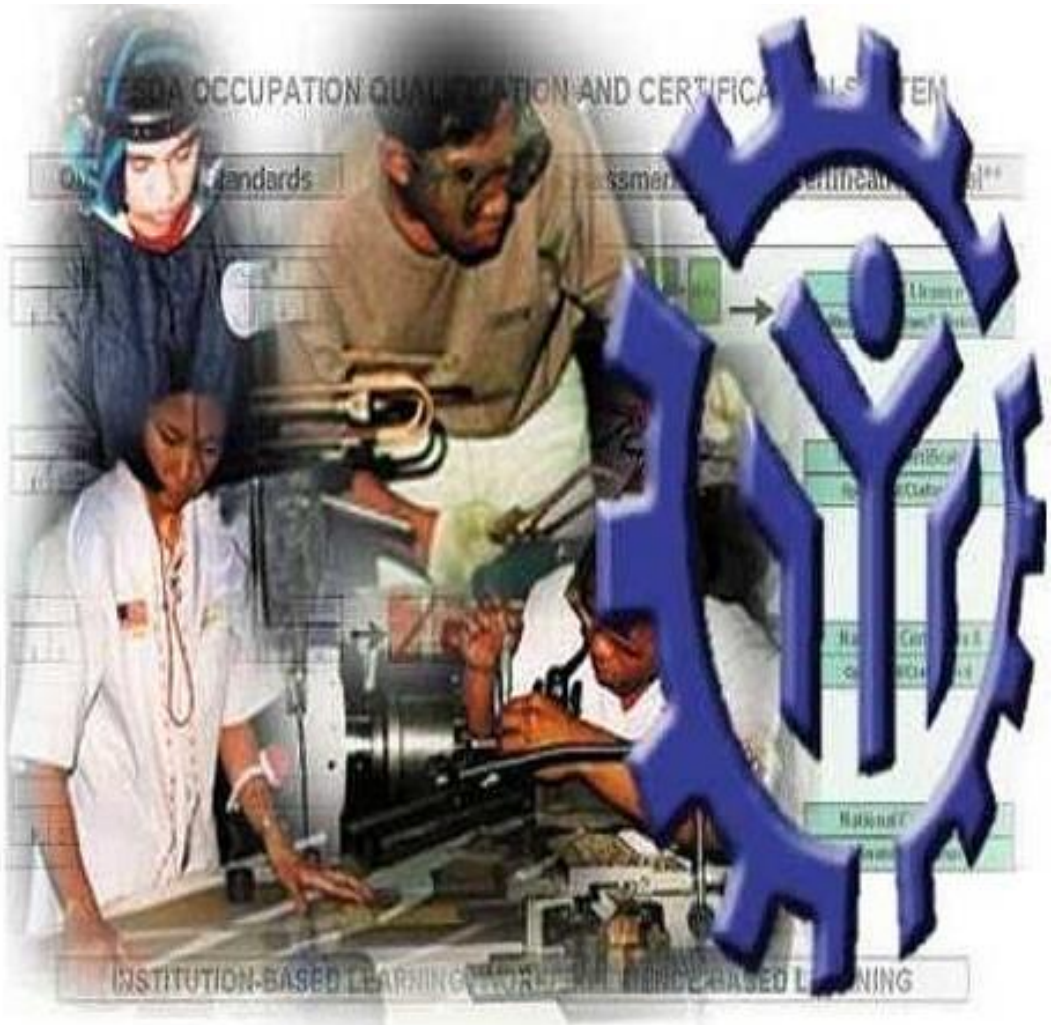
TRAINING REGULATIONS



ELECTRIC POWER DISTRIBUTION OPERATION AND MAINTENANCE NC III

UTILITIES 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 skill 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 Development of curriculum and assessment tools;
2 Registration and delivery of training programs; and
3 Establishment of competency assessment and certification arrangements;

Each TR has four sections:

Section 1 Definition of Qualification - refers to the group of competencies that describes the different functions of the qualification.

Section 2 Competency Standards - gives the specifications of competencies required for effective work performance.

Section 3 Training Arrangements - contains information and requirements in designing training program for certain Qualification. It includes curriculum design, training delivery; trainee entry requirements; tools and requirements; tools and equipment; training facilities and trainer's qualification.

Section 4 Assessment and Certification Arrangements - describes the policies governing assessment and certification procedure

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UTILITIES SECTOR

ELECTRIC POWER DISTRIBUTION OPERATION AND MAINTENANCE NATIONAL CERTIFICATE LEVEL III

TRAINING REGULATIONS FOR
ELECTRIC POWER DISTRIBUTION OPERATION AND MAINTENANCE NC III

SECTION 1: ELECTRIC POWER DISTRIBUTION OPERATION AND MAINTENANCE NC III QUALIFICATIONS

The **Electric Power Distribution Operation 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 line worker in the operation and maintenance of electric power distribution line, structures, equipment and accessories.

Specifically, this Training Regulations in Electric Power Distribution Operation and Maintenance NC III involves competencies in replacing electric distribution pole, pole top assemblies and conductors, installing or replacing single-, three- or vee-phase distribution line equipment and accessories, as well as installing or replacing single-, three- or vee-phase consumer service connection facilities and conducting vegetation clearing along distribution system.

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

The units of competency comprising this qualification include the following:

Code	BASIC COMPETENCIES
5 00 311 1 09	Lead workplace communication
5 00 311 1 10	Lead small teams
5 00 311 1 11	Develop and practice negotiation skills
5 00 311 1 12	Solve problems related to work activities
5 00 311 1 13	Use mathematical concepts and techniques
5 00 311 1 14	Use relevant technologies
5 00 311 1 42	Apply critical thinking and problem solving techniques in the workplace
5 00 311 1 45	Work in a diverse environment

Code	COMMON COMPETENCIES
UTL311203	Apply quality standards
UTL311206	Comply with environmental protection procedures
UTL311201	Observe procedures, specifications and manuals of instruction
UTL311205	Operate and maintain line tools and equipment
UTL311207	Perform Computer Operations

Code	CORE COMPETENCIES
UTL741316	Replace electric distribution pole, pole top assembly and conductors
UTL741317	Install/Replace single-, three-, or vee-phase distribution line equipment and accessories
UTL741318	Install/Replace single-, three-, or vee-phase consumer service connection facility
UTL741319	Conduct vegetation clearing along distribution system

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

- Maintenance line worker

SECTION 2: COMPETENCY STANDARDS

This section gives the details of the contents of the basic, common, and core units of competency required for Electric Power Distribution Operation and Maintenance 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
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 are 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 3.1.1. Workplace hazards 3.1.2. Environmental hazards 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 3.5. Reporting occupational & environmental hazards during safety meeting

RANGE OF VARIABLES

VARIABLE	RANGE
1. Methods of communication	Methods of communication may include: 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 **MUST** be provided: 2.1. Variety of Information 2.2. Communication tools 2.3. Simulated workplace
3. Methods of Assessment	Competency 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

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 3.2. Definition of team goals and expectations	3.1. Identifying performance indicators 3.2. Evaluating performance 3.3. Setting individual

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 members duties and area of responsibility 3.3. Performance expectations are discussed and disseminated to individual team members	3.3. Methods of monitoring performance 3.4. Client expectations 3.5. Team members duties and responsibilities 3.6. Defining performance expectations criteria	performance target/ expectation indicators
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	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 **MUST** 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 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 ***nonverbal 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	2.1 Outcome of negotiation 2.2 Knowledge on Language 2.3 Different Questioning techniques 2.4 Problem solving strategies on how to deal with unexpected questions and attitudes during negotiation	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 nonverbal 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. Nonverbal 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 **MUST** be provided: 2.1. Room with facilities necessary for the negotiation process 2.2. Human resources (negotiators)
3. Methods of Assessment	Competency 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 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, OHS 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 1.9. Identifying and clarifying the nature of problem	1.1. Using range of formal problem solving techniques 1.2. Identifying and clarifying the nature of the problem 1.3. Evaluating the effectiveness of a present process in the workplace 1.4. Applying analytical techniques
2. Determine fundamental	2.1 Possible causes are identified based on experience and the use	2.1 Relevant equipment and operational processes	2.1 Analysis of root causes

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
causes of the problem	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	2.2 Enterprise goals, targets and measures 2.3 Enterprise quality, OHS and environmental requirements 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 recommendation/s to manager	4.1 Report on recommendations is prepared according to procedures. 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 recommendations

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. Scatter grams
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 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 the application of mathematical concepts and techniques.

