. WordPress 15.2. Joomla 15.3. Drupal
16. Keywords	May include: 16.1. word 16.2. phrase 16.3. sentence

VARIABLE	RANGE
17. SEO standards	May include: 17.1. Use of search engine-friendly design (responsive web design) 17.2. Addition of meta tags - title, description, author, keywords, etc 17.3. Codes are checked for broken links, duplicate pages, etc. 17.4. Content checking 17.5. Checking of site weight and speed, etc. 17.6. Creation of sitemaps
18. Search engine tools	May include: 18.1. Web analytics 18.2. Programs 18.3. Services (ex. Google Analytics, google business, web master)
19. Regular basis	May include: 19.1. Monthly 19.2. Quarterly

EVIDENCE GUIDE

1. Critical Aspect of Competency	Assessment requires evidence that the candidate: 1.1 Performed research and analytics 1.2 Identified and prepared design requirements 1.3 Designed and developed user-friendly responsive web interface 1.4 Developed HTML/CSS website added wireframe with client side scripting 1.5 Used/Deployed website content management system 1.6 Performed search engine optimization
2. Method of Assessment	Competency in this unit may be assessed through: 2.1 Demonstration with oral questioning 2.2 Written Exam 2.3 Portfolio with interview
3. Resource Implication	The following resources should be provided: 3.1 Appropriate supplies and materials 3.2 Applicable equipment 3.3 Appropriate software 3.4 Workplace or assessment area
4. Context of Assessment	4.1 Competency maybe assessed in actual workplace or at the designated TESDA Accredited Assessment Center.

UNIT TITLE : CREATE INTERACTIVE WEBSITES

UNIT CODE : ICT 251303

UNIT DESCRIPTOR: This unit covers the knowledge, skills and attitude required to create interactive websites using JavaScript. This includes competencies to learn the basics of JavaScript for the web, combining with the principles of analysis, design and programming so that developers will be able to understand, plan and build an interactive interface.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Inspect and analyze HTML/CSS Files	1.1 ***Approved and complete layout*** are inspected and analyzed according to the information in the page source. 1.2 Goals, interaction of the contents and presentation of the web page are identified according to the ***initial specifications and plans***.	1.1. Oral communication 1.2. Written communication 1.3. Principles of Design 1.4. Project Plans 1.5. Basic programming language 1.6. Types of web platforms 1.7. Graphics software 1.8. Office application 1.9. Internet Literacy 1.10. Project Planning Software 1.11. Basic Mathematics	1.1. Effective communications 1.2. Presentation skills 1.3. Computer Operations 1.4. Planning and organizational skills
2. Gather and review specifications and requirements	2.1. ***Functional and non-functional requirements*** are identified based on project specifications. 2.2. ***JavaScript Framework*** is selected based on the project requirements for web-application only 2.3. Minimum requirements are added using ***FURPS+*** checklist to ensure overall scope of the project are determined completely. 2.4. Budget and schedule are determined according to the website requirements. 2.5. ***Resources*** are identified based on the project requirements. 2.6. Overall project plan is submitted to ***relevant personnel.***	2.1. Oral communication 2.2. Written communication 2.3. Principles of Design 2.4. Project Plans 2.5. Copyright laws and regulation 2.6. Data and user privacy law 2.7. Basic programming language 2.8. Types of web platforms 2.9. Office application 2.10. Internet Literacy 2.11. Project Planning Software 2.12. Basic Mathematics	2.1. Effective communications 2.2. Presentation skills 2.3. Computer Operations 2.4. Planning and organizational skills
3. Apply JavaScript to HTML/CSS	3.1 Code editor is prepared using ***web design and application*** with ***appropriate major browser***	3.1. Basic programming language 3.2. Types of web platforms	3.1. Computer Operations 3.2. Planning and organizational skills

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	3.2 Document object model (DOM) is applied on the web page 3.3 JavaScript structures/ libraries, best practices and style guides with script tags are applied on the appropriate ***HTML areas*****.** 3.4 External JavaScript files located at the nearest folder are called-out. 3.5 Backend data is accessed using ***web service/API*** 3.6 Basic ***JavaScript syntaxes*** are applied on the HTML/CSS page 3.7 Document Object Model is recalled to check the final output 3.8 JavaScript is applied on the CSS files	3.3. Web design and application 3.4. Office application 3.5. Internet Literacy 3.6. Project Planning Software 3.7. Basic Mathematics 3.8. Computer Science 3.8.1. Information theory 3.8.2. Data structure 3.8.3. Algorithms	
4. Configure JavaScript Efficiency	4.1 JavaScript syntax is tested using a browser. 4.2 ***Debugging software/ applications*** and JavaScript code checkers are used to fix errors 4.3 JavaScript code is minified using ***minification tools*****,** if needed 4.4 ***Content distribution network (CDN)*** from servers is used to deliver JavaScript files to ***improve performance***.	4.1 Basic programming language 4.2 Types of web platforms 4.3 Graphics software 4.4 Office application 4.5 Internet Literacy 4.6 Project Planning Software 4.7 Basic Mathematics	4.1 Computer Operations 4.2 Planning and organizational skills

RANGE OF VARIABLES

VARIABLE	RANGE	
1. Approved and Complete Layout	May include: 1.1. Static layout 1.2. Liquid layout 1.3. Responsive layout 1.4. Adaptive layout	
2. Initial Specifications and Plans	May Include: 2.1 UML diagram 2.2 Wireframe 2.3 Sitemap	
3. Functional and non-functional requirements	May Include: 3.1 **Functional** 3.1.1 Features and capabilities 3.1.2 System 3.1.3 Application requirements 3.1.4 Program requirements 3.2 **Nonfunctional** 3.2.1 Help / Documentations / FAQ 3.2.2 Legalities/Laws requirements 3.2.3 Performance 3.2.4 Time and availabilities 3.2.5 Support and documentations 3.2.6 Security	
4. FURPS+	May Include: 4.1 Functional Requirements 4.2 Usability Requirements 4.3 Reliability Requirements 4.4 Performance Requirements 4.5 Supportability Requirements 4.6 Design requirements 4.7 Implementations 4.8 Interface 4.9 Physical Requirements (Prototype)	
5. JavaScript Library/ Framework	May Include: 5.1 AngularJS 5.2 Aurelia 5.3 Backbone.js 5.4 Cappuccino 5.5 Chaplin.js 5.6 Echo 5.7 Ember.js 5.8 Enyo 5.9 Ext JS 5.10 Google Web Toolkit 5.11 JavaScript MVC 5.12 JQuery	5.13 Knockout 5.14 Meteor 5.15 Mojito 5.16 MooTools 5.17 Node.js 5.18 Prototype JavaScript Framework 5.19 React.js 5.20 Rialto Toolkit 5.21 SproutCore 5.22 Vue.js 5.23 Wakanda Framework

VARIABLE	RANGE	
6. Resources	May Include: 6.1. Manpower 6.2. Equipment 6.3. Software	
7. Relevant Personnel	May Include: 7.1. Project Manager 7.2. Senior/Head Web Designer 7.3. Team Leader 7.4. Team Members 7.5. Clients 7.6. Supervisors	
8. Web Design and Applications	May Include: 8.1. Notepad 8.2. Notepad++ 8.3. Sublime 8.4. Atom 8.5. Adobe Dreamweaver (CS6 or Latest) 8.6. Codeblocks	8.7. Xcode 8.8. Visual Studio 8.9. TextMate 8.10. Netbeans 8.11. Aptana 8.12. Komodo 8.13. NMD
9. Major Browsers	May Include” 9.1 Firefox 9.2 Chrome 9.3 Opera 9.4 Safari (OS) 9.5 Internet Explorer 10 (latest version only)	
10. HTML Areas	May Include: 10.1 Head Tags (internal) 10.2 Footer Tags (internal) 10.3 Other .js files (External)	
11. Web service/API	May Include: 11.1 JSON 11.2 XML 11.3 SOAP 11.4 RESTful	
12. JavaScript Syntaxes	May Include: 12.1. Variables 12.2. Conditional Codes 12.3. Operators 12.4. Loops 12.5. Functions 12.6. Arrays	12.7. Strings 12.8. Numbers 12.9. Dates 12.10. Objects 12.11. Events
13. Debugging Software and Applications	May Include: 13.1. Firebug 13.2. Modernizr 13.3. Web Developer’s Tool (browser)	

VARIABLE	RANGE
14. Minification Tools	May Include: 14.1. JSMin 14.2. YUI Compressor 14.3. Google Closure Compiler
15. CDN or Content Delivery Network	May Include: 15.1 jsDelivr 15.2 Cdnjs 15.3 Microsoft's Ajax CDN 15.4 OSSCDN 15.5 Google Hosted Libraries 15.6 Bootstrap CDN 15.7 jQuery CDN
16. Improve performance	May include improvement of : 16.1 Speed and less redundancy 16.2 Bandwidth 16.3 Downloads 16.4 Caching benefits

EVIDENCE GUIDE

1. Critical Aspect of Competency	Assessment requires evidence that the candidate: 1.1 Inspected and analyzed HTML/CSS files 1.2 Gathered and reviewed specifications and requirements 1.3 Applied JavaScript to HTML/CSS 1.4 Configured JavaScript efficiency
2. Method of Assessment	Competency in this unit may be assessed though: 2.1 Demonstration with oral questioning 2.2 Written Exam 2.3 Portfolio with interview
3. Resource Implication	The following resources should be provided: 3.1. Appropriate supplies and materials 3.2. Applicable equipment 3.3. Applicable software 3.4. Workplace/Assessment area
4. Context of Assessment	4.1 Competency maybe assessed in actual workplace or at the designated TESDA Accredited Assessment Center.

