TRAINING REGULATIONS

TRANSMISSION LINE INSTALLATION AND MAINTENANCE NC III

UTILITIES SECTOR

TECHNICAL EDUCATION AND SKILLS DEVELOPMENT AUTHORITY
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TRAINING REGULATIONS FOR
TRANSMISSION LINE INSTALLATION AND MAINTENANCE NC III

SECTION 1 TRANSMISSION LINE INSTALLATION AND MAINTENANCE NC III QUALIFICATION

The Transmission Line (T/L) Installation and Maintenance NC III Qualification consist of competencies that a person must achieve to enable him/her to perform all the required competencies of a transmission line foreman as well as planning, implementation and inspection/assessment works.

Specifically, this Training Regulations in Transmission Line Installation and Maintenance NC III deals with the planning of transmission line maintenance job, implementing transmission line maintenance works and inspecting/assessing transmission line components' conditions.

This Qualification is packaged from the competency map of utilities sector as shown in Annex A.

The Units of Competency comprising this Qualification include the following:

BASIC COMPETENCIES

CODE NO.	Units of Competency
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

COMMON COMPETENCIES

CODE NO.	Units of Competency
UTL311203	Apply quality standards
UTL311206	Comply with environmental protection procedures
UTL311205	Operate and maintain T/L tools and equipment
UTL311201	Observe procedures, specifications and manuals of instruction
UTL311202	Operate a personal computer

CORE COMPETENCIES

CODE NO.	Units of Competency
UTL723217	Plan T/L maintenance job
UTL723218	Implement T/L maintenance work
UTL723219	Inspect/Assess T/L component's condition

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

- Transmission Line Foreman

SECTION 2 COMPETENCY STANDARDS

This section gives the details of the contents of the units of competency required in Transmission Line Installation and Maintenance NC III. These units of competency are categorized into basic, common and core competencies.

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
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
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
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

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. Underpinning knowledge	2.1. Organization requirements for written and electronic communication methods 2.2. Effective verbal communication methods
3. Underpinning Skills	3.1. Organize information 3.2. Understand and convey intended meaning 3.3. Participate in variety of workplace discussions 3.4. Comply with organization requirements for the use of written and electronic communication methods
4. Resource Implications	The following resources MUST be provided: 4.1. Variety of Information 4.2. Communication tools 4.3. Simulated workplace
5. Methods of Assessment	Competency may be assessed through: 5.1. Competency in this unit must be assessed through 5.2. Direct Observation 5.3. Interview
6. Context for Assessment	6.1. Competency may be assessed in the workplace or in simulated workplace environment

UNIT OF COMPETENCY : LEAD SMALL TEAMS

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
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
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
3. Set performance expectations for team members	3.1. Performance expectations are established based on client needs and according to assignment requirements 3.2. Performance expectations are based on individual team members duties and area of responsibility 3.3. Performance expectations are discussed and disseminated to individual team members
4. Supervised 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

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. Underpinning Knowledge	2.1. Company policies and procedures 2.2. Relevant legal requirements 2.3. How performance expectations are set 2.4. Methods of Monitoring Performance 2.5. Client expectations 2.6. Team member's duties and responsibilities
3. Underpinning Skills	3.1. Communication skills required for leading teams 3.2. Informal performance counseling skills 3.3. Team building skills 3.4. Negotiating skills
4. Resource Implications	The following resources **MUST** be provided: 4.1. Access to relevant workplace or appropriately simulated environment where assessment can take place 4.2. Materials relevant to the proposed activity or task
5. Methods of Assessment	Competency may be assessed through: 5.1. Direct observations of work activities of the individual member in relation to the work activities of the group 5.2. Observation of simulation and/or role play involving the participation of individual member to the attainment of organizational goal 5.3. Case studies and scenarios as a basis for discussion of issues and strategies in teamwork
6. Context for Assessment	6.1. Competency assessment may occur in workplace or any appropriately simulated environment 6.2. Assessment shall be observed while task are being undertaken whether individually or in-group

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
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
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
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
4. Provide recommendation/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

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. Underpinning Knowledge	2.1. Competence includes a thorough knowledge and understanding of the process, normal operating parameters, and product quality to recognize non-standard 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 2.2.2. Enterprise goals, targets and measures 2.2.3. Enterprise quality, OHS and environmental requirement 2.2.4. Principles of decision making strategies and techniques 2.2.5. Enterprise information systems and data collation 2.2.6. Industry codes and standards
3. Underpinning Skills	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. Resource Implications	4.1. 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.
5. Methods of Assessment	Competency may be assessed through: 5.1. Case studies on solving problems in the workplace 5.2. 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.
6. Context for Assessment	6.1. 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 the application of mathematical concepts and techniques.

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables
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
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 is determined and verified based on job requirements
3. Analyze results	3.1 Result of application is reviewed based on expected and required specifications and outcome 3.2 ***Appropriate action*** is applied in case of error

RANGE OF VARIABLES

VARIABLE	RANGE
1. Mathematical techniques	May include but are not limited to: 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	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. Underpinning Knowledge	2.1 Fundamental operation (addition, subtraction, division, multiplication) 2.2 Measurement system 2.3 Precision and accuracy 2.4 Basic measuring tools/devices
3. Underpinning Skills	3.1 Applying mathematical computations 3.2 Using calculator 3.3 Using different measuring tools
4. Resource Implications	The following resources **MUST** be provided: 4.1 Calculator 4.2 Basic measuring tools 4.3 Case Problems
5. Methods of Assessment	Competency may be assessed through: 5.1 Authenticated portfolio 5.2 Written Test 5.3 Interview/Oral Questioning 5.4 Demonstration
6. Context for Assessment	6.1 Competency may be assessed in the work place or in a simulated work place setting

UNIT OF COMPETENCY: USE RELEVANT TECHNOLOGIES

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
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
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
3. Maintain/enhance ~~of~~ 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 3.2 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***

RANGE OF VARIABLES

VARIABLE	RANGE
1. Technology	May include but are not limited to: 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 but not limited to: 2.1 Real Time Management 2.2 KAIZEN or continuous improvement 2.3 5s 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 OHS 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. Underpinning Knowledge	2.1 Awareness on technology and its function 2.2 Repair and maintenance procedure 2.3 Operating instructions 2.4 Applicable software 2.5 Communication techniques 2.6 Health and safety procedure 2.7 Company policy in relation to relevant technology 2.8 Different management concepts 2.9 Technology adaptability
3. Underpinning Skills	3.1 Relevant technology application/implementation 3.2 Basic communication skills 3.3 Software applications skills 3.4 Basic troubleshooting skills
4. Resource Implications	The following resources MUST be provided: 4.1 Relevant technology 4.2 Interview and demonstration questionnaires 4.3 Assessment packages
5. Methods of Assessment	Competency must be assessed through: 5.1 Interview 5.2 Actual demonstration 5.3 Authenticated portfolio (related certificates of training/seminar)
6. Context for Assessment	6.1 Competency may be assessed in actual workplace or simulated environment

COMMON COMPETENCIES

UNIT TITLE : APPLY QUALITY STANDARDS

UNIT CODE : ICT315202

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes 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 Bold*** terms are elaborated in the Range of Variables
1. Assess quality of received materials or components	1.1. Work instructions are obtained and work is carried out in accordance with standard operating procedures 1.2. Received ***materials or component parts*** are checked against workplace standards and specifications 1.3. Faulty material or components 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 or components are replaced in accordance with workplace procedures
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. Faulty pieces are identified and isolated 2.4. Information on the quality and other indicators of production performance is recorded in accordance with workplace procedures 2.5. Deviations from specified ***quality standards***, causes are documented and reported in accordance with the workplace standards operating procedures
3. Engage in quality improvement	3.1. Process improvement procedures are participated in relation to workplace assignment 3.2. Work is carried out in accordance with process improvement procedures 3.3. Performance of operation or quality of product or service to ensure ***customer*** satisfaction is monitored