ELEMENT	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 is 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. Result of application is 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	3.1. Analyzing the result based on the specified requirements 3.2. Interpreting and communicating the results of the analysis

ELEMENT	PERFORMANCE CRITERIA *Italicized* terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		problem 3.6. Standard formulas 3.7. Conversion measurement	

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. Resource Implications	The following resources **MUST** be provided: 2.1. Calculator 2.2. Basic measuring tools 2.3. Case Problems
3. Methods of Assessment	Competency 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

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 Communication techniques 1.3 Health and safety procedure 1.4 Company policy in relation to relevant technology 1.5 Machineries/ equipment and their application 1.6 Software programs	1.1 Identifying relevant technology on job
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	2.1 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 3.2 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***	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 preventive maintenance

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. Resource Implications	The following resources **MUST** be provided: 2.1 Relevant technology 2.2 Interview and demonstration questionnaires 2.3 Assessment packages
3. Methods of Assessment	Competency must 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. Examine specific workplace challenges	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 nonstandard 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 1.2.1. Relevant equipment and operational processes 1.2.2. Enterprise goals, targets and measures 1.2.3. Enterprise quality, OHS and environmental requirement 1.2.4. Enterprise information systems and data collation 1.2.5. Industry codes and standards	1.1. Using range of analytical techniques (e.g., planning, attention, simultaneous and successive processing of information) in examining specific challenges in the workplace 1.2. Identifying extent and causes of specific challenges in the workplace
2. Analyze the causes of specific workplace challenges	2.1. Possible causes of specific problems 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	2.1. Using range of analytical techniques (e.g., planning, attention, simultaneous and successive processing of information) in examining specific challenges in the workplace.

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		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. Enterprise information systems and data collation 2.2.5. Industry codes and standards	2.2. Identifying extent and causes of specific challenges in the workplace 2.3. Providing clear-cut findings on the nature of each identified workplace challenges
3. Formulate resolutions to specific workplace challenges	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 nonstandard 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 analytical techniques (e.g., planning, attention, simultaneous and successive processing of information) in examining specific challenges in the workplace 3.2. Identifying extent and causes of specific challenges in the workplace 3.3. Providing clear-cut findings on the nature of each identified workplace challenges 3.4. Devising, communicating, implementing and evaluating strategies and techniques in addressing specific workplace challenges

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
4. Implement action plans and communicate results	4.1. Action plans are implemented and evaluated 4.2. Results of plan implementation and recommendations are prepared. 4.3. Recommendations are presented to appropriate personnel. 4.4. 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 action and provision of recommendations 4.2.1. Relevant equipment and operational processes 4.2.2. Enterprise goals, targets and measures 4.2.3. Enterprise quality, OHS and environmental requirement 4.2.4. Principles of decision making strategies and techniques 4.2.5. Enterprise information systems and data collation 4.2.6. Industry codes and standards	4.1. Using range of analytical techniques (e.g., planning, attention, simultaneous and successive processing of information) in examining specific challenges in the workplace 4.2. Identifying extent and causes of specific challenges in the workplace 4.3. Providing clear-cut findings on the nature of each identified workplace challenges 4.4. Devising, communicating, implementing and evaluating strategies and techniques in addressing specific workplace challenges

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. Resource implication	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. Method 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 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: 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	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

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	to show that diversity is valued by the business.	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	2.7. Identifying/ Recognizing diverse groups in the workplace and 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 : UTL311203

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	REQUIRED KNOWLEDGE	REQUIRED SKILLS
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	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. 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	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 Bold*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	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	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/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. Resource implication	2.1. Materials and component parts and equipment to be used in a real or simulated electronic production situation
3. Method of assessment	3.1. The assessor may select at least two (2) of the following assessment methods to objectively assess the candidate: 3.1.1. Observation 3.1.2. Questioning 3.1.3. Practical demonstration
4. Context of Assessment	4.1. 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	REQUIRED KNOWLEDGE	REQUIRED SKILLS
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	1.1. Relevant environmental protection regulations & codes of practice 1.2. Environmental risks associated with workplace operations and related precautions to control the risk 1.3. Environmental protection standards required in the workplace	1.1. Workplace reporting and recording processes and procedures 1.2. Communication skills 1.3. Accessing information and data 1.4. Ability to recognize potential environmental risks and ways of minimizing them
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	2.1 Relevant environmental protection regulations & codes of practice 2.2 Workplace procedures and guidelines for implementing and monitoring procedures concerning environmental hazards	2.1 Workplace reporting and recording processes and procedures 2.2 Communication skills 2.3 Problem solving skills 2.4 Ability to: 2.5 recognize potential environmental hazards and ways of

ELEMENT	PERFORMANCE CRITERIA *Italicized* terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	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	2.3 Workplace environmental hazards and related hazard control measures 2.4 Equipment and resources required when implementing and monitoring environmental protection procedures 2.5 Organizational structure and site layout	minimizing them 2.6 counsel, advise and inform others on environmental protection matters 2.7 identify and correctly use equipment and vehicles in accordance with environmental protection regulations and guidelines
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	3.1 Relevant environmental protection regulations & codes of practice 3.2 Workplace procedures and guidelines for implementing and monitoring environmental control procedures 3.3 Equipment and resources required when implementing and monitoring environmental control procedures 3.4 Organizational structure and site layout	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: ○ counsel, advise and inform others on environmental control procedures ○ identify and correctly use equipment and vehicles in accordance with environmental control procedures, regulations and guidelines

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

VARIABLE	RANGE
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. Resource implications	The following resources should be provided: 2.1 Environmental protection regulations and guidelines 2.2 OHS regulations and hazard prevention policies and procedures 2.3 workplace environmental protection policies, procedures and instructions 2.4 equipment/vehicle manufacturer's operating and servicing instructions
3. Methods of assessment	Competency should be assessed through: 3.1 Direct observation 3.2 Oral or written questioning 3.3 Questions/interview Assessment of underpinning knowledge and practical skills may be combined
4. Context of assessment	4.1 Competency assessment must be undertaken in accordance with the endorsed TESDA assessment guidelines 4.2 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	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify and access specification/ manuals	1.1 Appropriate manuals are identified and accessed as per job requirements 1.2 Version and date of manual are checked to ensure that correct specification and procedures are identified	1.1 Types of manuals used in distribution lines 1.2 Identification of symbols used in the manuals	1.1 Reading and comprehension skills 1.2 Identifying and interpreting manuals and specifications 1.3 Accessing information and data
2. Interpret manuals	2.1 Relevant sections, chapters of specifications/ manuals are located in relation to the work to be conducted 2.2 Information and procedure in the manual are interpreted in accordance with industry practices	2.1 Types of manuals used in distribution lines 2.2 Types of symbols used in manuals 2.3 Identification of units of measurements 2.4 Unit conversion	2.1 Reading and comprehension skills 2.2 Identifying and interpreting manuals and specifications 2.3 Accessing information and data 2.4 Applying conversion of units of measurements
3. Apply information in manual	3.1 ***Manual*** is interpreted according to job requirements 3.2 Work steps are correctly identified in accordance with manufacturer's specification 3.3 Manual data are applied according to the given task 3.4 All correct sequencing and adjustments are interpreted in accordance with information contained on the manual or specifications	3.1 Types of manuals used in distribution lines 3.2 Types and application of symbols used in the manuals 3.3 Unit conversion	3.1 Reading and comprehension skills 3.2 Applying information from manuals
4. 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	4.1 Types of manuals used in distribution lines 4.2 Manual storing and maintaining procedures	4.1 Reading and comprehension skills 4.2 Storing and maintaining manuals

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

1. Critical aspects of competency	Assessment requires that the candidate: 1.1 Identified and accessed specification/manuals as per job requirements 1.2 Interpreted manuals in accordance with industry practices 1.3 Applied information in manuals according to the given task 1.4 Stored manuals in accordance with company requirements
2. Resource implications	The following resources should be provided: 2.1 All manuals/catalogues relative to construction sector
3. Methods of assessment	Competency should be assessed through: 3.1 Direct observation 3.2 Questions/interview Assessment of underpinning knowledge and practical skills may be combined
4. Context of assessment	4.1 Competency assessment must be undertaken in accordance with the endorsed TESDA assessment guidelines 4.2 Assessment may be conducted in the workplace or a simulated environment