UNIT TITLE : DEVELOP WEBSITE BACKEND SYSTEMS
UNIT CODE : ICT 251304
UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitude required to develop website backend systems such as databases, web servers and server side scripts.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Develop a Project Plan	1.1. ***Project requirements*** are discussed and determined with other ***relevant personnel***. 1.2. ***Resources*** are identified based on the project requirements 1.3. Appropriate ***software development methodology*** is selected based on the project requirements 1.4. Budget and schedule are determined according to the scope of the project requirements and software development methodology to be used. 1.5. Project plan is drafted based on the project requirements. 1.6. Project plan document is submitted and presented to relevant personnel.	1.1 Oral communication 1.2 Written communication 1.3 Project planning 1.4 Copyright laws and regulation 1.5 Data and user privacy law 1.6 Cybersecurity laws 1.7 Types of software development methodologies 1.8 Software Development Life Cycle 1.9 Types of web platforms 1.10 Types of operating systems 1.11 Types of databases 1.12 Types of server side scripting languages 1.13 Office application software 1.14 Internet literacy 1.15 Basic Mathematics MDAS	1.1 Effective communication skills 1.2 Leadership and management skills 1.3 Presentation skills 1.4 Computer operation skills 1.5 Planning and organizational skills 1.6 Software design and planning skills
2. Configure Web/ Cloud Server	2.1 ***Web/Cloud server provider*** is identified and utilized based on project requirements 2.2 ***Server specifications*** are selected based on project requirements 2.3 ***Server operating system*** is selected and installed based on project requirements. 2.4 ***Web server user access*** is configured based on web/cloud server selected and project requirements. 2.5 ***Web server software*** is selected and installed based on project requirements 2.6 Domain name is registered and configured based on	2.1 Oral communication 2.2 Written communication 2.3 Service Level Agreements (SLA) 2.4 Cybersecurity laws 2.5 Data and user privacy laws 2.6 Types of web or cloud servers 2.7 Operating system command line interface (CLI) 2.8 Best Practice in installing and configuration of web servers and components.	2.1 Effective Communication skills 2.2 Presentation skills 2.3 Computer operation skills 2.4 Planning and organizational skills 2.5 Basic Programming skills 2.6 Problem-solving skills 2.7 Command line interface skills

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	web/cloud server selected and project requirements. 2.7 ***Server side scripting language*** software is installed and configured based project requirements. 2.8 ***Database server*** is installed and configured based on project requirements. 2.9 Security and firewalls are installed and configured based on web/cloud server selected and project requirements. 2.10 HTTPS/SSL is installed and configured based on web/cloud server selected and project requirements. 2.11 ***Uptime requirements*** are complied with based on web/cloud server selected and project requirements. 2.12 Web server access details are submitted to relevant personnel for their use and evaluation.	2.9 Web Security concepts and best practices 2.10 Office application software 2.11 Internet and WWW history and basic principles 2.12 Internet literacy 2.13 Website uptime/redundancy concepts and principles 2.14 Intermediate to advanced algebra 2.15 Mathematical Logic	
3. Design Databases	3.1. Database conceptual model is defined based on project requirements. 3.2. Attributes and data types are identified and normalized based on project requirements. 3.3. Entity relationship diagram is developed based on project requirements. 3.4. Data Structures are ***designed*** based on project requirements. 3.5. Database is populated with test or actual data. 3.6. Efficient queries and reports are generated based on project requirements. 3.7. Database design is submitted to relevant personal for their use and evaluation.	3.1. Oral communication 3.2. Written communication 3.3. Internet literacy 3.4. Database Design Concepts and Principles: 3.4.1 Database functions and features 3.4.2 Data Analysis 3.4.3 Data Modeling 3.4.4 Data Redundancy 3.4.5 Data Types and Data Structures 3.4.6 Logical Design Concepts 3.4.7 SQL Concepts 3.5. Programming concepts and principles 3.6. Intermediate to Advanced Algebra 3.7. Mathematical Logic 3.8. Computer Science concepts and principles	3.1. Effective Communication skills 3.2. Presentation skills 3.3. Computer operation skills 3.4. Analytical Skills 3.5. Problem-solving Skills 3.6. Technical skills in SQL programming

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		3.9. Information theory 3.10. Data structures 3.11. Algorithms	
4. Develop Server Side Scripts	4.1 Appropriate server side scripting language is selected based on project requirements 4.2 Secure ***CRUD*** server side scripts are designed and developed based on project requirements 4.3 Secure, efficient and standard-compliant ***web service/API*** are designed and developed based on project requirements. 4.4 Website security is implemented using server side scripting based on project requirements. 4.5 Scripts are tested using applicable testing methods and issues found are fixed. 4.6 Completed scripts with ***software documentation*** are submitted to relevant personnel.	4.1 Oral communication 4.2 Written communication 4.3 Cybersecurity laws 4.4 Data and user privacy laws 4.5 Server side scripting languages 4.6 Object Oriented Programming concepts and principles 4.7 Database Design concepts and principles 4.8 HTML and CSS concepts 4.9 Web Security concepts 4.10 Intermediate to Advance Algebra 4.11 Basic Geometry 4.12 Mathematical Logic 4.13 Computer Science concepts and principles o Information theory o Data structures o Algorithms	4.1 Effective Communication skills 4.2 Presentation skills 4.3 Planning Skills 4.4 HTML and CSS coding skills 4.5 Analytical Skills 4.6 Problem-solving skills 4.7 Research Skills 4.8 SQL Programming skills 4.9 Server side scripting skills 4.10 Using command line interface 4.11 Using FTP or other server access programs
5. Develop web application using Model-View-Controller (MVC) framework	5.1. Appropriate ***MVC framework*** is selected based on project requirements. 5.2. MVC Framework is installed on server. 5.3. Web application is programmed using selected MVC Framework based on project requirements. 5.4. Web application is tested using applicable testing methods and issues found are fixed. 5.5. Completed web application with software documentation is submitted to relevant personnel.	5.1. Oral communication 5.2. Written communication 5.3. Server side scripting languages 5.4. Types of Model-View-Controller (MVC) Frameworks 5.5. MVC concepts and principles 5.6. Object Oriented Programming concepts and principles 5.7. Database Design concepts and principles 5.8. HTML and CSS concepts	5.1. Effective Communication skills 5.2. Presentation skills 5.3. Planning Skills 5.4. Teamwork Skills 5.5. Team management skills 5.6. HTML and CSS coding skills 5.7. Analytical Skills 5.8. Problem-solving skills 5.9. Research Skills 5.10. SQL Programming skills

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		5.9. Web Security concepts 5.10. Intermediate to Advance Algebra 5.11. Basic Geometry 5.12. Mathematical Logic 5.13. Computer Science concepts and principles o Information theory o Data structures o Algorithms	5.11. Server side scripting skills 5.12. Using command line interface 5.13. Using FTP or other server access programs

RANGE OF VARIABLES

VARIABLE	RANGE
1. Project Requirements	May include: 1.1 Web and Cloud server platforms 1.2 Operating Systems 1.3 Database Servers 1.4 Web Servers 1.5 Server Side Scripting Languages 1.6 Security Requirements 1.7 Performance Requirements 1.8 Up-time requirements (Service Level Agreement - SLA)
2. Relevant personnel	May include: 2.1. Manager 2.2. Team leader 2.3. Team members 2.4. Senior developers 2.5. Client
3. Resources	May include: 3.1. Manpower 3.2. Equipment 3.3. Software
4. Software development methodology	May include: 4.1. Waterfall Method 4.2. Rapid Application Development 4.3. Agile Development 4.4. Iterative
5. Web/Cloud Server Provider	May Include: 5.1. Amazon Web Services (AWS) 5.2. Microsoft Azure 5.3. IBM 5.4. Google Cloud 5.5. Rackspace 5.6. Localhost or Virtual Machine
6. Server specifications	May Include: 6.1. RAM Size 6.2. Number of CPU Cores 6.3. Hard disk size 6.4. Bandwidth allocation/requirements
7. Server operating system	May Include: 7.1. CentOS 7.2. Debian 7.3. Fedora/Red Hat 7.4. Ubuntu 7.5. FreeBSD 7.6. Microsoft Windows Server
8. Web Server User Access	May Include: 8.1. FTP/sFTP 8.2. SSH 8.3. Windows Remote Desktop

VARIABLE	RANGE	
9. Web Server Software	May Include: 9.1. Apache HTTP Server 9.2. Nginx 9.3. Apache Tomcat 9.4. Microsoft IIS	9.5. Lighttpd 9.6. Node.js 9.7. Glassfish
10. Server Side Scripting Language	May Include: 10.1 ASP.NET 10.2 Java 10.3 Server Side JavaScript (Node.js)	10.4 Perl 10.5 PHP 10.6 Python 10.7 Ruby
11. Database Server	May include: 11.1 MySQL 11.2 Oracle 11.3 Microsoft SQL Server 11.4 IBM DB2	11.5 PostgreSQL 11.6 MariaDB 11.7 MongoDB
12. Uptime requirements	May include: 12.1 Backup 12.2 Redundancy 12.3 Load-balancing 12.4 Disaster recovery systems	
13. Designed data structure	Data structure design task are as follows: 13.1 Primary and foreign keys are defined. 13.2 Referential integrity constraints are identified. 13.3 Data validation rules are developed. 13.4 Indexes are designed and data dictionaries are developed.	
14. CRUD	May Include: 14.1 Create 14.2 Read 14.3 Update 14.4 Delete	
15. Web Service/API	May Include: 15.1. JSON 15.2. XML 15.3. RESTful 15.4. SOAP	
16. Software Documentation	May Include: 16.1. User manual 16.2. Source Code documentation 16.3. API documentation	
17. MVC Framework	May Include: 17.1. Laravel (PHP) 17.2. Symfony (PHP) 17.3. CodeIgniter (PHP) 17.4. Ruby on Rails (Ruby) 17.5. Spring MVC (Java) 17.6. Django (Python)	17.7. AngularJS (JavaScript) 17.8. ASP.NET MVC (ASP.NET) 17.9. Struts (Java) 17.10. ReactJS (JavaScript)

EVIDENCE GUIDE

1. Critical Aspect of Competency	Assessment requires evidence that the candidate: 1.1 Determine project requirements and develop a project plan. 1.2 Configure a web/cloud server. 1.3 Design databases 1.4 Develop server-side scripts 1.5 Develop web application using Model-View-Controller (MVC) framework
2. Method of Assessment	Competency in this unit may be assessed through: 2.1 Demonstration with oral questioning 2.2 Portfolio with oral questioning 2.3 Written exam
3. Resource Implication	The following resources should be provided: 3.1. Appropriate supplies and materials 3.2. Applicable equipment 3.3. Applicable software 3.4. Workplace/Assessment area
4. Context of Assessment	4.1 Competency maybe assessed in actual workplace or at the designated TESDA Accredited Assessment Center.