RANGE OF VARIABLES

VARIABLE	RANGE
1. Materials/components	1.1. Materials may include but not limited to: 1.1.1. Wires 1.1.2. Cables, soldering lead 1.1.3. Electrical tape 1.2. Components may include but not limited to: 1.2.1. ICs 1.2.2. Diodes
2. Faults	Faults may include but not limited to: 2.1. Components/materials not according to specification 2.2. Components/materials contain manufacturing defects 2.3. Components/materials do not conform with government regulation i.e., PEC, environmental code 2.4. Components/materials have safety defect
3. Documentation	3.1. Organization work procedures 3.2. Manufacturer's instruction manual 3.3. Customer requirements 3.4. Forms
4. Quality standards	4.1. Quality standards may relate but not limited to the following: 4.1.1. Materials 4.1.2. Component parts 4.1.3. Final product 4.1.4. Production processes
5. Customer	5.1. Co-worker 5.2. Suppliers 5.3. Client 5.4. Organization receiving the product or service

EVIDENCE GUIDE

1. Critical aspect of competency	Assessment requires evidence 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. Underpinning knowledge	2.1. Relevant production processes, materials and products 2.2. Characteristics of materials/component parts used in electronic production processes 2.3. Quality checking procedures 2.4. Workplace procedures 2.5. Safety and environmental aspects of production processes 2.6. Fault identification and reporting 2.7. Quality improvement process
3. Underpinning skills	3.1. Reading skills required to interpret work instruction 3.2. Communication skills needed to interpret and apply defined work procedures 3.3. Carry out work in accordance with OHS policies and procedures
4. Method of assessment	4.1. The assessor may select at least two (2) of the following assessment methods to objectively assess the candidate: 4.1.1. Observation 4.1.2. Questioning 4.1.3. Practical demonstration
5. Resource implication	5.1. Materials and component parts and equipment to be used in a real or simulated electronic production situation
6. Context of Assessment	6.1. Assessment may be conducted in the workplace or in a simulated work environment.

UNIT TITLE : **COMPLY WITH ENVIRONMENTAL PROTECTION PROCEDURES**

UNIT CODE : **UTL311206**

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to implement and monitor environmental protection policies and procedures including accessing relevant information concerning environmental protection regulations and procedures, and implementing and monitoring procedures concerning environmental hazards, related control procedures, environmental training arrangements, and required records and documentation

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables
1. Access information concerning environmental protection regulations and procedures	1.1 Relevant provisions of ***environmental*** legislation and codes of practice are accurately followed 1.2 Information on workplace environmental policies, procedures and programs is stored in a readily accessible location and manner 1.3 ***Information*** is accurately and clearly explained to the work team and updated according to change in workplace policy 1.4 Information about the outcomes of environmental risk identification and control procedures is provided to the ***appropriate personnel***
2. Implement and monitor procedures concerning environmental hazards	2.1 Existing and potential ***environmental hazards*** in the workplace are identified and reported 2.2 Identified hazards are assessed in relation to relevant environmental protection policies 2.3 ***Workplace procedures for dealing with hazardous events*** are implemented wherever necessary to ensure that prompt control action is taken 2.4 ***Personal protective equipment (PPE)*** are obtained and used in accordance with job requirements 2.5 Hazardous events are investigated to identify causes, and control measures are implemented to prevent recurrence and minimize risks of such events
3. Implement and monitor environmental control procedures	3.1 Existing environmental protection measures are implemented, monitored and reviewed 3.2 Work procedures to protect environment are implemented and adherence to them by the work group is monitored 3.3 Required improvements to existing control measures are identified, including required resources for implementation, and reported to appropriate personnel

RANGE OF VARIABLES

VARIABLE	RANGE
1 environment	Environment may include: 1.1 indoor 1.2 outdoor 1.3 marine 1.4 atmospheric
2 Information	Information/documents may include: 2.1 Workplace procedures and practices related to environmental protection, including all financial, operating and customer service policies and procedures 2.2 OHS and environmental protection regulations 2.3 Workplace housekeeping procedures and policies 2.4 Code of practice for environmental protection 2.5 Material safety data sheets 2.6 Policies and procedures for entry and work in confined spaces 2.7 Manufacturer's instructions concerning the use and servicing of equipment 2.8 Emergency procedures 2.9 Regulations and policies concerning noise, waste disposal/reprocessing, handling of dangerous goods/hazardous substances and other environmental protection issues 2.10 Standards and certification requirements 2.11 Quality assurance procedures
3 Appropriate personnel	Appropriate personnel may include: 3.1 Workplace personnel including supervisors and management 3.2 Site visitors 3.3 Contractors 3.4 Official representatives
4 Environmental hazards	4.1 Oils and lubricants 4.2 Exhaust fumes 4.3 Gas 4.4 Smoke 4.5 Chemicals and detergents 4.6 Rubbish 4.7 Noise 4.8 wastes

5 Workplace procedures for dealing with hazardous events	Procedures may include: 5.1 Inspection and housekeeping 5.2 Maintenance including plant and equipment 5.3 Purchasing 5.4 Evacuation 5.5 Hazardous substance containment 5.6 Operational instruction 5.7 Environmental information including incident and management practices 5.8 Specific hazardous materials policies and procedures 5.9 Risk assessment and control 5.10 First aid
6 Personal protective equipment (PPE)	PPE may include: 6.1 Gloves 6.2 Safety headwear and footwear 6.3 Safety glasses 6.4 Two-way radios 6.5 High visibility clothing

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires that the candidate: 1.1 Identified and monitored environmental hazards in the workplace 1.2 Implemented effective procedures for dealing with hazardous events 1.3 Monitored workplace adherence to environmental practices 1.4 Communicated effectively with the team members
2. Underpinning knowledge and attitude	2.1 Relevant environmental protection regulations & codes of practice 2.2 Workplace procedures and guidelines for implementing and monitoring environmental protection 2.3 Environmental risks associated with workplace operations and related precautions to control the risk 2.4 Environmental protection standards required in the workplace 2.5 Workplace environmental hazards and related hazard control measures 2.6 Equipment and resources required when implementing and monitoring environmental protection procedures 2.7 Organizational structure and site layout
3. Underpinning skills	3.1 Workplace reporting and recording processes and procedures 3.2 Communication skills 3.3 Accessing information and data 3.4 Problem solving skills 3.5 Ability to: 3.5.1 recognize potential environmental risks and ways of minimizing them 3.5.2 modify activities depending on differing workplace contexts, risk situations and environments 3.5.3 counsel, advise and inform others on environmental protection matters 3.5.4 identify and correctly use equipment and vehicles in accordance with environmental protection regulations and guidelines
4. Resource implications	The following resources should be provided: 4.1 Environmental protection regulations and guidelines 4.2 OHS regulations and hazard prevention policies and procedures 4.3 workplace environmental protection policies, procedures and instructions 4.4 equipment/vehicle manufacturer's operating and servicing instructions
5. Methods of assessment	Competency should be assessed through: 5.1 Direct observation 5.2 Oral or written questioning 5.3 Questions/interview Assessment of underpinning knowledge and practical skills may be combined
6. Context of assessment	6.1 Competency assessment must be undertaken in accordance with the endorsed TESDA assessment guidelines 6.2 Assessment may be conducted in the workplace or a simulated environment

UNIT OF COMPETENCY: **OBSERVE PROCEDURES, SPECIFICATIONS AND MANUALS OF INSTRUCTIONS**

UNIT CODE **:** **UTL311201**

UNIT DESCRIPTOR **:** This unit covers the knowledge, skills and attitudes on identifying, interpreting, applying services to specifications and manuals and storing manuals.