UNIT OF COMPETENCY : OPERATE AND MAINTAIN LINE TOOLS AND EQUIPMENT

UNIT CODE : UTL311205

DESCRIPTOR : This unit covers the knowledge, skills and attitude to operate and maintain electric distribution 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)	REQUIRED KNOWLEDGE	REQUIRED SKILLS
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	1.1. Relevant occupational health and safety standards 1.2. Types and usage of distribution line tools and equipment 1.3. Basic preventive maintenance servicing for distribution line equipment	1.1. Following and complying occupational health and safety standards 1.2. Following procedures for the safe use of distribution line tools and equipment 1.3. Performing basic preventive maintenance servicing for distribution line equipment
2. Prepare distribution line tools and equipment	2.1. Personal protective equipment (PPE) are obtained following job requirements 2.2. Distribution line tools, equipment and hardware are acquired and secured in line with job requirements 2.3. Electric distribution hot line tools are tested/set following manufacturer's standards or recommendation	2.1. Types and functions of PPEs 2.2. Types and usage of distribution line tools and equipment 2.3. Basic preventive maintenance servicing for distribution line equipment 2.4. Proper testing of electric distribution hot line tools	2.1. Following and complying occupational health and safety standards 2.2. Following procedures for the safe use of distribution line tools and equipment 2.3. Performing basic preventive maintenance servicing for distribution line equipment 2.4. Testing skills
3. Operate distribution line tools and equipment	3.1. PPE are used in line with job requirements 3.2. Distribution line tools and equipment are used in line with job requirements	3.1. Proper usage of PPEs 3.2. Proper procedure for the use of distribution line	3.1. Using PPEs 3.2. Following procedures for the safe use of distribution line

ELEMENT	PERFORMANCE CRITERIA (*Italicized Bold* terms are elaborated in the range of variables)	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		tools and equipment 3.3. Basic preventive maintenance servicing for distribution line equipment	tools and equipment 3.3. Performing basic preventive maintenance servicing for distribution line equipment
4. Check condition of distribution line tools and equipment	4.1. Distribution line tools and equipment are identified according to classification and job requirements 4.2. Non-functional distribution line tools and equipment are segregated and labeled according to classification 4.3. Safety of distribution 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	4.1. Classification of distribution line tools and equipment 4.2. Proper safety procedure for the use of distribution line tools and equipment 4.3. Basic preventive maintenance servicing for distribution line equipment	4.1. Classifying distribution line tools and equipment 4.2. Following and complying occupational health and safety standards 4.3. Following procedures for the safe use of distribution line tools and equipment 4.4. Performing basic preventive maintenance servicing for distribution line equipment
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. Distribution line tools are cleaned and tested according to standard procedures 5.4. Distribution 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	5.1. Types and usage of lubricants for distribution line equipment 5.2. Proper procedure for the use and maintenance of distribution line tools and equipment 5.3. Basic preventive maintenance servicing for distribution line equipment 5.4. Applicable OHSA regulations in preventive maintenance	5.1. Identifying types and usage of lubricants 5.2. Following procedures for the safe use and maintenance of distribution line tools and equipment 5.3. Performing basic preventive maintenance servicing for distribution line equipment 5.4. Following OHSA regulations

ELEMENT	PERFORMANCE CRITERIA (***Italicized Bold*** terms are elaborated in the range of variables)	REQUIRED KNOWLEDGE	REQUIRED SKILLS
6. Store tools and equipment	6.1. Inventory of distribution line tools and equipment are conducted and recorded as per company practices 6.2. Distribution line tools and equipment are stored safely in appropriate locations in accordance with manufacturer's specifications or company procedures	6.1. Proper procedure for the inventory and storage of distribution line tools and equipment	6.1. Following procedures for the inventory and storage of distribution line tools and equipment 6.2. Inventory skills 6.3. Proper storage and handling skills

RANGE OF VARIABLES

VARIABLE	RANGE
1. Job requirements	1.1. Erect pole 1.2. Perform overhead distribution line work 1.3. Perform hotline maintenance work 1.4. Perform cold-line maintenance work 1.5. Perform ground line maintenance work
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 Working clothes 2.2. Installation of grounding cluster
3. Distribution 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 distribution 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 distribution line equipment
2. Resource Implications	The following resources must be available: 2.1. Distribution line tools, equipment and PPE 2.2. Work area
3. Method of assessment	3.1. Observation and Oral questioning 3.2. Demonstration with oral questioning 3.3. Written test
4. Context of assessment	4.1. Competency may be assessed in the workplace or in a simulated workplace setting 4.2. Assessment shall be undertaken either individually or part of team under limited supervision

UNIT TITLE : PERFORM COMPUTER OPERATIONS
UNIT CODE : UTL311207
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 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	1.1. 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/ smartphone	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 3.3. ***Desktop icons*** are correctly selected, opened and closed for navigation purposes	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
	3.4. 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 5.1. Basic file maintenance procedures	5.1. Removing computer viruses from infected machines 5.1. Making backup files

RANGE OF VARIABLES

VARIABLE	RANGE
1. Hardware and peripheral devices	May include: 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 4.2. zip disks 4.3. hard disk drives, local and remote 4.4. cloud storage
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	May include: 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. Resource implication	2.1. Computer hardware with peripherals 2.2. Appropriate software
3. Method of assessment	3.1. The assessor may select two of the following assessment methods to objectively assess the candidate: 3.1.1. Observation 3.1.2. Questioning 3.1.3. Practical demonstration
4. Context of Assessment	4.1. Assessment may be conducted in the workplace or in a simulated work environment

CORE COMPETENCIES

UNIT OF COMPETENCY : REPLACE ELECTRIC DISTRIBUTION POLE, POLE TOP ASSEMBLY AND CONDUCTORS

UNIT CODE : UTL741316

DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to replace electric distribution pole, pole top assembly and conductors. It includes competencies in planning and preparing for maintenance work, replacing electric distribution pole, pole top assembly and conductors or wires. *This involves working with a team.*

ELEMENT	PERFORMANCE CRITERIA (***Italicized Bold*** terms are elaborated in the range of variables)	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Plan and prepare for maintenance work	1.1 Work instruction is secured and interpreted according to job requirements 1.2 Relevant ***occupational safety requirements*** are identified following job specifications 1.3 Relevant distribution line ***tools, equipment and hardware*** are identified, requested and acquired in accordance with construction specifications 1.4 Personal protective equipment (PPE) are obtained following job requirements	1.1 Uses and specifications of distribution line tools, equipment and hardware 1.2 Relevant occupational safety requirements 1.3 Safety procedures for installing pole hardware and conductors 1.4 Power distribution industry standards and specifications	1.1 Interpretation skills 1.2 Identifying distribution hand/line tools, equipment and hardware 1.3 Identifying occupational safety standards for line workers
2. Replace electric distribution pole and pole top assembly	2.1. Occupational work safety procedures are observed based on job requirements 2.2. Pole top assembly are removed for replacement 2.3. Electric distribution pole is removed using appropriate equipment 2.4. Pole digging is performed following established depth requirements 2.5. ***Pole setting/erection procedure*** is performed in line with job requirements 2.6. Proper backfill and tamping is performed according to standard procedure 2.7. ***Pole top assemblies*** are reinstalled/ replaced based on job requirements	2.1. Occupational work safety procedures 2.2. Different pole top assemblies 2.3. Safety standard procedures for installing pole hardware and conductors 2.4. Pole climbing techniques 2.5. Pole setting/ erection procedures 2.6. Proper use of pole digging tools	2.1. Communication skills 2.2. Pole climbing skills 2.3. Knot tying skills 2.4. Skills on pole setting and alignment

ELEMENT	PERFORMANCE CRITERIA (***Italicized Bold*** terms are elaborated in the range of variables)	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Replace conductors/ wires	3.1. Old conductors/wires are replaced of appropriate sizes based on job requirements and specifications 3.2. Stringing/payout and tensioning performed based on electric utility procedures 3.3. Armoring is applied for protection of conductor. 3.4. ***Tying of conductors*** is applied to avoid detachment from the insulators.	3.1. Types and sizes of conductors/ wires 3.2. Proper use of compression connectors and splicing materials and tools 3.3. Splicing techniques 3.4. Armoring and tying of conductors	3.1. Identifying conductors/ wires 3.2. Proper care and handling of conductors 3.3. Splicing skills 3.4. Armoring and tying skills