SECTION 3 TRAINING STANDARDS

These standards are set to provide technical and vocational education and training (TVET) providers with information and other important requirements to consider when designing training programs for **Web Development NC III.**

They include information on curriculum design; training delivery; trainee entry requirements; tools and equipment; training facilities; and trainer's qualification.

3.1 CURRICULUM DESIGN

TESDA shall provide the training on the development of competency-based curricula to enable training providers develop their own curricula with the components mentioned below.

Delivery of knowledge requirements for the basic, common and core units of competency specifically in the areas of mathematics, science/technology, communication/language and other academic subjects shall be contextualized. To this end, TVET providers shall develop a Contextual Learning Matrix (CLM) to include green technology, issues on health and drugs and catering to persons with disabilities (PWD's) to accompany in their curricula.

Course Title: Web Development **NC Level:** NC III

Nominal Training Duration:
68 hours – Basic Competencies
28 hours – Common Competencies
1,092 hours– Core Competencies

Total Nominal Duration - 1,188 hours

Course Description:

This course is designed to develop & enhance the knowledge, skills, & attitudes of a Web developer in accordance with web development industry standards. It covers the basic & common competencies in addition to the core competencies such as to develop responsive web design, utilize software methodologies, create interactive websites and develop website backend.

The nominal duration of 1,188 hours covers the required units at Web Development NC III. TVET providers can however, offer a longer, ladderized course covering the NC III basic, common and core units.

To obtain this, all units prescribed for this qualification must be achieved.

BASIC COMPETENCIES

(68 hours)

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Methods	Nominal Duration

1. Lead workplace communication	1.1. Communicate information about workplace processes.	• Lecture and discussion on:
		  o Effective verbal communication methods
		  o Sources of information
		• Practice organizing information
		• Identify organization requirements for written and electronic communication methods
		• Follow organization requirements for the use of written and electronic communication methods
		• Perform exercises on understanding and conveying intended meaning scenario
			• Lecture
			• Demonstration
			• Practical exercises
			• Demonstration
			• Role Play
				• Written Test
				• Observation
					2 Hours

	1.2. Lead workplace discussions	• Lecture and discussion on:
		  o Organizational policy on production, quality and safety
		  o Goals/ objectives and action plan setting
		• Read effective verbal communication methods
		• Prepare/set action plans based on organizational goals and objectives
			• Group discussion
			• Lecture
			• Demonstration
				• Oral evaluation
				• Written Test
				• Observation
					2 Hours

	1.3. Identify and communicate issues arising in the workplace	• Lecture and discussion on: o Organizational policy in dealing with issues and problems • Read effective verbal communication methods • Practice organizing information • Perform exercises on understanding and conveying intended meaning scenario	• Group discussion • Lecture • Demonstration • Role Play	• Oral evaluation • Written Test • Observation	2 Hours
2. Lead small teams	2.1. Provide team leadership.	• Lecture and discussion on: o Company policies and procedures • Identify client expectations • Practice team building skills • Perform exercises on communication skills required for leading teams	• Group discussion • Lecture • Demonstration • Role Play	• Oral evaluation • Written examination • Observation	2 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Methods	Nominal Duration
	2.2. Assign responsibilities among members	• Lecture and discussion on: ○ Team member's duties and responsibilities • Identify client expectations • Practice negotiating skills • Perform group exercises showing the skills and techniques in promoting team building	• Group discussion • Lecture • Demonstration • Role Play	• Oral evaluation • Written examination • Observation	2 Hours

	2.3. Set performance expectation for team members.	• Lecture and discussion on:
		  ○ Team member's duties and responsibilities
		  ○ How performance expectations are set
		• Identify client expectations
		• Perform group exercises in setting individual target/ expectation
		• Read instruction and requirements in up to date dissemination to members
			• Group discussion
			• Lecture
			• Demonstration
			• Role Play
				• Oral evaluation
				• Observation
				• Written examination
					2 Hours

	2.4. Supervise team performance	• Discuss listening and treating individual team members concern • Identify methods of Monitoring Performance • Perform group exercises showing the skills in monitoring team performance	• Group discussion • Lecture • Demonstration	• Oral evaluation • Written examination • Observation	2 Hours

3. Develop and practice negotiation skills	3.1. Plan negotiations	• Lecture and discussion on:
		  ○ codes of practice and guidelines for the organization
		  ○ differences between content and process
		• Read:
		  ○ Organizations policy and procedures for negotiations
		  ○ Decision making and conflict resolution strategies procedures
		  ○ Strategies to manage conflict
		  ○ Steps in negotiating process
		• Identify bargaining information
		• Apply strategies to manage process
		• Apply steps in negotiating process
			• Group Discussion
			• Lecture
			• Demonstration
				• Oral evaluation
				• Written examination
				• Observation
					4 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Methods	Nominal Duration

	3.2. Participate in negotiations	• Discuss/Describe the following strategies during negotiation:
		  ○ Decision making and conflict resolution strategies procedures
		  ○ Problem solving strategies on how to deal with unexpected questions and attitudes during negotiation
		• Practice the following scenarios in a group activity:
		  ○ Perform interpersonal skills to develop rapport with other parties
		  ○ Perform verbal communication and listening skill
		  ○ observation skills
		  ○ negotiation skills
		• Describe the Procedure in documenting negotiations
		• Apply a filing system in managing information
		• Demonstrate filing of documents
			• Group Discussion
			• Case studies
			• Demonstration
			• Simulation/ Role play
				• Oral evaluation
				• Observation
					4 Hours

4. Solve workplace problem related to work activities	4.1. Identify the problem	• Discussion on Normal operating parameters & product quality
		• Identify & clarify the nature of problem
		• Read:
		  ○ Brainstorming
		  ○ Cause and effect diagrams
		  ○ PARETO analysis
		  ○ SWOT analysis
		  ○ GANT chart
		  ○ PERT CPM & graph
		  ○ SCATTERGRAMS
		• Apply observation, investigation and analytical techniques in solving problem in the workplace
			• Group discussion
			• Lecture
			• Demonstration
				• Oral evaluation
				• Written examination
				• Observation
					2 Hours

	4.2. Determine fundamental cause of the problem	• Discussion on Teamwork and work allocation problem
		• Read:
		  ○ Using range of formal problem solving techniques
		  ○ Enterprise goals, targets and measures
			• Group discussion
			• Lecture
			• Demonstration
			• Role Play
				• Oral evaluation
				• Written examination
				• Observation
					2 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Methods	Nominal Duration
		○ Enterprise quality, OHS and environmental requirement ○ Non-routine process and quality problems • Perform group exercises showing safety in emergency situations and incidents • Identify & clarify the nature of problem • Select relevant equipment and operational processes			
	4.3. Determine correct / preventive action	• Discussion on principles of decision making strategies and techniques • Read: ○ Evaluating the solution ○ Devising the best solution • Perform group exercise how to implement the developed plan to rectify a problem	• Group Discussion • Lecture • Demonstration • Role Play	• Oral evaluation • Written examination • Observation	2 Hour
	4.4. Provide recommendation to manager	• Discuss industry codes and standards • Apply enterprise information systems and data collation • Prepare recommendation letter	• Group Discussion • Demonstration	• Oral evaluation • Observation	2 Hour
5. Use mathematical concepts and techniques	5.1. Identify mathematical tools and techniques to solve problem	• Discussion on the four fundamental operation (addition, subtraction, division, multiplication) • Read: ○ Measurement system ○ Precision and accuracy ○ Basic measuring tools/devices • Apply mathematical computations • Demonstrate activities on: ○ Use of calculator ○ Use of different measuring tools	• Group Discussion • Lecture • Demonstration	• Oral evaluation • Written examination • Observation	2 Hour
	5.2. Apply mathematical procedures/ solution	• Lecture and discussion on: ○ Estimation ○ Problem-based questions ○ Mathematical techniques • Apply mathematical computations • Demonstrate activities on:	• Lecture • Demonstration • Simulation/ Role play	• Written examination • Observation	4 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Methods	Nominal Duration
		○ Use of calculator ○ Use of different measuring tools ○ Use of mathematical tools and standard formulas			
	5.3. Analyze results	• Discussion on the four fundamental operation (addition, subtraction, division, multiplication) • Read: ○ Measurement system ○ Precision and accuracy ○ Basic measuring tools/devices • Apply mathematical computations • Demonstrate activities on: ○ Use of calculator ○ Use of different measuring tools	• Group Discussion • Lecture • Demonstration	• Oral evaluation • Written examination • Observation	2 Hours
6. Use relevant technologies	6.1. Identify appropriate technology	• Discussion on company policy in relation to relevant technology • Read: ○ Awareness on technology and its function ○ Relevant technology application/ implementation ○ Operating instructions • Practice basic communication skill in a group activity	• Group Discussion • Lecture • Demonstration • Simulation/ Role Play	• Oral evaluation • Written examination • Observation	2 Hour
	6.2. Apply relevant technology	• Discussion on different management concepts • Read: ○ Relevant technology application/ implementation ○ Technology adaptability ○ Different management concepts ○ Health and safety procedure ○ Communication techniques ○ Apply software applications skills • Practice drills on installing application software • Practice basic communication skill in a group activity	• Group Discussion • Lecture • Demonstration • Simulation/ Role Play	• Oral evaluation • Written examination • Observation	4 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Methods	Nominal Duration