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables
4. Identify and access specification/manuals	1.5 Appropriate manuals are identified and accessed as per job requirements 1.6 Version and date of manual are checked to ensure that correct specification and procedures are identified
5. Interpret manuals	2.6 Relevant sections, chapters of specifications/ manuals are located in relation to the work to be conducted 2.7 Information and procedure in the manual are interpreted in accordance with industry practices
6. Apply information in manual	3.4 ***Manual*** is interpreted according to job requirements 3.5 Work steps are correctly identified in accordance with manufacturer's specification 3.6 Manual data are applied according to the given task 3.7 All correct sequencing and adjustments are interpreted in accordance with information contained on the manual or specifications
7. Store manuals	4.1 Manual or specification is stored appropriately to prevent damage, ready access and updating of information when required in accordance with company requirements

RANGE OF VARIABLES

VARIABLE	RANGE
1. Procedures, Specifications and Manuals of Instructions	Kinds of Manuals: 1.1 Manufacturer's Specification Manual 1.2 Repair Manual 1.3 Maintenance Procedure Manual 1.4 Periodic Maintenance Manual

EVIDENCE GUIDE

2. Critical aspects of competency	Assessment requires that the candidate: 1.5 Identified and accessed specification/manuals as per job requirements 1.6 Interpreted manuals in accordance with industry practices 1.7 Applied information in manuals according to the given task 1.8 Stored manuals in accordance with company requirements
2. Underpinning knowledge and attitude	2.8 Types of manuals used in construction sector 2.9 Identification of symbols used in the manuals 2.10 Identification of units of measurements 2.11 Unit conversion
3. Underpinning skills	3.6 Reading and comprehension skills required to identify and interpret construction manuals and specifications 3.7 Accessing information and data
4. Resource implications	The following resources should be provided: 4.1 All manuals/catalogues relative to construction sector
5. Methods of assessment	Competency should be assessed through: 5.1 Direct observation 5.2 Questions/interview Assessment of underpinning knowledge and practical skills may be combined
6. Context of assessment	6.3 Competency assessment must be undertaken in accordance with the endorsed TESDA assessment guidelines 6.4 Assessment may be conducted in the workplace or a simulated environment

UNIT OF COMPETENCY : OPERATE AND MAINTAIN T/L TOOLS AND EQUIPMENT

UNIT CODE : UTL311205

DESCRIPTOR : This unit covers the knowledge, skills and attitude to operate and maintain transmission line tools and equipment. This unit will involve working in a team environment.

ELEMENT	PERFORMANCE CRITERIA (***Italicized Bold*** terms are elaborated in the range of variables)
1. Plan and prepare for work	1.1 Work instruction is secured and interpreted according to ***job requirements*** 1.2 Relevant ***occupational health and safety requirements*** are identified following job specifications 1.3 Relevant transmission line ***tools, equipment and hardware*** are identified and requested in accordance with job specifications
2. Prepare transmission line tools and equipment	2.1 Personal protective equipment (PPE) are obtained following job requirements 2.2 Transmission line tools, equipment and hardware are acquired and secured in line with job requirements 2.3 Transmission hot line tools are tested/set following manufacturer's standards or recommendation
3. Operate transmission line tools and equipment	3.1 PPE are used in line with job requirements 3.2 Transmission line tools and equipment are used in line with job requirements
4. Check condition of transmission line tools and equipment	4.1 Transmission line tools and equipment are identified according to classification and job requirements 4.2 Non-functional transmission line tools and equipment are segregated and labeled according to classification 4.3 Safety of transmission line tools and equipment are observed in accordance with manufacturer's instructions 4.4 Condition of PPE are checked in accordance with manufacturer's instructions
5. Perform basic preventive maintenance	5.1 Appropriate lubricants are identified according to types of equipment 5.2 Equipment are lubricated according to preventive maintenance schedule or manufacturer's specifications 5.3 Transmission line tools are cleaned and tested according to standard procedures 5.4 Transmission line tools and equipment are inspected, and repaired and replaced, if necessary, after use 5.5 Work place is cleaned and kept in safe state in line with OHSA regulations
6. Store tools and equipment	6.1 Inventory of transmission line tools and equipment are conducted and recorded as per company practices 6.2 Transmission line tools and equipment are stored safely in appropriate locations in accordance with manufacturer's specifications or company procedures

RANGE OF VARIABLES

VARIABLE	RANGE
1. Job requirements	1.1 Perform overhead transmission line work 1.2 Erect pole 1.3 Perform live-line maintenance work 1.4 Perform cold-line maintenance work 1.5 Perform ground line maintenance work 1.6 Perform emergency restoration structure
2. Occupational health and safety requirements	May include but not limited to: 2.1 Personal protective equipment (PPE) 2.1.1 Safety hat 2.1.2 Safety goggles 2.1.3 Safety gloves 2.1.4 Safety shoes 2.1.5 Safety harness/strap 2.2 Installation of grounding cluster
3. Transmission line tools, equipment and hardware	May include but not limited to: 3.1 Hand tools 3.1.1 Pliers 3.1.2 Screwdrivers 3.1.3 Adjustable wrenches 3.1.4 Ball peen hammer 3.1.5 Auger bit 3.1.6 Hacksaw/cutting tools 3.1.7 Steel tape 3.2 Equipment 3.2.1 Motorized capstan 3.2.2 Climbing gears 3.2.3 Line truck/Boom truck 3.3 Set of hot line trailer 3.4 Hardware 3.4.1 Insulator 3.4.2 Machine bolts 3.4.3 Suspension clamp assembly (ACSR/OHGW) 3.4.4 Strain clamp assembly(ACSR/OHGW) 3.4.5 Overhead ground wires 3.4.6 Cross-arms and braces 3.4.7 Conductors and accessories

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Demonstrates ability to identify and comply with occupational health and safety standards in operating and maintaining transmission line tools and equipment 1.2 Demonstrates ability to identify and safely use transmission tools and equipment 1.3 Demonstrates ability to perform basic preventive maintenance servicing for transmission line equipment
2. Underpinning knowledge and attitude	2.1 Relevant occupational health and safety standards 2.2 Proper procedure for the use of transmission line tools and equipment 2.3 Basic preventive maintenance servicing for transmission line equipment
3. Underpinning skills	3.1 Following and complying occupational health and safety standards 3.2 Following procedures for the safe use of transmission line tools and equipment 3.3 Performing basic preventive maintenance servicing for transmission line equipment
4. Resource Implications	The following resources must be available: 4.1 Transmission line tools, equipment and PPE 4.2 Work area
5. Method of assessment	5.1 Observation and Oral questioning 5.2 Demonstration with oral questioning 5.3 Written test
6. Context of assessment	6.1 Competency may be assessed in the workplace or in a simulated workplace setting 6.2 Assessment shall be undertaken either individually or part of team under limited supervision

UNIT TITLE : **OPERATE A PERSONAL COMPUTER**

UNIT CODE : **UTL 311202**

UNIT DESCRIPTOR : This unit defines the competency required to operate a personal computer by: starting the PC, logging in, using and working with files, folders and programs, saving work, and closing down the PC.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms are elaborated in the Range of Variables***
1. Start the computer	1.1 The ***peripheral devices*** are properly connected 1.2 Power is checked and the ***computer*** and peripheral devices are switched on 1.3 Proper logging in and logging off is successfully done 1.4 The ***operating system*** features and functions are accessed and navigated 1.5 Hardware configuration and other ***system features*** are checked
2. Arrange and customize desktop display/ GUI settings	2.1 The desktop screen or GUI elements are changed as needed 2.2 Desktop icons are added, renamed, moved, copied or deleted 2.3 The ***online help functions*** are accessed or used as needed 2.4 Desktop icons of ***application programs*** are selected, opened and closed 2.5 ***Properties*** of icons are displayed 2.6 Computer or desktop settings are saved and restored
3. Work with files and folders (or directories)	3.1 A file or folder is created, opened, moved, renamed or copied 3.2 Files are located, deleted and restored 3.3 Details and properties of files and folders are displayed or viewed 3.4 ***Various files*** are organized for easy lookup and use 3.5 Files and information are searched 3.6 ***Disks*** are checked, erased or formatted as necessary
4. Work with user application programs	4.1 ***Application programs*** are added, changed, removed or ran 4.2 User software or application program are installed, updated and upgraded 4.3 Information/data are moved between documents or files
5. Print information	5.1 Printer is added or installed and correct ***printer settings*** is ensured 5.2 Default printer is assigned accordingly 5.3 Information or document is printed on the installed printer 5.4 Progress of print jobs are viewed and deleted as required
6. Shut down computer	6.1 All open application programs are closed 6.2 Computer and peripheral devices are properly shut down

RANGE OF VARIABLES

VARIABLE	RANGE
1. Peripheral device	This may include but is not limited to: 1.1 mouse 1.2 keyboard 1.3 monitor or visual display unit 1.4 printer 1.5 scanner
2. Computer	May include: 2.1 Laptops/notebooks 2.2 Workstations 2.3 Servers 2.4 other personal computer devices
3. Application programs	Can include: 3.1 user programs 3.2 database programs 3.3 word processors 3.4 email programs 3.5 Internet browsers 3.6 system browsers 3.7 spreadsheets
4. Operating system	May include but is not limited to the various versions and variants of operating systems running on personal computers and servers, such as: 4.1 Windows 4.2 NT 4.3 Mac OS 4.4 Linux 4.5 Solaris 4.6 Unix
5. System features	May include but is not limited to the operating system features and hardware features like: 5.1 memory size 5.2 disk capacities 5.3 video cards 5.4 USBs 5.5 Modems 5.6 1394 and LAN connectors 5.7 SD and PC cards 5.8 wireless and infrared connections.