RANGE OF VARIABLES

VARIABLE	RANGE
1. Occupational safety requirements	May include: 1.1 Personal protective equipment (PPE) 1.1.1. Hard hat/Safety hat 1.1.2. Goggles/Eye protector 1.1.3. Work gloves 1.1.4. Line worker boots/Rubber boots 1.1.5. Working clothes 1.1.6. Rain suits 1.2 Pole climbing equipment 1.2.1. Safety strap/cord 1.2.2. Body belt 1.2.3. pair of climbers 1.3 Company health and safety policies and procedures
2. Distribution line tools, equipment and hardware	May include but not limited to: 2.1 Tools 2.1.1. Rope/Hand line 2.1.2. Adjustable wrench or Line worker wrench 2.1.3. Pliers 2.1.4. Ball peen hammer 2.1.5. Measuring rule / steel tape 2.1.6. Screw driver 2.1.7. Auger bit 2.1.8. Ratchet 2.1.9. Cum-a-long 2.1.10. Bolt cutter 2.1.11. wire skinning knife 2.1.12. Compression tool 2.1.13. Pulley 2.2 Equipment 2.1.1 Boom truck or derrick truck 2.1.2 Pole climbing equipment 2.1.3 Wench 2.1.4 Ladder 2.3 Construction materials for pole top, conductor, (anchor, guy, grounding assemblies, if needed) 2.4 Conductors or wires (bare or insulated) 2.4.1. Aluminum Conductor Steel Reinforced (ACSR) 2.4.2. Copper wire
3. pole top/ conductor assemblies	3.1 Primary 3.1.1. Single-phase 3.1.2. Vee-phase 3.1.3. Three-phase 3.2 Secondary 3.2.1. Open 3.2.2. Underbuilt
4. Tying of conductors	4.1 Top groove tie 4.2 Side groove tie

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Planned and prepared for maintenance work 1.2 Replaced electric distribution pole and pole top assembly 1.3 Replaced conductors/ wires
2. Resource implications	The following resources should be available: 2.1 Needed tools, equipment, poles, cross-arms, hardware and PPEs 2.2 Site or work area 2.3 Boom or derrick truck (if necessary)
3. Method of assessment	Competency may be assessed through: 3.1 Direct observation/Demonstration with oral questioning 3.2 Written test
4. Context of assessment	4.1 Competency maybe assessed in the workplace or in a simulated workplace setting 4.2 Assessment shall be undertaken either individually or part of team under limited supervision

UNIT OF COMPETENCY : INSTALL/REPLACE SINGLE-, THREE- OR VEE-PHASE DISTRIBUTION LINE EQUIPMENT AND ACCESSORIES

UNIT CODE : UTL741317

DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to install/replace single-, three-, or vee-phase distribution line equipment and devices. This involves planning and preparing for installation or replacement work, installing single-, three- or vee-phase equipment and accessories and tapping/connecting single-, three- or vee-phase line equipment and devices to distribution line. This involves working with a team.

ELEMENT	PERFORMANCE CRITERIA (***Italicized Bold*** terms are elaborated in the range of variables)	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Plan and prepare for installation/ replacement work	1.1 ***Work instructions*** are secured and interpreted according to job requirements 1.2 Relevant ***occupational safety requirements*** are identified following job specifications 1.3 Relevant single-, three- or vee-phase distribution line ***tools, equipment, materials and devices*** are identified, requested and acquired in accordance with ***construction specifications*** 1.4 Personal protective equipment (PPE) are obtained following job requirements	1.1 Uses and specifications of single-, three- or vee-phase distribution line equipment and devices 1.2 Relevant occupational safety requirements 1.3 Safety procedures for installing single-, three- or vee-phase distribution line equipment and devices 1.4 Power distribution industry standards and specifications	1.1 Interpretation skills 1.2 Identifying single-, three- or vee-phase distribution line equipment and devices 1.3 Identifying occupational safety standards for line workers
2. Install single-, three- or vee-phase line equipment and accessories	2.1 ***Lifting devices*** and pole clamp or bracket are installed securely to the top of the pole. 2.2 Boring is performed, if necessary, in accordance with the installation procedure 2.3 ***Line equipment and accessories*** are installed in accordance with construction and wiring specification standards 2.4 Housekeeping procedure is performed in line with established procedure	2.1 Types of lifting equipment 2.2 Types of single-, three- or vee-phase line equipment and devices 2.3 Line equipment and accessories installation procedures	2.1 Identifying lifting of devices and equipment 2.2 Rigging skills 2.3 Boring skills 2.4 Wiring skills
3. Tap/Connect three-phase line equipment	3.1 Connectors/jumpers are installed between line conductors and ***equipment*** for safety, conductivity and reliability purposes.	3.1 Kinds of connectors 3.2 Tapping and connection procedure of single-, three- or	3.1 Proper use of connectors 3.2 Correct tapping and connections

ELEMENT	PERFORMANCE CRITERIA (***Italicized Bold*** terms are elaborated in the range of variables)	REQUIRED KNOWLEDGE	REQUIRED SKILLS
and devices to distribution line	3.2 Grounding for equipment is installed in accordance with line construction specifications. 3.3 Line tapping and connection is performed in accordance with the wiring specification	vee-phase equipment and devices 3.3 Proper grounding procedure for single-, three- or vee-phase equipment and devices	3.3 Proper installation of grounding

RANGE OF VARIABLES

VARIABLE	RANGE
1. Work instruction	May include but are not limited to: 1.1 job order form 1.2 work order form
2. Occupational safety requirements	May include: 2.1 Personal protective equipment (PPE) 2.1.1. Hard hat/Safety hat 2.1.2. Goggles/Eye protector 2.1.3. Working gloves 2.1.4. Line worker boots 2.1.5. Working clothes 2.1.6. Rain suits 2.1.7. Rubber boots 2.2 Pole climbing equipment 2.2.1. Safety strap/cord 2.2.2. Body belt 2.2.3. Pair of climbers
3. Tools, materials, equipment and devices	May include but not limited to: 3.1 Tools 3.1.1. Rope/Hand line/Bull line 3.1.2. Adjustable wrench or Line worker wrench 3.1.3. Pliers 3.1.4. Ball peen hammer 3.1.5. Measuring rule / steel tape 3.1.6. Screw driver 3.1.7. Auger bit 3.1.8. Wire skinning knife 3.1.9. Compression tool 3.2 Materials/Hardware 3.2.1. conductors 3.2.2. insulators and pins 3.2.3. ground rod 3.2.4. ground lead 3.2.5. connectors 3.2.6. ground clip 3.2.7. bolts and accessories 3.2.8. pole clamps 3.2.9. wedge clamps 3.2.10. hot line clamps 3.3 Equipment and devices 3.3.1. Transformer gin 3.3.2. Cut-out and lightning arrester 3.3.3. Distribution transformer 3.3.4. Pulley or block and tackle 3.3.5. Ladder 3.3.6. Boom truck or derrick truck 3.3.7. Pole climbing equipment

VARIABLE	RANGE
4. Lifting devices	May include: 4.1 Transformer gin 4.2 Pulley or block and tackle 4.3 Handline / Rope / Bull line
5. line equipment and accessories	May include: 5.1 distribution transformer 5.2 cut-out 5.3 lightning arrester
6. equipment	May include: 6.1 fuse cut-out 6.2 lightning arrester 6.3 transformer

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1. Planned and prepared for installation/ replacement work 1.2. Installed single-, three- or vee-phase line equipment and accessories 1.3. Tapped/Connected single-, three- or vee-phase line equipment and devices to distribution line
2. Resource implications	The following resources should be available: 2.1. Needed tools, equipment and devices 2.2. Appropriate PPE 2.3. Site or work area 2.4. Transformer gin, Pulley or block and tackle, Handline / Rope / Bull line 2.5. Boom or derrick truck (if necessary)
3. Method of assessment	Competency may be assessed through: 3.1 Direct observation/Demonstration with oral questioning 3.2 Written test
4. Context of assessment	4.1. Competency maybe assessed in the workplace or in a simulated workplace setting 4.2. Assessment shall be undertaken either individually or part of team under limited supervision

UNIT OF COMPETENCY : INSTALL/REPLACE SINGLE-, THREE- OR VEE-PHASE CONSUMER SERVICE CONNECTION FACILITY

UNIT CODE : UTL741318

DESCRIPTOR : This unit covers the outcomes required for installing/replacing single-, three- or vee-phase consumer service connection facility. The scope of this unit covers installing service drop and single-, three- or vee-phase KWH meter.