	6.3. Maintain/ enhance relevant technology	• Lecture and discussion on:
		  ○ Repair and maintenance procedure
		  ○ Operating instructions
		• Practice drills:
		  ○ Installing application software
		  ○ Basic troubleshooting skills
			• Lecture
			• Demonstration
			• Simulation/ Role Play
				• Written examination
				• Observation
					2 Hours

7. Apply critical thinking and problem solving techniques in the workplace	7.1. Identify the problem	• Lecture and discussion on
		  ○ Processes, normal operating parameters, and product quality to recognize nonstandard situations
		  ○ Enterprise goals, targets and measures
		  ○ Analytical techniques
		  ○ Types of problems
			• Lecture
			• Group Discussion
				• Oral evaluation
				• Written Examination
					2 Hours

	7.2. Determine fundamental causes of the problem	• Lecture and collaboration on
		  ○ Root cause of the problem
		  ○ Problem solving tools
		• Exercise on cause and effect
		•
			• Lecture
			• Group Discussion
				• Oral evaluation
				• Written Examination
				• Observation
					2 Hours

	7.3. Determine corrective action	• Lecture and discussion on
		  ○ Identification and analysis of possible options for problem resolution
		  ○ Corrective actions
		  ○ Principles of decision making strategies and techniques
		• Layouting of action plans
			• Lecture
			• Group Discussion
				• Oral evaluation
				• Written Examination
				• Observation
					2 Hours

	7.4. Provide recommendation /s to manager	• Using range of formal problem solving techniques • Preparation and presentation of sample recommendation report	• Lecture • Group Discussion	• Oral evaluation • Written Examination • Presentation	2 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Methods	Nominal Duration

8. Use information creatively and critically	8.1. Use technical information systems and information technology	• Lecture and discussion on:
		  ○ Application in collating information
		  ○ Procedures for inputting, maintaining and archiving information
		  ○ Guidance to people who need to find and use information
		• Organizing information into a suitable form for reference and use
		• Classify stored information for identification and retrieval
		• Operate the technical information system by using agreed procedures
			• Lecture
			• Group Discussion
			• Hands on
			• Demonstration
				• Oral evaluation
				• Written Examination
				• Presentation
					4 Hours

	8.2. Apply information technology (IT)	• Lecture and discussion on:
		  ○ Attributes and limitations of available software tool
		  ○ Procedures and work instructions for the use of IT
		  ○ Operational requirements for IT systems
		  ○ Sources and flow paths of data
		  ○ Security systems and measures that can be used
		  ○ Methods of entering and processing information
		• Use procedures and work instructions for the use of IT
		• Extract data and format reports
		• Use WWW applications
			• Lecture
			• Group Discussion
			• Self-paced handout/ module
			• Hands on
			• Demonstration
				• Oral evaluation
				• Written Examination
				• Presentation
					2 Hours

	8.3. Edit, format and check information	• Lecture and discussion on:
		  ○ Basic file-handling techniques
		  ○ Techniques in checking documents
		  ○ Techniques in editing and formatting
		  ○ Proof reading techniques
		• Use different techniques in checking documents
		• Edit and format information applying different techniques
		• Proof read information applying different techniques
			• Lecture
			• Group Discussion
			• Self-paced handout/ module
			• Hands on
			• Demonstration
				• Oral evaluation
				• Written Examination
				• Presentation
					2 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Methods	Nominal Duration
9. Work in a diverse environment	9.1. Develop an individual's cultural awareness and sensitivity	• Lecture and discussion on: o Enterprise policies and core values o Awareness on individual cultures and world geography o Different methods of verbal and non-verbal communication in a multicultural setting o Workplace Diversity Policy	• Lecture • Group Discussion	• Oral evaluation • Written Examination • Presentation	2 Hours
	9.2. Work effectively in an environment that acknowledges and values cultural diversity	• Lecture and discussion on: o The value of diversity in the economy and society in terms of Workforce development o Innovation o Social justice o Customer service excellence o Teamwork and collaboration • Applying strategies for customer service excellence	• Lecture • Group Discussion	• Oral evaluation • Written Examination • Presentation	2 Hours
	9.3. Identify common issues in a multicultural and diverse environment	• Lecture and discussion on: o Diversity-related conflicts within the workplace o Change management policies o Advance strategies for customer service excellence • Identifying and addressing workplace harassment • Applying advance strategies for customer service excellence	• Lecture • Group Discussion	• Oral evaluation • Written Examination • Presentation	2 Hours

Note: Basic competencies may be embedded in the core competencies.

COMMON COMPETENCIES
28 hrs

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
1. Apply quality standards	1.1. Assess quality of received materials	• Identify relevant production processes, materials and products • Study and interpret characteristics of materials, software and hardware used in production processes • Perform quality checking procedures • Apply quality Workplace procedures • Identify faulty materials • Check quality of materials or component parts as per manufacturer's standards • Interpret specifications or symbols	• Lecture • Field trip • Symposium • Video clips • Simulation/ Role playing	• Written test • Demonstration & questioning • Observation & questioning	3 hours
	1.2. Assess own work	• Perform workplace procedure in documenting completed work • Perform fault identification and reporting • Observe safety and environmental aspects of production processes • Utilize workplace quality indicators • Document and report deviations from specified quality standards	• Field trip • Symposium • Simulation • On the job training	• Demonstration & questioning • Observation & questioning	3 hours
	1.3. Engage in quality improvement	• Participate in quality improvement processes a. IEC/ISO standards b. Environmental and safety standards • Carry out work as per process improvement procedures • Monitor operation performance • Implement continuous improvement	• Field trip • Symposium • Simulation • On the job training	• Demonstration & questioning • Observation & questioning	2 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
2. Perform computer operations	2.1. Plan and prepare for task to be undertaken	• Plan and prepare computer operation activity • Determine task requirements based on required output • Determine appropriate hardware and software • Identify/Select types of computers and basic features of different operating systems • Interpret and follow client-specific guidelines & procedures • Plan task as per data security guidelines	• Lecture • Modular • Computer based training (e-learning) • Project method • On the job training	• Written/Oral examination • Practical demonstration	4 hours
	2.2. Input data into computer	• Apply basic ergonomics of keyboard and computer user • Enter/Encode data using appropriate computer programs/applications • Check accuracy of encoded data/information per SOP • Save and store inputted data in storage media • Discuss storage devices and basic categories of memory • Identify and define relevant types of software	• Lecture • Modular • Group discussion • Project method • On the job training	• Written/Oral examination • Practical demonstration	4 hour

	2.3. Access information using computer	• Select correct program/ application based on job requirements
		• Access computer data/files
		• Interpret general security, privacy legislation & copyright
		• Use Productivity Application
		  ○ Microsoft office applications
		• Learn Business Application
		  ○ *Introduction* to Basic Programming software
		• Apply basic ergonomics of keyboard and computer user
			• Lecture
			• Computer based training (e-learning)
			• On the job training
				• Written/Oral examination
				• Practical demonstration
					5 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration

	2.4. Produce/output data using computer system	• Identify types and function of computer peripheral devices
		• Print and scan office documents and materials
		• Send office/ business documents through facsimile
		• Transfer files or data between compatible systems using computer software, hardware/ peripheral devices
		• Save documents in storage devices
		  ○ CD/DVD
		  ○ USB drives
		  ○ Hard disk drives
			• Lecture
			• Group discussion
			• Modular
			• On the job training
				• Written/Oral examination
				• Practical demonstration
					5 hour

	2.5. Maintain computer equipment and systems	• Perform computer equipment/ system basic maintenance procedures
		  ○ Perform basic file maintenance procedures
		  ○ Perform cleaning of PC parts/ hardware components
		  ○ Scan/Debug computer software and applications
		  ○ Perform cleaning and defragmentation of computer files
		  ○ Perform backup of computer files
		• Enumerate and define different types of computer viruses
			• Demonstration
			• Simulation
			• Modular
			• Video clips
			• Computer based training (e-learning)
				• Written/Oral examination
				• Practical demonstration
					2 hours

CORE COMPETENCIES

(1,092 hours)

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Approach	Nominal Duration

1. Utilize software methodology	1.1. Identify project requirements and software methodology	• Discussion on software development life cycle (SDLC)
		• Identification and discussion on the types of:
		  ○ Branding and style
		  ○ Functionality
		  ○ Web and Cloud server platforms
		  ○ Operating Systems
		  ○ Database Servers
		  ○ Web Servers
		  ○ Server Side Scripting Languages
		  ○ Security Requirements
		  ○ Up-time requirements (Service Level Agreement - SLA)
		• Practice on assessing which software development methodology is appropriate for a project
		• Practice on tailoring the software development methodology to the project requirements
		• Research on copyright laws and regulations
		• Research on data and user privacy laws
		• Practice how to interact with others
			• Lecture and discussions
			• Role playing
			• Case Studies
				• Written test
				• Written Report/Case Study
					16 hours