VARIABLE	RANGE
6. Online help functions	6.1 An instruction manual, or a portion of the manual, integrated and accessible from within the program or software being used.
7. Properties	Indicates the description of the file or folder to include the: 7.1 file name 7.2 type of file 7.3 file size 7.4 date created and modified 7.5 attributes (hidden, read-only).
8. Various files	8.1 Documents 8.2 Records 8.3 Pictures 8.4 Music 8.5 Video
9. Disks	May include but is not limited to: 9.1 Floppy disks 9.2 CDs 9.3 CD-RW (Compact discs-Read/Write) 9.4 DVD RW 9.5 zip disks 9.6 flash drives 9.7 memory sticks 9.8 hard drives
10. Printer settings	The properties of the printer that enables it to work includes: 10.1 page layout 10.2 paper size 10.3 ink/cartridge type 10.4 number of copies 10.5 page orientation.

EVIDENCE GUIDE

1. Critical Aspects of Competency	1.1 Assessment must confirm the ability to utilize software, navigate the desktop, using system features to perform tasks and save results of work.
2. Underpinning Knowledge	Knowledge includes: 2.1 Keyboard layout and functions 2.2 Computer functions 2.3 Basic parts of a computer and various hardware components 2.4 Storage devices and file concepts 2.5 Basic software operation and functionalities
3. Underpinning Skills	Skills include: 3.1 Saving and retrieving files to and from various folders or disk storage 3.2 Mouse and keyboarding skills for running software applications 3.3 Reading and writing at a level where basic workplace documents are understood 3.4 Clear ability to communicate with peers and supervisors 3.5 Interpretation of user manuals and help functions 3.6 The ability to carry out written and verbal instructions using a personal computer whether standalone or in a networked environment
4. Resource Implications	To demonstrate competence in this unit access to the following resources will be required: 4.1 A personal computer 4.2 A printer 4.3 Mouse and keyboard 4.4 Basic systems software
5. Methods of Assessment	Competency may be assessed through: 5.1 Observation in a workplace or simulated environment 5.2 Third party reports 5.3 Exams and tests 5.4 Demonstration of required skills 5.5 Interviews
6. Context of Assessment	6.1 Competency may be assessed in the workplace or in a simulated work environment.

CORE COMPETENCIES

UNIT OF COMPETENCY : PLAN TRANSMISSION LINE MAINTENANCE JOB

UNIT CODE : UTL723217

UNIT DESCRIPTOR : This unit deals with the knowledge, skills and attitudes in facilitating job planning for T/L maintenance work.

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables
1. Analyze work orders	1.1 ***Work orders*** are received, interpreted and ***prioritized*** based on job requirements and resources 1.2 Work order job site is inspected for specific job conditions and requirements***.*** 1.3 ***Potential problems*** in worksite are addressed or referred to appropriate personnel 1.4 Maintenance work is confirmed and scheduled in accordance with enterprise procedures.
2. Identify and request equipment and materials	2.1 Approval of activity plan and schedule is secured in accordance with enterprise procedures 2.2 Equipment and materials required are requisitioned and withdrawn following enterprise procedures 2.3 Condition and quantity of equipment, instruments and materials are ensured/ confirmed prior to maintenance work.
3. Discuss and plan maintenance work with team members	3.1 ***Work arrangements*** and ***safety precautions*** are discussed and confirmed with ***concerned personnel*** 3.2 Required forms are accomplished and filed following enterprise procedures. 3.3 ***Specific procedures*** for maintenance work are emphasized and confirmed with personnel concerned.

RANGE OF VARIABLES

VARIABLE	RANGE
1. work orders	Work orders include: 1.2 corrective maintenance 1.3 preventive maintenance
2. priority levels	2.1 priority 1 2.2 priority 2 2.3 priority 3
3. potential problems	May include: 3.1 illegal structures 3.2 right-of-way problems 3.3 security problems 3.4 sabotage/pilferage
4. Work arrangements	May include: 4.1 work assignments 4.2 scope of work activity 4.3 job hazards identification 4.4 coordination with control engineer or substation 4.5 coordination with other work teams and their team leaders 4.5 housekeeping / cleanup procedures
5. Safety precautions	5.1 use of PPE 5.2 installation of grounding cluster 5.3 use of tagging system 5.4
6. Concerned personnel	May include: 6.1 principal engineer 6.2 safety officer/engineer 6.3 control engineer 6.4 lineman 6.5 heavy equipment operator 6.6 driver-mechanic
7. Specific procedures	7.1 Cold-line procedures 7.2 Live-line procedures 7.2.1 Hot-stick method 7.2.2 Bare-hand method 7.3 Procedures for setting up emergency-restoration structures (ERS)

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Planned and scheduled maintenance work 1.2 Oriented team members on work assignments, responsibilities and safety procedures 1.3 Ensured optimal use of available personnel and resources 1.4 Ensured availability and good condition of equipment, instruments and materials
2. Underpinning Knowledge and Attitude	2.1 Standards and specifications for construction of overhead transmission lines structures 2.2 Quality-system policies and procedures for T/L maintenance 2.3 Transmission line hardware and accessories 2.4 Occupational health and safety standards 2.5 Uses and specifications of T/L tools and equipment 2.6 Emergency-restoration structures (ERS) 2.6.1 Parts and functions 2.6.2 Procedures for erecting ERS 2.7 Economic use of materials 2.8 Safe working habits/Safety procedures 2.9 Use of maintenance procedures manual 2.10 Cleaning of worksite, tools and equipment 2.11 Desirable work values and attitudes (cost conscious, safety conscious, quality conscious, etc.)
3. Underpinning Skills	3.1. Interpreting work orders 3.2. Planning and scheduling skills 3.3. Coaching skills 3.4. Working efficiently and systematically 3.5. Observing health and safety precautions 3.6. Verifying materials, tools and testing instruments 3.7. Communicating skills (both written and oral) 3.8. Preparing request forms for supplies/materials/tools and equipment
4. Resource Implications	The following resources should be provided: 4.1 Workplace location 4.2 Materials relevant to the activity (e.g. work orders)
5. Methods of Assessment	Competency in this unit may be assessed through: 5.1 Direct observation / Demonstration with oral questioning 5.2 Role playing/ Simulation 5.3 Portfolio 5.4 Third party report
6. Context for Assessment	6.1 Competency may be assessed in the workplace or in a simulated environment 6.2 Assessment shall be observed while the tasks are being undertaken either individually or as part of a team under limited supervision

UNIT OF COMPETENCY : IMPLEMENT TRANSMISSION-LINE MAINTENANCE WORK

UNIT CODE : UTL723218

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes in supervising/directing field work for corrective and preventive maintenance of overhead transmission lines.