ELEMENT	PERFORMANCE CRITERIA (***Italicized Bold*** terms are elaborated in the range of variables)	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Plan and prepare for work	1.1 Work instruction is secured and interpreted according to job requirements 1.2 Relevant ***occupational safety requirements*** are identified following job specifications 1.3 Necessary ***tools, materials, equipment and devices*** needed for the work are identified, requested and acquired in accordance with construction specifications 1.4 Personal protective equipment (PPE) are obtained following job requirements	1.1 Uses and specifications of single-, three- or vee-phase distribution line equipment and devices 1.2 Relevant occupational safety requirements 1.3 Safety procedures for installing single-, three- or vee-phase consumer service devices 1.4 Power distribution industry standards and specifications	1.1 Interpretation skills 1.2 Identifying single-, three- or vee-phase consumer service devices 1.3 Identifying occupational safety standards for line workers
2. Install/ Replace Service Drop	2.1 Approved electrical/ house wiring permit is secured for new installation. 2.2 ***Service drop accessories*** are installed/replaced according to construction standards and requirements 2.3 ***Service drop cables*** are installed/replaced according construction standards and requirements 2.4 Service drop clearance is checked in compliance to Philippine Electrical Code	2.1 Safety procedures for proper installation/ replacement of service drop 2.2 Kinds of service drop accessories 2.3 Types of service drop cables	2.1 Interpretation skills 2.2 Identifying and following occupational safety standards for line workers 2.3 Following safety procedures for service drop installation
3. Install/ Replace single-, three- or vee-phase KWH meter	3.1 Meter base (socket-type) is installed/ replaced, if necessary, according to construction standards and requirements 3.2 ***KWH meter*** is installed/ replaced according to	3.1 Safety procedures for proper installation/ replacement of single-, three- or	3.1 Communication skills 3.2 Identifying and following occupational safety standards for line workers 3.3 Following safety procedures for

ELEMENT	PERFORMANCE CRITERIA (***Italicized Bold*** terms are elaborated in the range of variables)	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	construction standards and requirements 3.3 Customer is advised for completion of work and verify availability of electric power 3.4 Housekeeping procedure is performed in line with established procedure	vee-phase KWH meter 3.2 Types of KWH meter 3.3 5-S principles	single-, three- or vee-phase KWH meter installation

RANGE OF VARIABLES

VARIABLE	RANGE
1. Occupational safety requirements	May include but not limited to: 1.1 Personal protective equipment (PPE) 1.1.1. Hard hat/Safety hat 1.1.2. Goggles/Eye protector 1.1.3. Work gloves 1.1.4. Line worker boots 1.1.5. Working clothes 1.1.6. Rubber boots 1.1.7. Rain suits 1.2 Pole climbing equipment 1.2.1. Safety strap/cord 1.2.2. Body belt 1.2.3. pair of climbers
2. Tools, materials, equipment and devices	May include but not limited to: 2.1 Tools 2.1.1. Rope/Hand line 2.1.2. Adjustable wrench or lineman wrench 2.1.3. Pliers 2.1.4. Ball peen hammer 2.1.5. Measuring rule (wood) 2.1.6. Screw driver 2.1.7. Auger bit 2.1.8. Electric tape 2.1.9. Wire skinning knife 2.1.10. Compression/crimping tool 2.2 Equipment and devices 2.2.1. Ladder 2.2.2. Pole climbing equipment 2.2.3. Single-, three- or vee-phase KWH meter 2.2.4. Multi-tester (amps-volt) 2.3 Materials/Wires 2.3.1 Service drop cables 2.3.2 Service connection accessories
3. Service drop accessories	May include: 3.1 Oval eye bolt/nut 3.2 Service swinging clevis 3.3 Spool insulator 3.4 Service grip / Dead-end loop clamp 3.5 Service drop wire 3.6 Service wire grip 3.7 Strain/Screw insulators 3.8 Compression connector/ Clamps 3.9 Meter box
4. Service drop cable	May include: 4.1 Triplex aluminum/copper cable 4.2 Duplex aluminum/copper cable 4.3 Single wire copper

VARIABLE	RANGE
5. KWH meter	May include: 5.1 Single-, three- or vee-phase 5.2 Socket type or button connected

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1. Planned and prepared for work 1.2. Installed/ Replaced Service Drop 1.3. Install/ Replace single-, three- or vee-phase KWH meter
2. Resource implications	The following resources should be available: 2.1. PPE, 2.2. Tools, materials, equipment and devices 2.3. Site or work area
3. Method of assessment	Competency may be assessed through: 3.1. Direct observation / Demonstration with oral questioning 3.2. Written test
4. Context of assessment	4.1. Competency maybe assessed in the workplace or in a simulated workplace setting 4.2. Assessment shall be undertaken either individually or part of team under limited supervision

UNIT OF COMPETENCY: CONDUCT VEGETATION CLEARING ALONG DISTRIBUTION SYSTEM

UNIT CODE : UTL741319

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitude required to conduct vegetation clearing in particular trees for defects and hazards prior to cutting and pruning around live distribution lines up to the live work zone. *This involves working with a team.*

ELEMENT	PERFORMANCE CRITERIA (***Italicized Bold*** terms are elaborated in the range of variables)	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Plan, assess and prepare for clearing work	1.1 Work instructions are secured and interpreted according to job requirements 1.2 Relevant ***occupational safety requirements*** are identified following job specifications 1.3 Relevant ***trimming/ pruning tools and equipment*** are identified, requested and acquired in accordance with job requirements 1.4 Personal protective equipment (PPE) are obtained following job requirements 1.5 Hazards near live distribution line and equipment are identified and reported according to electric utility procedures. 1.6 Relevant ***permit/s*** to cut/trim trees or other plants are secured and confirmed with relevant personnel. 1.7 Road signage, barriers and warning devices are identified, where appropriate, in accordance with given instructions and requirements. 1.8 Assistance for traffic and road safety is coordinated with ***related authority*** for directions according to electric utility procedures.	1.1 Relevant occupational safety requirements 1.2 Types of trimming/ pruning tools and equipment 1.3 Personal Protective Equipment (PPE) 1.4 Possible hazards encountered during clearing operation 1.5 Road signage, barriers, warning devices 1.6 Traffic and road safety regulations and standards 1.7 Power distribution industry standards and specifications	1.1 Interpretation skills 1.2 Communication skills 1.3 Identifying types of trimming/ pruning tools and equipment 1.4 Identifying occupational safety standards for line workers 1.5 Skills in interpreting traffic and road safety regulations and standards
2. Undertake clearing of vegetation	2.1. Relevant occupational safety requirements are followed in accordance with given instructions, requirements and/or electric utility procedures. 2.2. Trimming/Pruning site is suitably signed and barricaded during operations in	2.1. Relevant occupational safety requirements 2.2. Types of trimming/ pruning tools and equipment 2.3. PPE	2.1. Interpretation skills 2.2. Communication skills 2.3. Identifying occupational safety standards for line workers

	accordance with electric utility procedures. 2.3. Trimming/Pruning activities are undertaken according to electric utility procedures and safety requirements. 2.4. Trimming/Pruning tools and equipment are operated safely and effectively. 2.5. Ongoing checks of quality of the work and safety clearances are undertaken in accordance with given instructions and electric utility procedures.	2.4. Possible hazards encountered during clearing operation 2.5. Road signage, barriers, warning devices 2.6. Traffic and road safety regulations and standards 2.7. Trimming/ Pruning tools and equipment operation 2.8. Proper handling of tools and equipment 2.9. Safety clearances standards 2.10. Power distribution industry standards and specifications	2.4. Trimming/ Pruning skills 2.5. Skills in interpreting traffic and road safety regulations and standards 2.6. Skills in handling tools and equipment
3. Complete pruning activity	3.1. Prunings and waste material removed from the site are disposed of in an environmentally aware and safe manner according to electric utility procedures. 3.2. Correct manual handling techniques are used when lifting or moving loads. 3.3. Trimming/Pruning tools and equipment are cleaned, maintained and stored according to electric utility procedures. 3.4. Clean and safe area is maintained throughout and on completion of work. 3.5. Accomplishment report is submitted in accordance with the guidelines.	3.1. Relevant occupational safety requirements 3.2. Waste disposal management regulations 3.3. Types of trimming/ pruning tools and equipment 3.4. Proper lifting or moving loads procedures 3.5. Road signage, barriers, warning devices 3.6. Traffic and road safety regulations and standards 3.7. Proper handling of tools and equipment 3.8. Principles of good housekeeping	3.1. Interpretation skills 3.2. Communication skills 3.3. Identifying occupational safety standards for line workers 3.4. Trimming/ Pruning skills 3.5. Skills in interpreting traffic and road safety regulations and standards 3.6. Skills in handling tools and equipment 3.7. Rigging skills 3.8. Skills in housekeeping

RANGE OF VARIABLES

VARIABLE	RANGE
1. Occupational safety requirements	May include but not limited to: 1.1 Personal protective equipment (PPE) 1.1.1. Hard hat/Safety hat 1.1.2. Goggles/Eye protector 1.1.3. Work gloves 1.1.4. Line worker boots 1.1.5. Working clothes 1.1.6. Rubber boots 1.1.7. Rain suits 1.1.8. Rubber gloves 1.2 Pole climbing equipment 1.2.1. Safety strap/cord 1.2.2. Body belt 1.2.3. pair of climbers 1.3 Hotline tools 1.3.1. shotgun stick 1.3.2. hot stick or telescopic stick 1.4 Grounding cluster
2. Trimming/ Pruning tools and equipment	May include but not limited to: 2.1 Tools 2.1.1. chainsaw 2.1.2. pruning saw 2.1.3. bolo 2.1.4. scythe 2.1.5. rope/handline 2.1.6. Pole climbing equipment 2.2 Equipment and devices 2.2.1. Ladder 2.2.2. boom truck 2.2.3. basket truck
3. Permit/s	May include permit/s secured from: 3.1 DENR 3.2 private property owners 3.3 LGUs 3.4 For road safety permits (LGUs/Barangay, MMDA, PNP, etc.)
4. related authority	May include: 4.1 LGU 4.2 Barangay 4.3 MMDA 4.4 PNP 4.5 etc.)