	1.2. Apply software methodologies	• Identify the different types of software methodologies • Practice using case studies in using each type of software methodologies • Practice creating a project schedule • Practice determination of component breakdown of the project • Practice tasks determination and allocation based on the component breakdown	• Lecture and discussion • Demonstration • Hands-on Practice	• Written Test • Practical / Performance Test	16 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Approach	Nominal Duration
		• Practice using schedule controls and project flows			
	1.3. Utilize code versioning tools	• Identify the importance of using code versioning tools • Identify the concepts on version control system • Identify and compare different code versioning tools • Practice selection and installation of code versioning tools • Practice using code versioning tools in the web development process	• Lecture and discussion • Demonstration • Hands-on Practice	• Written Test • Practical / Performance Test	8 hours
	1.4. Conduct testing	• Identify concepts and applications of software testing • Identify the procedures in developing testing schedules • Identify the software test procedures • Practice obtaining feedback and incorporation of relevant changes • Practice copying of codes to a testing environment • Practice code integration to production environment • Practice full system test • Practice evaluation of system test for acceptability of the system	• Lecture and discussion • Demonstration • Hands-on Practice	• Written Test • Practical / Performance Test	16 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Approach	Nominal Duration
2. Develop responsive web design	2.1 Perform research and analytics	• Discussion on different design principles and approaches • Perform information gathering using web searches, interviews and surveys • Identify and list relevant topics for responsive web design • Perform analysis of data	• Lecture • Discussion • Viewing Multimedia • Actual demonstration • Internet browsing	• Practical Exam • Interviews/ Questioning • Presentation • Hands-on demonstration	16 hours
	2.2 Identify and prepare design requirements	• Identify and determine different client specifications and requirements • Identify resources and determine schedule of a project • Discussion on the roles and responsibilities of the team: o Content Strategist / Creator o Information Architect o User Tester o Graphic Designer o UX Designer o System Architect o QA-Beta Tester o Front and Backend Developer • Discussion on the importance of sitemap, wireframe and moodboards • Compilation of content assets using Spreadsheets • Identify and observe: o Copyright laws and regulation o Data and user privacy law	• Lecture • Discussion • Viewing Multimedia • Actual demonstration	• Practical Exam • Interviews/ Questioning • Presentation • Hands-on demonstration	16 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Approach	Nominal Duration
	2.3 Design and develop user-friendly responsive Web interface	• Discussion on the importance of creating a great content before starting a design • Discuss the user personas, the users' centric design (demographics) • Discuss how end-users only interested on the content and how does it provides and accessible from the website • Discussion on the content modeling, content priority hierarchies, and information architectures • Identify and utilize design tools for responsive web design • Discuss and utilize graphics/photo-editing software • Prepare mockups for responsive web interface using graphics/photo-editing software • Practice application of user interface components • Application of user experience principles to brand guidelines	• Lecture • Discussion • Viewing Multimedia • Actual design and demonstration	• Practical Exam • Interviews/ Questioning • Presentation • Hands-on demonstration	80 hours
			• Supervised-industry training	• Performance evaluation	40 hours
	2.4 Develop HTML/CSS website	• Discuss and begin how to code the basic HTML structures • Discuss and begin how to code the basic CSS, internal and external • Discussion on the creation of style guide via or directly on the browser • Practice proper slicing of mockups using graphics/photo-editing software • Practice creating HTML pages and CSS • Utilizing FTP to upload HTML/CSS website	• Lecture • Discussion • Actual development and demonstration	• Practical Exam • Interviews/ Questioning • Presentation • Hands-on demonstration	80 hours
			• Supervised-industry training	• Performance evaluation	60 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Approach	Nominal Duration
	2.5 Use/Deploy website content management system (CMS)	• Discussion on how to connect FTP to web hosting • Discussion on how to install CMS framework manually • Discussion on how to install necessary plugins • Discussion on how to embed codes from google analytics, web master tools and any related web policies needed to verify your account • Identify content management system (CMS) and its usage/functions • Perform installation of CMS to client servers • Perform uploading of website content to CMS • Practice incorporating plugins to CMS	• Lecture • Discussion • Viewing Multimedia • Actual demonstration	• Practical Exam • Interviews/ Questioning • Presentation • Hands-on demonstration	16 hours
	2.6 Perform search engine optimization (SEO)	• Discussion on the basics of SEOs and analytics • Checking of websites for conformity with SEO standards • Identify Search Engine Tools and its usage • Perform social media and website housekeeping • Preparing reports and analytics	• Lecture • Discussion • Viewing Multimedia • Actual demonstration	• Practical Exam • Interviews/ Questioning • Presentation • Hands-on demonstration	16 hours
3. Create interactive websites (using JavaScript)	3.1 Inspect and analyze HTML/CSS files	• Discuss the static web page used in HTML and CSS (If HTML/CSS has not been created, a simple page will do) • Practice how to check the files and how to handle them • Practice how to analyze the files and how to handle them • Practice on basic programming	• Lecture and discussions • Hands-on Practice	• Written test • Actual presentation	8 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Approach	Nominal Duration
	3.2 Gather and review specifications and requirements	• Discussion on the foundation of object oriented analysis and design • Discussion about FURPS+ • Discussion on the JavaScript framework/ libraries • Practice on how to determine budget and schedule • Identify resources for specific project	• Lecture and discussions	• Written test • Actual presentation	8 hours
	3.3 Apply JavaScript to HTML/CSS	• Discussion on foundations of programming • Discussion on object-oriented programming • Technical discussions for Code Editors • Discuss the essential training for JavaScript • Discussion on the JavaScript libraries and how to use them • Preparing code editor using with design and application • Applying document object model on the web page • Discussion on the web service/API formats • Applying basic JavaScript syntaxes to HTML/CSS page	• Demonstration • Hands-on Practice	• Written test • Actual presentation	160 hours
			• Supervised-industry training	• Performance evaluation	80 hours
	3.4 Configure JavaScript Efficiency	• Discussion on how browsers use for debugging JavaScript • Discussion on how Firebug application use • Testing JavaScript syntax through browser • Using error debugging software/applications and code checkers • Practice using minification tools • Practice using content distribution network from server to deliver JavaScript files	• Oral Recitations • Practice how to hand-over/ turn-over the files professionally • Hands-on Practice	• Written test • Actual presentation	48 hours
			• Supervised-industry training	• Performance evaluation	10 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Approach	Nominal Duration

4. Develop website backend systems	4.1 Develop a project plan	• Identify project requirements:
		  ○ Software Methodologies
		  ○ Web Platforms
		  ○ Operating Systems
		  ○ Databases
		  ○ Server side languages
		• Identify copyright laws and regulations
		• Identify data and user privacy laws
		• Identify cybersecurity laws
		• Practice how to lead and manage meetings
		• Practice creating project planning documents
			• Lecture and discussions
			• Role playing
			• Case Studies
				• Written test
				• Written Report/Case Study
					8 hours

	4.2 Configure a web or cloud server	• Research how the internet and World Wide Web works.
		• Identify types of web and cloud server providers.
		• Identify web security concepts and best practices
		• Practice using the command line interface (CLI) and discuss most common commands and tools.
		• Perform how to register a domain name and configuring it to a server.
		• Practice configuring a web server:
		  ○ Select system specifications
		  ○ Select operating system
		  ○ Create a server user
		  ○ Install Web Server
		  ○ Install Server Side Scripting
		  ○ Install Database Server
		  ○ Install and configure Firewall
		  ○ Configure HTTPS/SSL
			• Lecture and discussion
			• Research
			• Demonstration
			• Hands-on Practice
				• Written Test
				• Practical / Performance Test
					24 hours

			• Supervised-industry training	• Performance evaluation	10 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Approach	Nominal Duration
		• Discussion on Service Level Agreements and concepts on server backup, redundancy, load balancing and disaster recovery.			

	4.3 Design databases	• Identification and discussion on types of Databases
		• Research database design concepts and principles:
		  ○ Database Functions and Features
		  ○ Data Analysis
		  ○ Data Modeling
		  ○ Data Redundancy
		  ○ Data Types and Data Structures
		  ○ Logical Design Concepts
		• Identify and practice SQL programming
		• Practice designing a database:
		  ○ Conceptual Model
		  ○ Logical Model
		  ○ Data Structures
		  ○ Queries and Reports
			• Lecture and discussion
			• Research
			• Demonstration
			• Hands-on Practice
				• Written Test
				• Practical / Performance Test
					56 hours

			• Supervised-industry training	• Performance evaluation	40 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Approach	Nominal Duration
	4.4 Develop server side scripts	• Identify various types of Server Side Scripting Languages • Research object oriented programming (OOP) concepts and principles • Research best practices in creating secure server side scripts (How to prevent SQL injection, cross-site scripting, encrypting data, denial of service, etc.) • Practice server side scripts that create, read, update, and delete (CRUD) entries from a database server • Practice creating standard-compliant Web Services/APIs using server side scripts. • Practice creating password-protected web pages with secure passwords, cookies and sessions using Server-side scripts • Practice creating search engine applications using server side scripts. • Practice creating shopping cart applications that make use of sessions and cookies using server side scripts	• Lecture and discussion • Research • Demonstration • Hands-on Practice	• Written Test • Practical / Performance Test	160 hours
			• Supervised-industry training	• Performance evaluation	60 hours
	4.5 Develop web application using MVC Frameworks	• Identify types of MVC Frameworks • Practice installing MVC Frameworks • Practice developing a simple Content Management System using a MVC Framework • Practice software documentation on completed web application	• Lecture and discussion • Demonstration • Hands-on Practice	• Written Test • Practical / Performance Test	40 hours

3.2 TRAINING DELIVERY

1. The delivery of training shall adhere to the design of the curriculum. Delivery shall be guided by the principles of competency-based TVET.

    a. Course design is based on competency standards set by the industry or recognized industry sector; (**Learning system is driven by competencies written to industry standards**)
    b. Training delivery is learner-centered and should accommodate individualized and self-paced learning strategies;
    c. Training can be done on an actual workplace setting, simulation of a workplace and/or through adoption of modern technology.
    d. Assessment is based in the collection of evidence of the performance of work to the industry required standards;
    e. Assessment of competency takes the trainee's knowledge and attitude into account but requires evidence of actual performance of the competency as the primary source of evidence.
    f. Training program allows for recognition of prior learning (RPL) or current competencies;
    g. Training completion is based on satisfactory completion of all specified competencies not on the specified nominal duration of learning.