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables
1. Prepare maintenance resources and job site	1.1 Hauling/***Transport*** of ***tools, equipment and materials/hardware*** to job site is arranged and coordinated with ***concerned personnel*** 1.2 Job site is prepared / excavated for maintenance work in accordance with work standards. 1.3 Tools, equipment and materials transported to job site are checked prior to maintenance work
2. Discuss work assignments with team members	2.1 Responsibilities of team members are discussed and confirmed in job site 2.2 Where necessary, ***arrangements*** are negotiated/ coordinated with ***third parties*** concerned. 2.3 Team members' queries and concerns are recognized, discussed and dealt with
3. Monitor/Supervise maintenance work	3.1 ***Safety procedures*** are stressed and enforced before, during and after actual work in job site 3.2 Guidance/Assistance is provided to new, inexperienced, stressed or uneasy transmission line workers to ensure work quality and safety 3.3 ***Deviations*** from planned work are documented and dealt with following enterprise procedures 3.4 Lifting and moving of heavy loads and components are coordinated and performed based on established procedures and using available resources on-site 3.5 Communication with base/office and substation is maintained to ensure quick response in case of problems or emergencies 3.6 ***Unexpected situations*** are responded to in accordance with enterprise procedures 3.7 Work completion is confirmed and reported to concerned personnel.
4. Clean up work site	4.1 Work site is cleared and kept in safe state in accordance with established housekeeping procedures. 4.2 Tools, equipment and unconsumed/unused materials are cleaned, checked and documented according to established enterprise procedures 4.3 Documentation related to maintenance work is completed and submitted in accordance with enterprise procedures

RANGE OF VARIABLES

VARIABLE	RANGE
1. Transportation method	1.1 By land 1.1.1 Using motor vehicles 1.1.2 Using animal-drawn vehicles 1.2 By air (helicopter) 1.3 By manual hauling
2. tools, equipment and materials	May include but are not limited to: 2.1 Tools 2.1.1 Pliers 2.1.2 Screwdrivers 2.1.3 Adjustable wrenches 2.1.4 Ball-peen hammer 2.1.5 Auger bit 2.1.6 Hacksaw/cutting tools 2.1.7 Hot-line tools 2.1.7.1 Fiber glass stick 2.1.7.2 Fiber glass extendible ladder 2.1.7.3 Fiber glass work platform 2.2 Equipment 2.1.1 Ratchet hoist 2.1.2 Capstan/Hand winch 2.1.3 Block and tackle 2.1.4 Compression machine 2.1.5 Snatch block 2.1.6 Climbing gears 2.1.7 Hydraulic cutter 2.1.8 Wire grip 2.1.9 Connecting tool (wedge connector) 2.1.10 Dynamometer/Tension meter 2.1.11 Leakage-current monitoring kit 2.1.12 Line truck/Boom truck 2.1.13 Personal Protective equipment (PPE) 2.1.13.1 Conductive suit 2.1.13.2 Hard hat 2.1.13.3 Safety shoes 2.1.13.4 Safety goggles 2.1.13.5 Working clothes 2.1.13.6 Safety gloves 2.2 Hardware 2.2.1 Insulator 2.2.2 Machine bolts 2.2.3 Suspension clamps 2.2.4 Strain clamp 2.2.5 Overhead ground wires 2.2.6 Cross-arms and braces 2.2.7 Conductors and accessories 2.2.8 Tower parts

3 concerned personnel	May include: 3.1 principal engineer 3.2 safety officer/engineer 3.3 lineman 3.4 property custodian 3.5 heavy equipment operator 3.6 driver-mechanic
4 Work arrangements	May include: 4.1 Date and time of maintenance work 4.2 work assignments 4.3 scope of work activity 4.4 job hazards identification 4.5 hotline/coldline tagging 4.6 coordination with control engineer or substation 4.7 housekeeping / cleanup procedures
5 Third parties	5.1 residents in the area 5.2 local officials 5.3 control engineer or substation personnel 5.4 other work teams
6 safety procedures	Includes procedures for -- 6.1 Cold-line maintenance safety procedures 6.2 Live-line maintenance safety procedures 6.3 Lifting procedures 6.4 Installation/use of rigging equipment 6.5 Hand signaling 6.6 Installation of ERS
7 Deviations	May include: 7.1 unexpected absence of manpower 7.2 bad weather condition 7.3 sudden equipment failure 7.4 damaged materials or hardware
8 Unexpected situations	May include: 8.1 bad weather condition 8.2 accidents 8.3 sudden worker sickness, uneasiness or stress 8.4 human error 8.5 sudden equipment failure 8.6 sudden line tripping

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Ensured availability of tools, equipment and materials in job site 1.2 Prepared job site for maintenance work 1.3 Discussed/Clarified work assignments to team members 1.4 Enforced safety procedures during maintenance work 1.5 Responded to deviations and unexpected situations 1.6 Enforced housekeeping 1.7 Documented and notified completion of maintenance work
2. Underpinning Knowledge and Attitude	2.1 Standards and specifications for construction of overhead transmission lines structures 2.2 Quality-system policies and procedures for T/L maintenance 2.3 Transmission line hardware and accessories 2.4 Occupational health and safety standards 2.5 Uses and specifications of T/L tools & equipment 2.6 Installation/Use of rigging equipment 2.7 Hand signaling 2.8 Knot tying and splicing procedures for ropes 2.9 Conductor splicing and jointing procedures 2.10 Economic use of materials 2.11 First-aid procedures 2.12 Fire-prevention and fire-fighting procedures 2.13 Safe working habits/Safety procedures 2.14 Use of maintenance procedures manual 2.15 Cleaning of worksite, tools and equipment 2.16 Effective communication 2.17 Desirable work values and attitudes (cost conscious, safety conscious, quality conscious, etc.)
3. Underpinning Skills	3.1. Interpreting work orders 3.2. Planning and scheduling skills 3.3. Supervisory/coordination skills 3.4. Coaching skills 3.5. Working efficiently and systematically 3.6. Observing health and safety precautions 3.7. Using rigging equipment 3.8. Rope knot tying and splicing skills 3.9. Conductor splicing and jointing skills 3.10. First-aid skills 3.11. Fire-prevention and fire-fighting skills 3.12. Verifying materials, tools and testing instruments 3.13. Communicating skills (both written and oral) 3.14. Hand signaling skills 3.15. Preparing request forms for supplies/materials/tools and equipment
4. Resource Implications	The following resources should be provided: 4.1 Workplace location 4.2 Tools and equipment appropriate to maintenance work 4.3 Materials/Hardware relevant to the proposed activity 4.4 Work order and other documents relevant to the task 4.5 Safety/First-aid manuals

5. Methods of Assessment	Competency in this unit may be assessed through: 5.1 Direct observation/Demonstration with oral questioning 5.2 Role-playing/Simulation 5.3 Written test or examination 5.4 Third-party report 5.5 Portfolio
6. Context for Assessment	6.1 Competency may be assessed in the workplace or in a simulated workplace setting 6.2 Assessment shall be observed while the tasks are being undertaken either individually or as part of a team under limited supervision

UNIT OF COMPETENCY : **INSPECT/ASSESS TRANSMISSION LINE COMPONENTS' CONDITION**

UNIT CODE : **UTL723219**

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes in inspecting or assessing transmission line (T/L) components and its conditions.

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables
1. Prepare and schedule conduct of inspection/ assessment	1.1 Schedule of revalidation or assessment of T/L is coordinated with concerned personnel. 1.2 Work team is oriented on the scheduled work to be done. 1.3 ***Tools, equipment and instruments*** required for assessment are identified and acquired. 1.4 T/L manual of specifications and standards are accessed and obtained prior to assessment / inspection
2. Assess the worksite and T/L components	2.1 Area is accessed and surveyed in accordance with established procedures 2.2 Where necessary, pole or tower structure is climbed/ascended following safety procedures 2.3 ***Condition of pole or tower structure*** is assessed and confirmed based on T/L standards 2.4 ***Condition*** of ***T/L components*** are assessed through visual, sensory and instrument ***methods***. 2.5 Aerial inspection is conducted for emergency cases following established procedures. 2.6 ***Safety procedures*** are observed and followed during assessment / inspection.
3. Document findings and recommendations	3.1 ***Findings and observations*** are documented following established procedures and T/L standards 3.2 ***Recommendations*** for corrective/preventive maintenance are prepared based on the findings of the assessment.