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1. Planned, assessed and prepared for clearing work 1.2. Undertook clearing of vegetation 1.3. Completed pruning activity
2. Resource implications	The following resources should be available: 2.1. Trimming/Pruning tools and equipment 2.2. PPE 2.3. Work area
3. Method of assessment	Competency may be assessed through: 3.1. Direct observation / Demonstration with oral questioning 3.2. Written test
4. Context of assessment	4.1. Competency maybe assessed in the workplace or in a simulated workplace setting 4.2. Assessment shall be undertaken either individually or part of team under limited supervision

SECTION 3 TRAINING ARRANGEMENTS

This set of standards provides Technical and Vocational Education and Training (TVET) providers with information and other important requirements to consider when designing training programs for Electric Power Distribution Operation and Maintenance NC III.

This includes information on curriculum design; training delivery; trainee entry requirements; tools and equipment; training facilities; and trainer's qualification and institutional assessment.

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 accompany their curricula.

Course Title : Electric Power Distribution Operation and Maintenance
NC Level : NC III

Nominal Training Duration:

48 hrs – Basic Competencies
60 hrs – Common Competencies
112 hrs – Core Competencies
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220 hrs

Course Description:

This course is designed to develop & enhance the knowledge, skills, & attitudes of an electric power distribution line worker, in accordance with industry standards. It covers the basic and common competencies in addition to the core competencies such as replace electric distribution pole, pole top assemblies and conductors, install/replace single-, three- or vee-phase distribution line equipment and accessories, as well as install/replace single-, three- or vee-phase consumer service connection facilities and conduct vegetation clearing along distribution system.

The nominal duration of 220 hours covers the required units at Electric Power Distribution Operation and Maintenance 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
(48 hours)

UNIT OF COMPETENCY	LEARNING OUTCOMES	LEARNING ACTIVITIES	METHODOLOGY	ASSESSMENT APPROACH	NOMINAL DURATION
1. Lead workplace communication	1.1. Communicate information about workplace processes	1.1.1. Read ○ Effective verbal communication methods ○ Sources of information 1.1.2. Practice organizing information 1.1.3. Identify organization requirements for written and electronic communication methods 1.1.4. Follow organization requirements for the use of written and electronic communication methods 1.1.5. Perform exercises on understanding and conveying intended meaning scenario	• Lecture • Demonstration • Practical exercises • Role Play	• Written Test • Observation	2 Hours
	1.2. Lead workplace discussions	1.2.1. Discuss organizational policy on production, quality and safety 1.2.2. Goals/ objectives and action plan setting 1.2.3. Read effective verbal communication methods 1.2.4. 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	1.3.1. Discuss organizational policy in dealing with issues and problems 1.3.2. Read effective verbal communication methods 1.3.3. Practice organizing information 1.3.4. 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 team	2.1. Provide team leadership	2.1.1. Discuss company policies and procedures 2.1.2. Identify client expectations 2.1.3. Practice team building skills 2.1.4. 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 APPROACH	NOMINAL DURATION
	2.2. Assign responsibilities	2.2.1. Discuss: ○ Team member's duties and responsibilities 2.2.2. Identify client expectations 2.2.3. Practice negotiating skills 2.2.4. 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 expectations for team members	2.3.1. Discuss: ○ Team member's duties and responsibilities ○ How performance expectations are set 2.3.2. Identify client expectations 2.3.3. Perform group exercises in setting individual target/ expectation 2.3.4. Read instruction and requirements in up to date dissemination to members	• Group discussion • Lecture • Demonstration • Role Play • Lecture	• Oral evaluation • Written examination • Observation	1 Hour
	2.4. Supervise team performance	2.4.1. Describe listening and treating individual team members concern 2.4.2. Identify methods of Monitoring Performance 2.4.3. Perform group exercises showing the skills in monitoring team performance	• Group discussion • Lecture • Demonstration	• Oral evaluation • Written examination • Observation	1 Hour
3. Develop and practice negotiation skills	3.1. Identify relevant information in planning negotiations	3.1.1. Discuss codes of practice and guidelines for the organization 3.1.2. Discuss differences between content and process 3.1.3. Read: ○ Organizations policy and procedures for negotiations ○ Decision making and conflict resolution strategies procedures ○ Strategies to manage conflict ○ Steps in negotiating process 3.1.4. Identify bargaining information 3.1.5. Apply strategies to manage process 3.1.6. Apply steps in negotiating process	• Group Discussion • Lecture • Demonstration	• Oral evaluation • Written examination • Observation	2 hours

UNIT OF COMPETENCY	LEARNING OUTCOMES	LEARNING ACTIVITIES	METHODOLOGY	ASSESSMENT APPROACH	NOMINAL DURATION
	3.2. Participate in negotiations	3.2.1. 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 3.2.2. 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	• Group Discussion • Case studies • Demonstration • Simulation/ Role play	• Oral evaluation • Observation	2 Hours
	3.3. Document areas for agreement	3.3.1. Discuss the procedure in documenting negotiations 3.3.2. Apply a filing system in managing information 3.3.3. Demonstrate filing of documents	• Group Discussion • Simulation/ Role play • Demonstration	• Oral evaluation • Observation	2 Hours
4. Solve workplace problems related to work activities	4.1. Identify the problem	4.1.1. Discuss Normal operating parameters & product quality 4.1.2. Identify & clarify the nature of problem 4.1.3. Read: ○ Brainstorming ○ Cause and effect diagrams ○ PARETO analysis ○ SWOT analysis ○ GANT chart ○ PERT CPM & graph ○ SCATTERGRAMS 4.1.4. Apply observation, investigation and analytical techniques in solving problem in the workplace	• Group discussion • Lecture • Demonstration	• Oral evaluation • Written examination • Observation	2 Hours

UNIT OF COMPETENCY	LEARNING OUTCOMES	LEARNING ACTIVITIES	METHODOLOGY	ASSESSMENT APPROACH	NOMINAL DURATION
	4.2. Determine fundamental cause of the problem	4.2.1. Discuss Teamwork and work allocation problem 4.2.2. Read: ○ Using range of formal problem solving techniques ○ Enterprise goals, targets and measures ○ Enterprise quality, OHS and environmental requirement ○ Non-routine process and quality problems 4.2.3. Perform group exercises showing safety in emergency situations and incidents 4.2.4. Identify & clarify the nature of problem 4.2.5. Select relevant equipment and operational processes	• Group discussion • Lecture • Demonstration • Role Play	• Oral evaluation • Written examination • Observation	1 Hour
	4.3. Determine correct / preventive action	4.3.1. Discuss principles of decision making strategies and techniques 4.3.2. Read: ○ Evaluating the solution ○ Devising the best solution 4.3.3. Perform group exercise how to implement the developed plan to rectify a problem	• Group Discussion • Lecture • Demonstration • Role Play	• Oral evaluation • Written examination • Observation	1 Hour
	4.4. Provide recommendation to manager	4.4.1. Discuss industry codes and standards 4.4.2. Apply enterprise information systems and data collation 4.4.3. Prepare recommendation letter	• Group Discussion • Demonstration	• Oral evaluation • Observation	1 Hour