2. The competency-based TVET system recognizes various types of delivery modes, both on-and off-the-job as long as the learning is driven by the competency standards specified by the industry. The following training modalities and their variations/components may be adopted singly or in combination with other modalities when designing and delivering training programs:

2.1 Institution- Based:

- Dual Training System (DTS)/Dualized Training Program (DTP) which contain both in-school and in-industry training or fieldwork components. Details can be referred to the Implementing Rules and Regulations of the DTS Law and the TESDA Guidelines on the DTP;

- Distance learning is a formal education process in which majority of the instruction occurs when the students and instructor are not in the same place. Distance learning may employ correspondence study, audio, video, computer technologies or other modern technology that can be used to facilitate learning and formal and non-formal training. Specific guidelines on this mode shall be issued by the TESDA Secretariat.

- The traditional classroom-based or in-center instruction may be enhanced through use of learner-centered methods as well as laboratory or field-work components.

2.2 Enterprise-Based:

- Formal Apprenticeship – Training within employment involving a contract between an apprentice and an enterprise on an approved apprenticeable occupation.

- Informal Apprenticeship - is based on a training (and working) agreement between an apprentice and a master craftsperson wherein the agreement may be written or oral and the master craftsperson commits to training the apprentice in all the skills relevant to his or her trade over a significant period of time, usually between one and four years, while the apprentice commits to contributing productively to the work of the business. Training is integrated into the production process and apprentices learn by working alongside the experienced craftsperson.

- Enterprise-based Training- where training is implemented within the company in accordance with the requirements of the specific company. Specific guidelines on this mode shall be issued by the TESDA Secretariat.

2.3 Community-Based:

- Community-Based Training – short term programs conducted by non-government organizations (NGOs), LGUs, training centers and other TVET providers which are intended to address the specific needs of a community. Such programs can be conducted in informal settings such as barangay hall, basketball courts, etc. These programs can also be mobile training program (MTP).

3.3 TRAINEE ENTRY REQUIREMENTS

The trainees who wish to enter the course should possess the following requirements:

- Must have completed at least 10 yrs. basic education or an alternative learning systems (ALS) certificate of completion with grade 10 equivalent holder;
- Must get 20 points out of 30 items mathematics (10 items algebra, 10 items trigonometry, 10 items geometry) test and 20 points out of 30 items abstract reasoning test given by the institution;
- Able to communicate both oral and written;
- Must know how to operate a computer and how to navigate the internet

This list does not include specific institutional requirements such as educational attainment, appropriate work experience and others that may be required from the trainees by the school or training center delivering the TVET program.

3.4 LIST OF TOOLS, EQUIPMENT AND MATERIALS

Recommended list of tools, equipment and materials for the conduct of training in Web Development NC III:

TOOLS		EQUIPMENT		MATERIALS	
Qty.	Description	Qty.	Description	Qty.	Description
21	Any photo editing or graphic software that is commonly used in the industry either free, open source or licensed, e.g. - Adobe Photoshop - GIMP - CorelDraw/Paint - Adobe Illustrator	21	Ergonomic computer tables and chairs	1 box of 12 pieces	White board Marker
21	Any HTML/CSS editor that is commonly used in the industry either free, open source or licensed, e.g. - Notepad ++ - Adobe Dreamweaver	1	White board (4' x 8' standard)	3 pieces	White Board Eraser
1	Any CMS program that is commonly used in the industry either free, open source or licensed, e.g. - WordPress - Joomla - Drupal - Sharepoint	21	Desktop computer (graphics/ photo editing software dependent specifications) with mouse and keyboard	1 ream	Bond paper, 80 GSM, A4
21	Any OS that is commonly used in the industry either open source or licensed, e.g. - Windows - Mac - Linux	1	Projector or at least 40 inch LCD monitor	21 pad Assorted colors	Post-it, 3"x3"
21	Have all the following browsers: - Google Chrome - Microsoft Explorer/Edge - Mozilla Firefox - Safari - Opera	21 pcs	Headset or Speaker	1 pc	1 TB External hard drive

TOOLS		EQUIPMENT		MATERIALS	
Qty.	Description	Qty.	Description	Qty.	Description
21	Any FTP program that is commonly used in the industry either free, open source or licensed, e.g. - Filezilla - WSFTP - Cyberduck - WinSCP - CuteFTP	1	Wired Switch (minimum of 24 ports)		
21	Any SSH program that is commonly used in the industry either free, open source or licensed, e.g. - PuTTy - Bitvise	1	Router		
1	Stable internet connection with at least 2Mbps				

3.5 TRAINING FACILITIES

Based on class size of 20 students/trainees the space requirements for the teaching/learning and circulation areas are as follows:

TEACHING/LEARNING AREAS	SIZE IN METERS	AREA IN SQ. METERS	QTY	TOTAL AREA IN SQ. METERS
Lecture Area	6 x 8	48	1	48
Learning Resource Area	3 x 5	15	1	15
Wash ,Toilet & Locker Room	2 x 2	4	2	8
Total				71
Facilities / Equipment / Circulation**				21
Total Area				**92**

***** Area requirement is equivalent to 30% of the total teaching/learning areas***

Appropriate consideration should be given in providing and allocating work space, communications facilities, and the usual workplace amenities to ensure a proper learning environment. Where applicable, training shall be held or conducted in learning facilities in accordance with generally accepted industry standards and practice.

3.6 TRAINERS QUALIFICATIONS FOR WEB DEVELOPMENT NC III

- Must be a holder of National TVET Trainer Certificate (NTTC) level I in Web Development NC III;
- Must have at least three (3) years as full-stack* web developer industry experience within the last 5 years.

* Full-stack web developer – somebody who is knowledgeable on both front-end and back-end web development

3.7 INSTITUTIONAL ASSESSMENT

Institutional assessment is undertaken by trainees to determine their achievement of units of competency. A certificate of achievement is issued for each unit of competency. The institutional assessment is administered by the trainer/assessor.

The result of the institutional assessment may be considered as evidence for the assessment for national certification.

SECTION 4. ASSESSMENT AND CERTIFICATION ARRANGEMENT

Competency Assessment is the process of collecting evidence and making judgments whether competency has been achieved. The purpose of assessment is to confirm that an individual can perform to the standards expected at the workplace as expressed in relevant competency standards.

The assessment process is based on evidence or information gathered to prove achievement of competencies. The process may be applied to an employable unit(s) of competency in partial fulfillment of the requirements of the national qualification.

4.1. NATIONAL ASSESSMENT AND CERTIFICATION ARRANGEMENTS

4.1.1 To attain the National Qualification of **Web Development NC III**, the candidate must demonstrate competence in all the units listed in Section 1. Successful candidates shall be awarded a National Certificate III level signed by the TESDA Director-General.

4.1.2 The qualification of **Web Development NC III** may be attained through:

4.1.2.1 Accumulation of Certificates of Competency (COCs) in all the following units of competencies:

COC-1. Developing Responsive Web Design
- Utilize software methodologies
- Develop responsive web design

COC-2. Creating Interactive Websites (using JavaScript)
- Utilize software methodologies
- Create interactive websites

COC-3. Developing website backend
- Utilize software methodologies
- Develop website backend

Successful candidates shall be awarded a **Certificate of Competency (COC)** in each of the core units.

4.1.2.2 Demonstration of competence through a single comprehensive project-type assessment covering all required units of competency of this qualification.

4.1.3 Upon accumulation and submission of all COCs acquired for all the relevant units of competency comprising this qualification, an individual shall be issued the corresponding National Certificate.

4.1.4 Assessment shall cover all competencies, with basic and common integrated or assessed concurrently with the core units of competency.

4.1.5 Any of the following are qualified to apply for assessment and certification:

4.5.1 Graduates of formal or non-formal including enterprise-based training programs.
4.5.2 Experienced workers (wage employed or self-employed)

4.1.6 The guidelines on assessment and certification are discussed in detail in the "Operating Procedures on Assessment and Certification" and "Guidelines on the Implementation of the Philippine TVET Competency Assessment and Certification System (PTCACS)".

4.2. COMPETENCY ASSESSMENT REQUISITE

4.2.1 *Self-Assessment Guide*. The self-assessment guide (SAG) is accomplished by the candidate prior to actual competency assessment. SAG is a pre-assessment tool to help the candidate and the assessor determine what evidence is available, where gaps exist, including readiness for assessment.

This document can:

a. Identify the candidate's skills and knowledge
b. Highlight gaps in candidate's skills and knowledge
c. Provide critical guidance to the assessor and candidate on the evidence that need to be presented
d. Assist the candidate to identify key areas in which practice is needed or additional information or skills that should be gained prior to assessment.