RANGE OF VARIABLES

VARIABLE	RANGE
1. tools, equipment and materials	May include: 1.1 Tools 2.1.1 Screwdrivers 2.1.2 Adjustable wrenches 2.1.3 Ballpeen hammer 2.1.4 Auger bit 2.2 Equipment 2.2.1 Climbing gears 2.2.1.1 Safety harness 2.2.1.2 Vertical/Horizontal lifeline 2.2.2 Personal protective equipment 2.2.2.1 Hard hat 2.2.2.2 Safety goggles 2.2.2.3 Safety shoes 2.2.2.4 Working clothes 2.2.2.5 Safety gloves 2.2.3 Line truck/Boom truck 2.3 Instrument 2.3.1 Measuring instrument 2.3.1.1 Tele-height meter 2.3.1.2 Steel tape 2.3.2 Thermal scanner 2.3.3 Telescope
2. Condition of pole or tower structure	Condition of pole or tower structure may include: 2.1 Tower structure 2.1.1 corroded tower parts 2.1.2 loose/bent tower parts 2.1.3 eroded foundation 2.2 Pole 2.2.1 rotten pole top 2.2.2 leaning pole 2.2.3 eroded foundation 2.2.4 splitting 2.2.5 effects of lightning 2.2.6 splitting or pulling of guys 2.2.7 twisting or raking 2.2.8 knotshole or birdshole 2.2.9 presence of insects 2.2.10 burned pole 2.2.11 termite infested pole 2.2.12 excessive cracks 2.2.13 corroded pole

3. Condition of T/L components	May include: 3.1 Support structures (see ROV #2) 3.2 Crossarms and X'braces 3.2.1 Rotten crossarm 3.2.2 Splitting or twisting 3.2.3 Loose, broken, or missing nuts and braces 3.2.4 Presence of insects 3.3 Insulators 3.3.1 Disc type 3.3.1.1 Corroded pin shank 3.3.1.2 Flashover 3.3.1.3 Broken insulator 3.3.1.4 Molds/moss or algae 3.3.1.5 Corona effect 3.3.2 Synthetic 3.3.2.1 Broken rubber petticoat at hot end part 3.3.2.2 Burned rubber petticoat at hot end part 3.3.2.3 Corona effect 3.4 Conductors 3.4.1 cut strand 3.4.2 loosed conductor 3.4.3 loosed vibration damper spacer 3.4.4 low clearance (line to ground) for 69KV 3.4.5 melted conductor at connector 3.4.6 vegetation clearance 3.4.7 too much vibration effect and corona tracking 3.5 Other fittings and HDG steel components 3.5.1 Corroded bolts and nuts/steel pin 3.5.2 Loose cotter key 3.5.3 Dislocated steel pin 3.5.4 Missing cotter key 3.6 Ground wires and connectors 3.6.1 Corroded OHGW 3.6.2 Corroded/detached connector at jumper loop 3.6.3 Corroded/ cut ground lead 3.6.4 Detached connector on ground lead and OHGW 3.7 Guy wires 3.7.1 Rotten anchor rod 3.7.2 Corroded anchor rod/lead 3.7.3 Cut-off lead

4. Transmission line components	May include: 4.1 Support structures 4.1.1 Poles 4.1.1.1 Wooden 4.1.1.2 Steel 4.1.1.3 Concrete 4.1.2 Towers 4.1.2.1 Rigid 4.1.2.2 Flexible 4.2 Crossarms and X'braces 4.3 Insulators 4.3.1 Disc type 4.3.2 synthetic 4.4 Conductors 4.5 Other fittings and HDG steel components 4.6 Ground wires and connectors 4.7 Guy wires
5. Methods	5.1 visual inspection 5.2 sounding method 5.3 use of instruments 5.3.1 thermal scanner 5.3.2 tele-height meter 4.3.3 Binoculars 4.3.4 Steel tape
6. Safety procedures	Safety procedure for: 6.1 Live-line work 6.2 Pole and tower-climbing
7. Findings and observations	May include: 7.1 Defective/Damaged T/L components 7.2 Defective/Damaged pole/tower structures 7.3 Right-of-way problems 7.3.1 Illegal structures 7.3.2 Vegetations and other obstructions 7.4 Serviceability of T/L components
8. Recommendations	May include: 8.1 Retirement/replacement of poles 8.2 Repair of steel tower parts 8.3 Replacement/Adjustment of T/L components 8.4 Removal of obstructions and illegal structures 8.5 Deferment or postponement of maintenance work 8.6 Installation of danger signs 8.7 Resolution of right-of-way problems

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Prepared and arranged the inspection/assessment activity 1.2 Accessed and surveyed the target area 1.3 Identified and validated defects and problems in T/L structures and components 1.4 Documented inspection/assessment results and recommendations
2. Underpinning Knowledge and Attitude	2.1 Transmission line inspection/assessment standards for T/L components 2.2 Standards and specifications for construction of overhead transmission lines structures 2.3 Quality-system policies and procedures for T/L maintenance 2.4 Transmission line hardware and accessories 2.5 Occupational health and safety standards 2.6 Uses and specifications of T/L tools and equipment 2.7 Safe working habits/Safety procedures 2.8 Use of T/L manual of specifications and standards 2.9 Calculation and mensuration 2.10 Effective communication 2.11 Desirable work values and attitudes (cost conscious, safety conscious, quality conscious, etc.)
3. Underpinning Skills	3.1. Interpreting work orders 3.2. Planning and scheduling skills 3.3. Working efficiently and systematically 3.4. Observing health and safety precautions 3.5. First-aid skills 3.6. Communication and negotiation skills (both written and oral) 3.7. Using measuring instruments 3.8. Calculation and mensuration skills
4. Resource Implications	The following resources should be provided: 4.1 Workplace location 4.2 Tools, equipment and instruments appropriate to inspection/ assessment of T/L structures and components 4.3 Materials relevant to the proposed activity 4.4 Manuals and documents relevant to the task
5. Methods of Assessment	Competency in this unit must be assessed: 5.1 Direct observation/Demonstration with oral questioning 5.2 Written report 5.3 Third party report 5.4 Portfolio
6. Context for Assessment	6.1 Competency may be assessed in the workplace or in a simulated workplace setting 6.2 Assessment shall be observed while the tasks are being undertaken either individually or as part of a team under limited supervision

SECTION 3 TRAINING STANDARDS

These guidelines 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 Transmission Line Installation and Maintenance NC III.

3.1 CURRICULUM DESIGN

Course Title: TRANSMISSION LINE INSTALLATION AND MAINTENANCE NC III

Nominal Training Duration: **30 Hours (Basic)**
60 Hours (Common)
120 Hours (Core)

210 Hours

Course Description:

This course is designed to equip individuals with the basic and common competencies in Utilities sector for Transmission Line Installation and Maintenance NC III level.

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

BASIC COMPETENCIES
(30 hours)

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
1. Lead workplace communication	1.1 Communicate information about workplace processes. 1.2 Lead workplace discussions. 1.3 Identify and communicate issues arising in the workplace	• Group discussion • Role Play • Brainstorming	• Observation • Interviews
2. Lead small teams	2.1 Provide team leadership. 2.2 Assign responsibilities among members. 2.3 Set performance expectation for team members. 2.4 Supervise team performance	• Lecture • Demonstration • Self-paced (modular)	• Demonstration • Case studies

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
3. Develop and practice negotiation skills	3.1 Identify relevant information in planning negotiations 3.2 Participate in negotiations 3.3 Document areas for agreement	• Direct observation • Simulation/role playing • Case studies	• Written test • Practical/ performance test
4. Solve workplace problem related to work activities	4.1 Explain the analytical techniques. 4.2 Identify the problem. 4.3 Determine the possible cause/s of the problem.	• Direct observation • Simulation/role playing • Case studies	• Written test • Practical/ performance test
5. Use mathematical concepts and techniques	5.1 Identify mathematical tools and techniques to solve problem 5.2 Apply mathematical procedures/solution 5.3 Analyze results	• Direct observation • Simulation/role playing • Case studies	• Written test • Practical/ performance test
6. Use relevant technologies	6.1 Identify appropriate technology 6.2 Apply relevant technology 6.3 Maintain/enhance relevant technology	• Direct observation • Simulation/role playing • Case studies	• Written test • Practical/ performance test

COMMON COMPETENCIES

(60 hours)