UNIT OF COMPETENCY	LEARNING OUTCOMES	LEARNING ACTIVITIES	METHODOLOGY	ASSESSMENT APPROACH	NOMINAL DURATION
5. Use mathematical concepts and techniques	5.1. Identify mathematical tools and techniques to solve problems	5.1.1. Discuss the four fundamental operation (addition, subtraction, division, multiplication) 5.1.2. Read: ○ Measurement system ○ Precision and accuracy ○ Basic measuring tools/devices 5.1.3. Apply mathematical computations 5.1.4. Demonstrate activities on: ○ Use of calculator ○ Use of different measuring tools	• Group Discussion • Lecture • Demonstration	• Oral evaluation • Written examination • Observation	1 Hour
	5.2. Apply mathematical procedures / solution	5.2.1. Read: ○ Estimation ○ Problem-based questions ○ Mathematical techniques 5.2.2. Apply mathematical computations 5.2.3. Demonstrate activities on: ○ Use of calculator ○ Use of different measuring tools ○ Use of mathematical tools and standard formulas	• Lecture • Demonstration • Simulation/ Role play	• Written examination • Observation •	2 Hours
	5.3. Analyze results	5.3.1. Discuss the four fundamental operation (addition, subtraction, division, multiplication) 5.3.2. Read: ○ Measurement system ○ Precision and accuracy ○ Basic measuring tools/devices 5.3.3. Apply mathematical computations 5.3.4. Demonstrate activities on: ○ Use of calculator ○ Use of different measuring tools	• Group Discussion • Lecture • Demonstration	• Oral evaluation • Written examination • Observation	1 Hours

UNIT OF COMPETENCY	LEARNING OUTCOMES	LEARNING ACTIVITIES	METHODOLOGY	ASSESSMENT APPROACH	NOMINAL DURATION
6. Use relevant technologies	6.1. Identify appropriate technology	6.1.1. Discuss company policy in relation to relevant technology 6.1.2. Read: ○ Awareness on technology and its function ○ Relevant technology application/ implementation ○ Operating instructions 6.1.3. Practice basic communication skill in a group activity	• Group Discussion • Lecture • Demonstration • Simulation/ Role Play	• Oral evaluation • Written examination • Observation	1 Hour
	6.2. Apply relevant technology	6.2.1. Discuss different management concepts 6.2.2. Read: ○ Relevant technology application/ implementation ○ Technology adaptability ○ Different management concepts ○ Health and safety procedure ○ Communication techniques 6.2.3. Apply software applications skills 6.2.4. Practice drills on installing application software 6.2.5. Practice basic communication skill in a group activity	• Group Discussion • Lecture • Demonstration • Simulation/ Role Play	• Oral evaluation • Written examination • Observation	2 Hours
	6.3. Maintain / enhance relevant technology	6.3.1. Read: ○ Repair and maintenance procedure ○ Operating instructions 6.3.2. Practice drills: ○ Installing application software ○ Basic troubleshooting skills	• Lecture • Demonstration • Simulation/ Role Play	• Written examination • Observation	2 Hours

UNIT OF COMPETENCY	LEARNING OUTCOMES	LEARNING ACTIVITIES	METHODOLOGY	ASSESSMENT APPROACH	NOMINAL DURATION
7. Apply critical thinking and problem solving techniques in the workplace	7.1. Examine specific workplace challenges	7.1.1. 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 ○ Identification of fundamental cause	• Lecture • Group Discussion	• Oral evaluation • Written Examination	2 hrs
	7.2. Analyze the causes of specific workplace challenges	7.2.1. Lecture and collaboration on ○ Root cause of the problem ○ Problem solving tools 7.2.2. Exercise on cause and effect	• Lecture • Group Discussion	• Oral evaluation • Written Examination • Observation	2 hrs
	7.3. Formulate resolutions to specific workplace challenges	7.3.1. Lecture and discussion on ○ Identification and analysis of possible options for problem resolution ○ Corrective actions ○ Principles of decision making strategies and techniques ○ Provision of recommendation 7.3.2. Layouting of action plans	• Lecture • Group Discussion	• Oral evaluation • Written Examination • Observation	2 hrs
	7.4. Implement action plans and communicate results	7.4.1. Using range of formal problem solving techniques 7.4.2. Devising best solutions 7.4.3. Preparation and presentation of sample recommendation report	• Lecture • Group Discussion	• Oral evaluation • Written Examination • Presentation	2 hrs
8. Work in a diverse environment	8.1. Develop an individual's cultural awareness and sensitivity	8.1.1. Lecture and discussion on: ○ Enterprise policies and core values ○ Awareness on individual cultures and world geography ○ Different methods of verbal and non-verbal communication in a multicultural setting ○ Workplace Diversity Policy	• Lecture • Group Discussion	• Oral evaluation • Written Examination • Presentation	2 hrs

UNIT OF COMPETENCY	LEARNING OUTCOMES	LEARNING ACTIVITIES	METHODOLOGY	ASSESSMENT APPROACH	NOMINAL DURATION
	8.2. Work effectively in an environment that acknowledges and values cultural diversity	8.2.1. Lecture and discussion on: ○ The value of diversity in the economy and society in terms of Workforce development ○ Innovation ○ Social justice ○ Customer service excellence ○ Teamwork and collaboration 8.2.2. Applying strategies for customer service excellence	• Lecture • Group Discussion	• Oral evaluation • Written Examination • Presentation	2 hrs
	8.3. Identify common issues in a multicultural and diverse environment	8.3.1. Lecture and discussion on: ○ Diversity-related conflicts within the workplace ○ Change management policies ○ Advance strategies for customer service excellence 8.3.2. Identifying and addressing workplace harassment 8.3.3. Applying advance strategies for customer service excellence	• Lecture • Group Discussion	• Oral evaluation • Written Examination • Presentation	4 hrs

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

COMMON COMPETENCIES

(60 hours)