4.2.2 *Accredited Assessment Center*. Only Assessment Center accredited by TESDA is authorized to manage the assessment activities of candidates for national certification.

4.2.3 *Accredited Competency Assessor*. Only competency assessor accredited by TESDA is authorized to assess the competencies of candidates for national certification.

ANNEX A. ICT COMPETENCY MAP – WEB DEVELOPMENT NC III

BASIC COMPETENCIES

Receive and Respond to Workplace Communication	Work with Others	Demonstrate work values	Practice basic housekeeping procedures	Participate in Workplace Communication
Work in a Team Environment	Practice career professionalism	Practice occupational health and safety procedures	**Lead Workplace Communication**	**Lead Small Team**
Develop and practice negotiation skills	**Solve Problems Related to Work Activities**	**Use mathematical concepts and techniques**	**Use relevant technologies**	Utilize Specialist Communication Skills
Develop Team and Individuals	Apply Problem Solving Techniques in the Workplace	Collect, analyze and organize information	Plan and Organize Work	Promote environmental protection

COMMON COMPETENCIES

Apply Critical Thinking and Thought Organization	**Apply Quality Standards**	**Perform Computer Operation**		

CORE COMPETENCIES

Communicate effectively in a customer contact center	Render quality customer service	Utilize enterprise/ company technology	Conduct contact center campaign	Provide specialized support and assistance to customers
Lead a contact center work team	Manage the activities of a contact center work team	Use business technology	Use medical technology to carry out task	Produce text from audio transcription
Review/edit documents	Lead a team in delivering quality service	Apply traditional drawing techniques for animation	Produce traditional cleaned-up drawings	Produce traditional in-between drawings
Produce Traditional key poses/drawings for animation	Create 2D digital animation	Export Animation into Video file format	Produce digital cleaned-up drawings	Produce digital in-between drawings
Produce background designs	Composite and edit animation sequence	Create 3D digital animation	Produce storyboard for animation	Coordinate the production of animation
Produce over-all designs for animation	Produce key drawings for animation	Create 3D models for animation	Apply 3D texture and lighting to 3D models	Set character rigging
Create 2D digital animation	Produce cleaned-up and in-between drawings	Use an authoring tool to create an interactive sequence	Animate character	Composite and render animation sequence
Produce key drawings for animation	**Utilize Software Methodologies**	**Develop Responsive Web Design**	**Create Interactive Websites** (Using JavaScript)	**Develop Website Backend Systems**
Develop designs for a logo	Develop designs for print media	Develop designs for user experience	Develop designs for user interface	Develop designs for product packaging
Design booth and product/window display				

DEFINITION OF TERMS

GENERAL

1) **Certification -** is the process of verifying and validating the competencies of a person through assessment

2) **Certificate of Competency (COC)** – is a certification issued to individuals who pass the assessment for a single unit or cluster of units of competency

3) **Common Competencies** - are the skills and knowledge needed by all people working in a particular industry

4) **Competency** - is the possession and application of knowledge, skills and attitudes to perform work activities to the standard expected in the workplace

5) **Competency Assessment -** is the process of collecting evidence and making judgements on whether competency has been achieved

6) **Competency Standard (CS)** - is the industry-determined specification of competencies required for effective work performance

7) **Context of Assessment** - refers to the place where assessment is to be conducted or carried out

8) **Core Competencies - are** the specific skills and knowledge needed in a particular area of work - industry sector/occupation/job role

9) **Critical aspects of competency -** refers to the evidence that is essential for successful performance of the unit of competency

10) **Elective Competencies -** are the additional skills and knowledge required by the individual or enterprise for work

11) **Elements** - are the building blocks of a unit of competency. They describe in outcome terms the functions that a person performs in the workplace

12) **Evidence Guide** - is a component of the unit of competency that defines or identifies the evidences required to determine the competence of the individual. It provides information on critical aspects of competency, underpinning knowledge, underpinning skills, resource implications, assessment method and context of assessment

13) **Level -** refers to the category of skills and knowledge required to do a job

14) **Method of Assessment** - refers to the ways of collecting evidence and when evidence should be collected

15) **National Certificate (NC)** – is a certification issued to individuals who achieve all the required units of competency for a national qualification defined under the Training Regulations. NCs are aligned to specific levels within the PTQF

16) **Performance Criteria** - are evaluative statements that specify what is to be assessed and the required level of performance

17) **Qualifications** - is a cluster of units of competencies that meets job roles and are significant in the workplace. It is also a certification awarded to a person on successful completion of a course in recognition of having demonstrated competencies in an industry sector

18) **Range of Variables** - describes the circumstances or context in which the work is to be performed

19) **Recognition of Prior Learning (RPL)** – is the acknowledgement of an individual's skills, knowledge and attitudes gained from life and work experiences outside registered training programs

20) **Resource Implications -** refers to the resources needed for the successful performance of the work activity described in the unit of competency. It includes work environment and conditions, materials, tools and equipment

21) **Basic Competencies -** are the skills and knowledge that everyone needs for work

22) **Training Regulations (TR)** – refers to the document promulgated and issued by TESDA consisting of competency standards, national qualifications and training guidelines for specific sectors/occupations. The TR serve as basis for establishment of qualification and certification under the PTQF. It also serves as guide for development of competency-based curricula and instructional materials including registration of TVET programs offered by TVET providers

25) **Unit of Competency** – is a component of the competency standards stating a specific key function or role in a particular job or occupation; it is the smallest component of achievement that can be assessed and certified under the PTQF

SECTOR SPECIFIC

1. **Attributes** - a piece of information that determines the properties of a field or tag in a database or a string of characters in a display.
2. **Browser** – a software package that provides the user interface for accessing Internet, intranet and extranet Web sites.
3. C**loud server** is a logical server that is built, hosted and delivered through a cloud computing platform over the Internet. Cloud servers possess and exhibit similar capabilities and functionality to a typical server but are accessed remotely from a cloud service provider.
4. **Code minification,** also called code minimization or code compression - is the process of removing all unnecessary characters from the source code. This includes removing all unwanted white space characters, new line characters, comments, etc. Code minification does not affect the functionality of the source code. It however, improves load time (and your web app's performance) because the size of the file to be downloaded now reduces.
5. **Computer** – a device that has the ability to accept data; internally store and execute a program of instructions; perform mathematical, logical, and manipulative operations on data; and report the results.
6. **Computer Terminal** – any input/output device connected by telecommunications links to a computer.
7. **CSS** – Cascading Style Sheet is a language that describes the style of an HTML document. CSS describes how HTML elements should be displayed.
8. **Data** - objective measurements of the attributes (characteristics) of entities such as people, places, things, and events.
9. **Data structure** - is a particular way of storing and organizing information in a computer so that it can be retrieved and used most productively. Different kinds of data structures are meant for different kinds of applications, and some are highly specialized to specific tasks.
10. **Database conceptual model** - is also known as the data model as data model can be used to describe the conceptual schema when a database system is implemented. It hides the internal details of physical storage and targets on describing entities, datatype, relationships and constraints.
11. **Documentation** – a collection of documents or information.
12. **Document object model** (DOM) - is a programming API for HTML and XML documents. It defines the logical structure of documents and the way a document is accessed and manipulated. In the DOM specification, the term "document" is used in the broad sense - increasingly, XML is being used as a way of representing many different kinds of information that may be stored in diverse systems, and much of this would traditionally be seen as data rather than as documents. Nevertheless, XML presents this data as documents, and the DOM may be used to manage this data.
13. **Domain name** - is an identification string that defines a realm of administrative autonomy, authority or control within the Internet. Domain names are formed by the rules and procedures of the Domain Name System (DNS). Any name registered in the DNS is a domain name.
14. **Edit** – to modify the form or format of data

15. **Entity relationship diagram** (ERD) - is a graphical representation of an information system that shows the relationship between people, objects, places, concepts or events within that system. An ERD is a data modeling technique that can help define business processes and can be used as the foundation for a relational database.
16. **Ergonomics** - the science and technology emphasizing the safety, comfort, and ease of use of human-operated machines. The goal of ergonomics is to produce systems that are user-friendly: safe, comfortable and easy to use.
17. **Firewall** - A firewall is a network security device that grants or rejects network access to traffic flows between an untrusted zone (e.g., the Internet) and a trusted zone (e.g., a private or corporate network).
18. **Front-end web development**, also known as client-side development is the practice of producing HTML, CSS and JavaScript for a website or Web Application so that a user can see and interact with them directly
19. **FTP** - the File Transfer Protocol (FTP) is a standard network protocol used for the transfer of computer files from a server to a client using the Client–server model on a computer network. FTP is built on a client-server model architecture and uses separate control and data connections between the client and the server.
20. **Full-stack web developer** – somebody who is knowledgeable on both front-end and back-end web development.
21. **HTML** – hypertext markup language, a markup language that is used to create documents on the World Wide Web incorporating text, graphics, sound, video, and hyperlinks.
22. **HTML tag** - the <html> tag tells the browser that this is an HTML document. The <html> tag represents the root of an HTML document. The <html> tag is the container for all other HTML elements (except for the <!DOCTYPE> tag).
23. **Hyperlink** - is a reference to data that the reader can directly follow either by clicking, tapping, or hovering. A hyperlink points to a whole document or to a specific element within a document. Hypertext is text with hyperlinks.
24. **Information** – data placed in a meaningful and useful context for an end user.
25. **Information and Communication Technology (ICT) -** refers to technologies associated with the transmission and exchange of data in the form of sound, text, visual images, signals or any combination of those forms through the use of digital technology. It encompasses such services as telecommunications, posts, multimedia, electronic commerce, broadcasting, and information technology.
26. **JavaScript** ("JS" for short) is a full-fledged dynamic programming language that, when applied to an HTML document, can provide dynamic interactivity on websites. It is an interpreted programming language with object-oriented capabilities.
27. **JavaScript syntax** - the syntax of JavaScript is the set of rules that define a correctly structured JavaScript program. The examples below make use of the log function of the console object present is most browsers for standard text output. The JavaScript standard library lacks an official standard text output function
28. **Lighttpd** - is a secure, fast, compliant, and very flexible web-server that has been optimized for high-performance environments. It has a very low memory footprint compared to other webservers and takes care of cpu-load. Its advanced feature-set (FastCGI, CGI, Auth, Output-Compression, URL-Rewriting and many

more) make lighttpd the perfect webserver-software for every server that suffers load problems.