SECTOR : UTILITIES

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
1. Apply Quality Standards	1.1 Check materials and replace faulty ones in accordance with workplace standards and requirements 1.2 Carry out work assignments in accordance with standard operating procedures 1.3 Check completed work against standards and specifications 1.4 Document and prepare a report on deviations from specific quality standards	▪ Lecture ▪ Discussion ▪ Demonstration ▪ Viewing multimedia ▪ Hands on practice	▪ Observation in workplace ▪ Demonstration ▪ Oral questioning ▪ Third Party Report

3.1 Comply with environmental protection procedures	2.1 Access information concerning environmental protection regulations and procedures 2.2 Implement and monitor procedures concerning environmental hazards 2.3 Implement and monitor environmental control procedures	▪ Lecture ▪ Discussion ▪ Demonstration ▪ Viewing multimedia ▪ Hands on practice ▪	▪ Observation in workplace ▪ Demonstration ▪ Oral questioning ▪ Third Party Report ▪
2. Observe procedures, Specifications and Manuals of Instructions	3.2 Identify and access specification/ manuals 3.3 Interpret and apply information in manuals	▪ Lecture ▪ Discussion ▪ Demonstration ▪ Viewing multimedia ▪ Hands on practice	▪ Observation in workplace ▪ Demonstration ▪ Oral questioning ▪ Third Party Report
3. Maintain and operate transmission line tools and equipment	4.1 Plan and prepare for work to operate and maintain T/L tools and equipment 4.2 Prepare T/L hardware, tools and equipment for operation and maintenance 4.3 Operate T/L tools and equipment 4.4 Check condition of T/L tools and equipment 4.5 Perform basic preventive maintenance 4.6 Store tools and equipment	▪ Lecture ▪ Discussion ▪ Demonstration ▪ Viewing multimedia ▪ Hands on practice	▪ Observation in workplace ▪ Demonstration ▪ Oral questioning ▪ Third Party Report
4. Operate a Personal Computer	5.1 Plan and prepare for task to be undertaken 5.2 Input data into computer 5.3 Access information using computer 5.4 Produce output/data using computer system 5.5 Use basic functions of a web browser to locate information 5.6 Maintain computer equipment and systems	• Modular • Film showing • Computer based training (e-learning) • Project method • On the job training	• Demonstration & questioning • Observation & questioning • Third party report • Assessment of output product • Portfolio • Computer- based assessment

CORE COMPETENCIES

Course Title: TRANSMISSION LINE INSTALLATION AND MAINTENANCE NC III

Nominal Training Duration: 120 Hours

Course Description:

This course is designed to equip individual with operational skills in transmission line installation and maintenance to be able to plan and implement transmission line maintenance works as well as to inspect/assess transmission line components' conditions.

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

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
1. Plan transmission line maintenance job	1.1 Analyze work order for maintenance 1.2 Identify and request materials, tools and equipment 1.3 Inspect equipment, instruments and materials 1.4 Discuss and plan maintenance work	-Lecture / Discussion -Audio Visual -Demonstration -Case problems	-Direct observation -Questions or interview -Portfolio (credentials) -Written Test -Case problem solving
2. Implement transmission line maintenance work	2.1 Prepare maintenance resources and job site 2.2 Discuss work assignments with team members 2.3 Supervise transmission line maintenance work 2.4 Follow occupational health and safety standards 2.5 Document completion of maintenance work	-Audio Visual -Lecture/ Discussion -Practical exercises/Field work -Demonstration	-Direct observation -Oral questioning -Written test or examination -Demonstration -Case problem solving

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
3. Inspect/Assess transmission line components' conditions	3.1 Plan and prepare inspection/ assessment activities 3.2 Assess the worksite and transmission line components 3.3 Follow occupational health and safety standards 3.4 Document findings and recommendations	-Audio Visual -Lecture/ Discussion -Demonstration/ Field work	-Direct observation of application of tasks. -Oral questioning -Written test or examination -Demonstration

3.2 TRAINING DELIVERY

The delivery of training should adhere to the design of the curriculum. Delivery shall be guided by the 10 basic principles of competency-based TVET:

- The training is based on curriculum developed from the competency standards;
- Learning is modular in its structure;
- Training delivery is learner-centered and should accommodate individualized and self-paced learning strategies;
- Training is based on work that must be performed;
- Training materials are directly related to the competency standards and the curriculum modules;
- Assessment is based on the collection of evidence of the performance of work to the industry required standard;
- Training is based both on and off-the-job components;
- Training program allows for recognition of prior learning (RPL) or current competencies;
- Training allows for multiple entry and exit; and
- Training programs are registered with the UTPRAS.

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 may be adopted when designing training programs:

- The dualized mode of training delivery is preferred and recommended. Thus programs would contain both in-school and in-industry training or fieldwork components. Details can be referred to the Dual Training System (DTS) Implementing Rules and Regulations.

- Modular/self-paced is a competency-based training modality wherein the trainee is allowed to progress at his/her own pace. The trainer only facilitates the training delivery.

- Peer teaching/mentoring is a training modality wherein fast learners are given the opportunity to assist the slow learners.

- Supervised Industry Training or On-the-Job Training is an approach in training designed to enhance the knowledge and skills of the trainee through actual experience in the workplace to acquire specific competencies prescribed in the training regulations.

- 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, or audio, video or computer technologies.

- Project-based instruction is an authentic instructional model or strategy in which students plan, implement and evaluate projects that have real world applications.

3.3 TRAINEE ENTRY REQUIREMENTS

To qualify as trainee for Transmission Line Installation and Maintenance NC III, a candidate must be:

- at least a holder of Transmission Line Installation and Maintenance NC II or its equivalent
- at least 5-yrs of relevant or equivalent experience in T/L installation and maintenance
- of good moral character
- able to communicate; and
- physically and mentally fit

3.4 LIST OF TOOLS, EQUIPMENT AND MATERIALS

TRANSMISSION LINE INSTALLATION AND MAINTENANCE NC III

Recommended list of tools, equipment and materials for the training of 20 trainees for Transmission Line Installation and Maintenance NC III are as follows:

TOOLS		EQUIPMENT		HARDWARE	
QTY	**ITEM**	**QTY**	**ITEM**	**QTY**	**ITEM**
20	Pliers	2	Ratchet hoist		Insulator
20	Ballpeen hammers	2	Capstan/Hand winch		Machine bolts
20	Screwdrivers	2	Block and tackle		Suspension clamps
20	Hacksaw	2	Compression machine		Strain clamp
20	Adjustable wrenches	2	Snatch block		Overhead ground wires
20	Auger bit	20	Climbing gears set		Cross-arms and braces
20	Cutting tools	5	Dynamometer/ Tension meter		*Conductors and accessories*
	Hotline tools	20	Wire grip		*Tower parts*
1	- Fiber glass stick	5	Hydraulic cutter		
1	- Fiber glass extension ladder	1	Leakage-current monitoring kit		
1	- Fiber glass work platform	1	Line truck		
		1	Boom truck		
		1	Connecting tool (wedge connector)		
			PPE		
INSTRUMENTS		20	Hard hat	**MATERIALS**	
5	Tele-height meter	20	Safety shoes		
20	Steel tape	20	Safety goggles		
5	Thermal scanner	20	Conductive suit		
5	telescope	20	Safety gloves		
		1	First-aid kit set		

3.5 TRAINING FACILITIES

TRANSMISSION LINE INSTALLATION AND MAINTENANCE NC III

Based on a class intake of 20students/trainees, below are the space requirement & their sizes:

Space Requirement	Size in Meters	Area in Sq. Meters	Total Area in Sq. Meters
1. Student/Trainee Working Space	2.50 x 2.50 per student/trainee	6.25 per student	156.25
2. Contextual Learning Laboratory / Lecture Room	4 x 5	20	20
3. Learning Resource Center	4 x 5	20	20
4. Facilities/Equipment/ Circulation area	10 x 6	60	60
TOTAL AREA			**256.25**

3.6 TRAINER'S QUALIFICATIONS FOR UTILITIES SECTOR

TRANSMISSION LINE INSTALLATION AND MAINTENANCE NC III
TRAINER QUALIFICATION III (TQ III)

- Must be a holder of Transmission Line Installation and Maintenance NC III or equivalent
- Must have completed Training Methodology Course III (TM III) or equivalent training/experience
- Must be computer literate
- Must be physically and mentally fit
- * Minimum of three (3) years relevant job/industry experience

*Optional. Only when required by the hiring institution
Reference: TESDA Board Resolution No. 2004-03

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.

SECTION 4 NATIONAL ASSESSMENT AND CERTIFICATION ARRANGEMENTS

4.1. To attain the National Qualification of Transmission Line Installation and Maintenance NC III, the candidate must demonstrate competence all the units listed in Section 1. Successful candidates shall be awarded a National Certificate signed by the TESDA Director General.

4.2. The qualification of Transmission Line Installation and Maintenance NC III may be attained through demonstration of competence through a single project-type assessment covering all required units of competency of the qualification.

4.3. Assessment shall focus on the core units of competency. The basic and common units shall be integrated or assessed concurrently with the core units.

4.4. The following are qualified to apply for assessment and certification:

4.3.1 Graduates of formal, non-formal and informal including enterprise-based training programs

4.3.2. Experienced Workers (wage-employed or self-employed)

4.5. The guidelines on assessment and certification are discussed in detail in the “Procedures Manual on Assessment and Certification” and “Guidelines on the Implementation of the Philippine TVET Qualification and Certification System (PTQCS)”.

ANNEX A

TRANSMISSION LINE INSTALLATION & MAINTENANCE NC III COMPETENCY MAP

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 Working Teams**	**Develop and Practice Negotiating Skills With Team Members**	**Guide Effective Solutions to Problems Arising from Work Activities**	**Check and Develop the Use of Mathematical Concepts & Techniques**	**Use Relevant Technologies Applicable to Assigned Work**
Lead in Utilizing Specialized Communication Skills	Assist in Developing Team and Individuals	Apply Problem Solving Techniques in the Workplace	Collect, analyze and organize information	Plan and Organize Work for Several Working Teams	Promote Environmental Protection	

COMMON COMPETENCIES

Apply quality standards	**Comply with environmental protection procedures**	**Observe procedures, specifications and manual of instruction**	**Operate and Maintain T/L tools and equipment**	**Perform computer operation**

CORE COMPETENCIES

Tender Diesel Engine	Operate Diesel Power plant	Maintain and Repair Diesel Engine Systems and Alternator	Service Alternator/ Generator	Diagnose and Repair Diesel Engine	Diagnose and Repair Electrical System
Overhaul Diesel Engine	Perform transmission line pole erection	Perform overhead transmission line work	Perform cold-line maintenance work	Perform live-line maintenance work	Perform ground line maintenance work
Install emergency restoration structure (ERS)	**Plan transmission line maintenance job**	**Implement transmission line maintenance works**	**Inspect/Assess transmission line components' conditions**		

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 judgments 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) **Qualification** - is a cluster of units of competencies that meets job roles and is 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 serves 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

23) **Underpinning Knowledge -** refers to the competency that involves in applying knowledge to perform work activities. It includes specific knowledge that is essential to the performance of the competency

24) **Underpinning Skills** - refers to the list of the skills needed to achieve the elements and performance criteria in the unit of competency. It includes generic and industry specific skills

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

SPECIFIC

1. **ACSR** - abbreviation of Aluminum Cable Steel Reinforced, a cable type having aluminum strands and a core of one or more steel strands. ACSR are primarily used for medium and high voltage lines and may also be used for overhead services to individual customers.

2. **Aerial Cable- i**nsulated cable usually supported by a bare cable, for power transmission above ground.

3. **Air Gap -** the shortest air space between two contacts exposed above an insulating barrier.

4. **Armor Rod** - an outer metal layer applied to a cable for mechanical protection. Armor rods are comprised of factory formed wire, designed to be applied to a range of conductor sizes

5. **Armor Rod (preformed) -** a spiral-formed aluminum rod, a group of which is placed around a conductor at the point of suspension to minimize vibration and to protect the conductor from burning in case of a flashover.

6. **Block and tackle** - an apparatus of pulley blocks and ropes or cables used for hauling and hoisting heavy objects.

7. **Conductor** - 1) a wire or combination of wires suitable for carrying an electrical current. Conductors may be insulated or bare. 2) any material that allows electrons to flow through it.

8. **Damper** - a device used to inhibit the vibration of conductors on a transmission line.

9. **Groundman** - a person working at ground level in support of a lineman working aloft.

10. **Guy** - a rope, cord, or cable used to steady, guide, or secure something.

11. **Guy-wire or guy-rope** -is a tensioned cable designed to add stability to structures (frequently ship masts, radio masts, wind turbines, utility poles, and tents). One end of the cable is attached to the structure, and the other is anchored to the ground at a distance from the structure's base.

12. **Guy Strain Insulator** - an insulator, normally porcelain, used to electrically isolate one part of a down guy from another. Guy Strain Insulators are made of porcelain products.

13. **Hazard** - a dangerous condition, potential or inherent, that can bring about an interruption or interfere with the expected orderly progress of an activity.

14. **Hazardous** - an atmosphere that may expose employees to the risk of death, atmosphere incapacitation, impaired ability to self-rescue unaided, injury, or acute illness.

15. **Hazardous atmospheres** - include flammable gas, vapor, or mist, airborne combustible dust, oxygen concentration below 19.5 percent or above 23.5 percent, concentrations of substances that exceed dose or permissible exposure limits, or other atmospheric condition immediately dangerous to life or health.

16. **Hot Line Order** - a statement with documentation from the Operations Supervisor to the Job Supervisor that specific work may be done on or near a line or other equipment without requiring that it be disconnected from all sources of energy. The equipment is to be considered energized or "hot."

17. **Hotstick** - an insulated stick, usually made of fiberglass, that is used to work energized overhead conductors and operate electrical equipment that is overhead, underground and pad mounted.

18. **Insulator** - a device that is used to electrically isolate a conductor or electrical device from ground or a different electrical potential. Insulators must support the conductors and withstand both the normal operating voltage and surges due to switching and lightning. Insulators are broadly classified as either pin-type, which support the conductor above the structure, or suspension type, where the conductor hangs below the structure. Up to about 33 kV (69 kV in North America) both types are commonly used. At higher voltages only suspension-type insulators are common for overhead conductors. Insulators are usually made of wet-process porcelain or toughened glass, with increasing use of glass-reinforced polymer insulators.

19. **Lineman** - a payroll classification or title given a craftsperson whose duties include climbing wood poles or steel structures to perform work on electric power transmission and distribution circuits.

20. **Overhead power line -** is an electric power transmission line suspended by towers or poles. Since most of the insulation is provided by air, overhead power lines are generally the lowest-cost method of transmission for large quantities of electric power. Towers for support of the lines are made of wood (as-grown or laminated), steel (either lattice structures or tubular poles), concrete, aluminum, and occasionally reinforced plastics. The bare wire conductors on the line are generally made of aluminum (either plain or reinforced with steel or sometimes composite materials), though some copper wires are used in medium-voltage distribution and low-voltage connections to customer premises.

21. **Personal Protective Equipment (PPE) -** the term shall include, but is not limited to, devices designed to be worn by workers for eye, face, head, respiratory, hand, arm, body, leg, foot, and fall protection.

22. **Tag Line** - A rope used to control the position of equipment being lifted. This is not to be confused with the rope used to actually lift the equipment.

23. **Transmission line** - is the material medium or structure that forms all or part of a path from one place to another for directing the transmission of energy, such as electromagnetic waves or acoustic waves, as well as electric power transmission.

Components of transmission lines include wires, coaxial cables, dielectric slabs, optical fibers, electric power lines, and waveguides.

24. **Low voltage** – less than 1000 volts, used for connection between a residential or small commercial customer and the utility.

25. **Medium Voltage** (Distribution) – between 1000 volts (1 kV) and to about 33 kV, used for distribution in urban and rural areas.

26. **High Voltage** (Sub-transmission if 33-115kV and transmission if 115kV+) – between 33 kV and about 230 kV, used for sub-transmission and transmission of bulk quantities of electric power and connection to very large consumers.

27. **Extra High Voltage** (Transmission) – over 230 kV, up to about 800 kV, used for long distance, very high power transmission.

28. **Ultra High Voltage** – higher than 800 kV.

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