29. **Modernizr** - is a JavaScript library which is designed to detect HTML5 and CSS3 features in various browsers, which lets JavaScript avoid using unimplemented features or use a workaround such as a shim to emulate them. Modernizr aims to provide this feature detection in a complete and standardized manner.
30. **Model–view–controller** (MVC) - is a software design pattern for implementing user interfaces on computers. It divides a given application into three interconnected parts in order to separate internal representations of information from the ways that information is presented to and accepted from the user. The MVC design pattern decouples these major components allowing for efficient code reuse and parallel development.
31. **Moodboard** - an arrangement of images, materials, pieces of text, etc., intended to evoke or project a particular style or concept.
32. **MVC framework** - the Model-View-Controller (MVC) architectural pattern separates an application into three main components: the model, the view, and the controller. The ASP.NETMVC framework provides an alternative to the ASP.NET Web Forms pattern for creating Web applications.
33. **MVC Pattern** stands for Model-View-Controller Pattern - is used to separate application's concerns. Model - Model represents an object or JAVA POJO carrying data. It can also have logic to update controller if its data changes.
34. **Normalization** or database normalization - is the process of organizing the columns (attributes) and tables (relations) of a relational database to reduce data redundancy, insertion anomaly, update anomaly & deletion anomaly and improve data integrity.
35. **Plug-in** - a small piece of software that supplements a larger program (as a browser) program or makes a program work better
36. **Quality assurance –** methods for ensuring that information system are free from errors and fraud and provide information products of high quality.
37. **Script tag** - the <script> tag is used to define a client-side script (JavaScript). The <script> element either contains scripting statements, or it points to an external script file through the SRC attribute. Common uses for JavaScript are image manipulation, form validation, and dynamic changes of content
38. **Search engine optimization** (**SEO**) is the process of affecting the visibility of a website or a web page in a web search engine's unpaid results—often referred to as "natural", "organic", or "earned" results.
39. **Server-side scripting** - is a technique used in web development which involves employing **scripts** on a web **server** which produce a response customized for each user's (client's) request to the website. ... **Server-side scripting** is often used to provide a customized interface for the user.
40. **Simulation** - the process of imitating a real phenomenon with a set of mathematical formulas. Advanced computer programs can simulate weather conditions, chemical reactions, atomic reactions, and even biological processes.
41. **Sitemap** is an XML file that lists URLs for a site along with additional metadata about each URL (when it was last updated, how often it usually changes, and how important it is, relative to other URLs in the site) so that search engines can more intelligently crawl the site.

42. **Sitemap** - is a list of pages of a web site accessible to crawlers or users. It can be either a document in any form used as a planning tool for Web design, or a Web page that lists the pages on a website, typically organized in hierarchical fashion.
43. **Software –** computer programs and procedures concerned with the operation of an information system.
44. **SQL** (Structured Query Language) -is a domain-specific language used in programming and designed for managing data held in a relational database management system (RDBMS), or for stream processing in a relational data stream management system (RDSMS).
45. **Standards –** measures of performance developed to evaluate the progress of a system toward its objectives.
46. **Style guide** (or manual of style) - is a set of standards for the writing and design of documents, either for general use or for a specific publication, organization, or field. (It is often called a style sheet, though that term has other meanings.) A style guide establishes and enforces style to improve communication.
47. **System –** an assembly of methods, procedures, or techniques unified by regulated interaction to form an organized whole
48. **Uptime** - is the amount of time that a server has stayed up and running. This is usually listed as a percentage, like "99.9% uptime." Uptime is a great measure of how good a Web hosting provider is at keeping their systems up and running
49. **User experience** (UX) refers to a person's emotions and attitudes about using a particular product, system or service. It includes the practical, experiential, affective, meaningful and valuable aspects of human–computer interaction and product ownership.
50. **User- friendly** – a characteristic of human-operated equipment and systems that makes them safe, comfortable, and easy to use.
51. **Web analytics** is the measurement, collection, analysis and reporting of web data for purposes of understanding and optimizing web usage. Web analytics is not just a process for measuring web traffic but can be used as a tool for business and market research, and to assess and improve the effectiveness of a website. Web analytics also provides information about the number of visitors to a website and the number of page views. It helps gauge traffic and popularity trends which is useful for market research.
52. **Web design** is a process of conceptualizing, planning, and building a collection of electronic files that determine the layout, colors, text styles, structure, graphics, images, and use of interactive features that deliver pages to your site visitors.
53. **Web developer** is a programmer who specializes in, or is specifically engaged in, the development of World Wide **Web** applications, or distributed network applications that are run over HTTP from a **web** server to a **web** browser
54. **Web programming** refers to the writing, markup and coding involved in **Web** development, which includes **Web** content, **Web** client and server scripting and network security. The most common languages used for **Web programming** are XML, HTML, JavaScript, Perl 5 and PHP
55. **Web server** - is a computer system that processes requests via HTTP, the basic network protocol used to distribute information on the World Wide Web. The term can refer to the entire system, or specifically to the software that accepts and supervises the HTTP requests.

56. **Web service** - is any piece of software that makes itself available over the internet and uses a standardized XML messaging system. XML is used to encode all communications to a web service. For example, a client invokes a web service by sending an XML message, and then waits for a corresponding XML response.
57. **Web service API** (Application Programming Interface) - is the means by which third parties can write code that interfaces with other code. A Web Service is a type of API, one that almost always operates over HTTP (though some, like SOAP, can use alternate transports, like SMTP).
58. **Website** is a collection of related web pages, including multimedia content, typically identified with a common domain name, and published on at least one web server. A website may be accessible via a public Internet Protocol (IP) network, such as the Internet, or a private local area network (LAN), by referencing a uniform resource locator (URL) that identifies the site.
59. **Wireframe** – is a visual representation of a website. It allows designers and developers to present proposed functions, graphics elements, structure, and content of a website with simple line drawings.
60. **W3C** - the World Wide Web Consortium (W3C) is the main international standards organization for the World Wide Web.

TRAINING REGULATIONS (TR)
DOCUMENT REVISION HISTORY

Qualification Title : Web Development NC III
Qualification Code: ICTWBD318

Revision No.	Document Description Types*	Replaces Version (TESDA Board Resolution No./ Date)	New Version (TESDA Board Resolution No./ Date)	Deployment Circular
00	Document Created – Web Development NC III	Not Applicable	TB No. 2018-05/ February 27, 2018	TESDA Circular No. __ s. 2018

Legend: *Description Types
- **Document Created**
- **Document Amended**

ACKNOWLEDGEMENTS

The Technical Education and Skills Development Authority (TESDA) wishes 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 and validation of these Training Regulations.

- **THE TECHNICAL EXPERT COMMITTEE – FY 2017**

  MS. MARIE GRACE A. DIMARANAN
  Board Director, Animation Council of the Philippines, Inc. (ACPI)

  MR. MIKHAIL JOSEPH T. TORRES
  Managing Director, EACOMM

  MR. KARLO MARTIN M. ROBOSA
  Senior Business Analyst, EACOMM

  MR. JONATHAN V. MARTIN
  Senior Product Marketing, Natural Intelligence Solutions/LLOOPP

  MR. ROMUALDO JOSE V. VERDAN II
  Owner/Manager, CADWEB Business Solutions

- **THE ANIMATION COUNCIL OF THE PHILIPPINES, INC. (ACPI)**

- **THE PHILIPPINE SOFTWARE INDUSTRY ASSOCIATION (PSIA)**

- **THE TESDA BOARD - STANDARDS SETTING AND SYSTEMS DEVELOPMENT COMMITTEE**

- **THE PARTICIPANTS IN THE NATIONAL VALIDATION OF THIS TRAINING REGULATION**

Ms. Candice Michelle T. Garcia	-	Pointwest Technologies Corp.
Mr. Alexis John Solis	-	Pointwest Technologies Corp.
Mr. Jarek Boilo T. Cabautan	-	Ten Rabbit
Mr. Raphael Angelo K. Warren	-	EACOMM Corporation
Mr. John Henry M. Pacay	-	EACOMM Corporation
Mr. Jotham M. Hernandez	-	Pinwheel Developers
Ms. Niña Ana Marie Jocelyn A. Sales	-	IGDA Manila/DLSU/iAcademy/CIIT

- **THE MANAGEMENT AND STAFF OF THE TESDA SECRETARIAT**

  - **Qualifications and Standards Office (QSO)**

    1. DIR. IMELDA B. TAGANAS - QSO-TESDA
    2. MR. JULFORD C. ABASOLO - CSDD-QSO-TESDA
    3. MR. SAMUEL E. CALADO, JR. - CSDD-QSO-TESDA
    4. MR. VENZEL V. CONCOLES - CSDD-QSO-TESDA