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
1. Apply Quality Standards	1.1 Assess quality of received materials	1.1.1 Identify relevant production processes, materials and products 1.1.2 Study and interpret characteristics of materials, software and hardware used in production processes 1.1.3 Perform quality checking procedures 1.1.4 Apply quality Workplace procedures 1.1.5 Identify faulty materials 1.1.6 Check quality of materials or component parts as per manufacturer's standards 1.1.7 Interpret specifications or symbols	• Lecture • Field trip • Symposium • Video clips • Simulation/ Role playing	• Written test • Demonstration & questioning • Observation & questioning	2 hours
	1.2 Assess own work	1.2.1 Perform workplace procedure in documenting completed work 1.2.2 Perform fault identification and reporting 1.2.3 Observe safety and environmental aspects of production processes 1.2.4 Utilize workplace quality indicators 1.2.5 Document and report deviations from specified quality standards	• Field trip • Symposium • Simulation • On the job training	• Demonstration & questioning • Observation & questioning	2 hours
	1.3 Engage in quality improvement	1.3.1 Participate in quality improvement processes a. IEC/ISO standards b. Environmental and safety standards 1.3.2 Carry out work as per process improvement procedures 1.3.3 Monitor operation performance 1.3.4 Implement continuous improvement	• Field trip • Symposium • Simulation • On the job training	• Demonstration & questioning • Observation & questioning	8 hours
2. Comply with environmental protection procedures	2.1 Access information concerning environmental protection regulations and procedures	2.1.1 Lecture on relevant environmental protection regulations & codes of practice 2.1.2 Lecture/Discussion on environmental risks associated with workplace operations and related precautions to control the risk 2.1.3 Lecture/Discussion on environmental protection standards required in the workplace	• Lecture • Discussion • Demonstration • Viewing multimedia • Hands on practice	• Observation in workplace • Demonstration • Oral questioning • Third Party Report	4 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
		2.1.4 Lecture on workplace reporting and recording processes and procedures 2.1.5 Accessing information and data 2.1.6 Identifying potential environmental risks and ways of minimizing them			
	2.2 Implement and monitor procedures concerning environmental hazards	2.2.1 Applying environmental protection regulations & codes of practice concerning environmental hazards 2.2.2 Lecture/Discussion on workplace procedures and guidelines for implementing and monitoring procedures concerning environmental hazards 2.2.3 Lecture/Discussion on workplace environmental hazards and related hazard control measures 2.2.4 Using equipment and resources required when implementing and monitoring environmental protection procedures 2.2.5 Lecture/Discussion on Organizational structure and site layout 2.2.6 Reporting and recording processes and procedures 2.2.7 Application of problem solving techniques 2.2.8 Identifying potential environmental hazards and ways on minimizing them 2.2.9 Identifying and correctly using equipment and vehicles in accordance with environmental protection regulations and guidelines	• Lecture • Discussion • Demonstration • Viewing multimedia • Hands on practice	• Observation in workplace • Demonstration • Oral questioning • Third Party Report	4 hours
	2.3 Implement and monitor environmental control procedures	2.3.1 Applying relevant environmental protection regulations & codes of practice for environmental control procedures 2.3.2 Lecture/Discussion on workplace procedures and guidelines for implementing and monitoring environmental control procedures 2.3.3 Using equipment and resources required when implementing and monitoring environmental control procedures 2.3.4 Carry out workplace reporting and recording processes and procedures	• Lecture • Discussion • Demonstration • Viewing multimedia • Hands on practice	• Observation in workplace • Demonstration • Oral questioning	4 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
		2.3.5 Application of problem solving techniques 2.3.6 counsel, advise and inform others on environmental control procedures 2.3.7 identifying and correctly using equipment and vehicles in accordance with environmental control procedures, regulations and guidelines			
3. Observe procedures, Specifications and Manuals of Instructions	3.1. Identify and access specification/ manuals	3.1.1. Familiarization on types of manuals used in transmission lines 3.1.2. Identification of symbols used in the manuals 3.1.3. Discussion on manuals and specifications 3.1.4. Accessing information and data	• Lecture-demonstration	• Oral questioning • Written test or examination	2 Hours
	3.2. Interpret manuals	3.2.1. Interpretation of symbols used in manuals 3.2.2. Lecture and discussion on system of measurements 3.2.3. Lecture on Unit conversion 3.2.4. Accessing information and data	• Actual demonstration • Group discussion	• Direct observation • Written test or examination	2 Hours
	3.3. Apply information in manual	3.3.1. Application of symbols in manuals 3.3.2. Applying conversion of units of measurements 3.3.3. Applying information from manuals	• Demonstration • Group discussion	• Demonstration Practical and oral exam	2 Hours
	3.4. Store Manual	3.4.1. Manual storing and maintaining procedures 3.4.2. Storing and maintaining manuals	• Demonstration • Group discussion	• Demonstration • Practical and oral exam	2 Hours
4. Maintain and operate line tools and equipment	4.1 Plan and prepare for work to operate and maintain tools and equipment	4.1.1 Acquire sample work instruction 4.1.2 Interpret sample work instruction 4.1.3 Identify necessary and appropriate occupational health and safety requirements based on job specification 4.1.4 Identify relevant distribution line tools, equipment and hardware based on job specifications	• Lecture • Discussion • Demonstration • Viewing multimedia • Hands on practice	• Observation in workplace • Demonstration • Oral questioning	2 hour
	4.2 Prepare hardware, tools and equipment for operation and maintenance	4.2.1 Enumerate the personal protective equipment in preparing tools, hardware and equipment as per job requirements 4.2.2 Procedures in acquiring distribution line tools, equipment and hardware	• Lecture • Discussion • Demonstration • Viewing multimedia • Hands on practice	• Observation in workplace • Demonstration • Oral questioning	2 hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
		4.2.3 Perform functionality test of electric distribution hot line tools as per manufacturers standards			
	4.3 Operate tools and equipment	4.3.1 Enumerate the personal protective equipment in operating tools, hardware and equipment as per job requirements 4.3.2 Discuss procedures in proper handling and application of tools and equipment based on job assignments 4.3.3 Discuss special features and function of identified tools and equipment	• Lecture • Discussion • Demonstration • Viewing multimedia • Hands on practice	• Observation in workplace • Demonstration • Oral questioning	4 hours
	4.4 Check condition of tools and equipment	4.4.1 Discuss and classify tools and equipment based on different usage and requirements 4.4.2 Study proper segregation of functional and non-functional tools and equipment 4.4.3 Analyze different safety procedures in handling tools and equipment as per manufacturer's instructions 4.4.4 Examine condition of personal protective equipment and tools	• Lecture • Discussion • Demonstration • Viewing multimedia • Hands on practice	• Observation in workplace • Demonstration • Oral questioning	2 hours
	4.5 Perform basic preventive maintenance	4.5.1 Identify appropriate and different types of lubricants for different type and condition of equipment. 4.5.2 Review lubrication procedures in every preventive maintenance 4.5.3 Explain and perform testing and cleaning of distribution line tools and equipment 4.5.4 Practice inspection of working and non-working tools and equipment 4.5.5 Perform repair and replacement of components and parts for damage and non-working equipment 4.5.6 Discuss good housekeeping after preventive maintenance procedure	• Lecture • Discussion • Demonstration • Viewing multimedia • Hands on practice	• Observation in workplace • Demonstration • Oral questioning	4 hours
	4.6 Store tools and equipment	4.6.1 Discuss proper inventory and auditing of tools and equipment as per company procedure 4.6.2 Describe and determine different storage places for different tools and equipment	• Lecture • Discussion • Demonstration • Viewing multimedia	• Observation in workplace • Demonstration • Oral questioning	2 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
		4.6.3 Identify conditions, weather and surroundings appropriate and not appropriate for storage of tools and equipment 4.6.4 Create checklist for inventory and auditing of tools and equipment	• Hands on practice		
5. Perform Computer Operations	5.1 Plan and prepare for task to be undertaken	5.1.1 Plan and prepare computer operation activity 5.1.2 Determine task requirements based on required output 5.1.3 Determine appropriate hardware and software 5.1.4 Identify/Select types of computers and basic features of different operating systems 5.1.5 Interpret and follow client-specific guidelines & procedures 5.1.6 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	2 hours
	5.2 Input data into computer	5.2.1 Apply basic ergonomics of keyboard and computer user 5.2.2 Enter/Encode data using appropriate computer programs/applications 5.2.3 Check accuracy of encoded data/information per SOP 5.2.4 Save and store inputted data in storage media 5.2.5 Storage devices and basic categories of memory 5.2.6 Identify and define relevant types of software	• Lecture • Modular • Group discussion • Project method • On the job training	• Written/Oral examination • Practical demonstration	2 hour
	5.3 Access information using computer	5.3.1 Select correct program/ application based on job requirements 5.3.2 Access computer data/files 5.3.3 Interpret general security, privacy legislation & copyright 5.3.4 Use Productivity Application ○ Microsoft office applications 5.3.5 Learn Business Application ○ Introduction to Basic Programming software 5.3.6 Apply basic ergonomics of keyboard and computer user	• Lecture • Computer based training (e-learning) • On the job training	• Written/Oral examination • Practical demonstration	2 hours
	5.4 Produce/ output data using	5.4.1 Identify types and function of computer peripheral devices	• Lecture • Group discussion	• Written/Oral examination	2 hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
	computer system	5.4.2 Print and scan office documents and materials 5.4.3 Send office/ business documents through facsimile 5.4.4 Transfer files or data between compatible systems using computer software, hardware/ peripheral devices 5.4.5 Save documents in storage devices a. CD/DVD b. USB drives c. Hard disk drives d. Cloud storage	• Modular • On the job training	• Practical demonstration	
	5.5 Maintain computer equipment and systems	5.5.1 Perform computer equipment/ system basic maintenance procedures e. Perform basic file maintenance procedures f. Perform cleaning of PC parts/ hardware components g. Scan/Debug computer software and applications h. Perform cleaning and defragmentation of computer files i. Perform backup of computer files 5.5.2 Enumerate and define different types of computer viruses	• Demonstration • Simulation • Modular • Video clips • Computer based training (e-learning)	• Written/Oral examination • Practical demonstration	4 hours

CORE COMPETENCIES
112 hours
[88 hrs + 24 hrs. (3 days Supervised-Industry Training / Practicum)]

*** Note:** Training providers must include separate modules or learning outcomes on Basic Electricity (including basic power generation, transmission and distribution), Industrial Safety and First Aid.

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
1. Replace electric distribution pole, pole top assembly and conductors	1.1. Plan and prepare for maintenance work	1.1.1. Lecture and discussion on: ○ Uses and specifications of distribution line tools, equipment and hardware ○ Relevant occupational safety requirements ○ Safety procedures for installing pole hardware and conductors ○ Power distribution industry standards and specifications	• Lecture • Discussion • Demonstration • Viewing multimedia • Hands on practice	• Demonstration • Oral questioning • Written exam	8 hours
	1.2. Replace electric distribution pole and pole top assembly	1.2.1. Lecture and discussion on: ○ Installation of grounding cluster ○ Different pole top assembly units ○ Pole climbing techniques ○ Procedures for installing pole hardware, conductors and equipment ○ Procedures in pole setting/erection 1.2.2. Removal of poles and accessories 1.2.3. Replacement of poles and accessories ○ Pole hole digging activity ○ Pole erection activity ○ Pole dressing activity	• Lecture • Discussion • Demonstration • Viewing multimedia • Hands on practice	• Demonstration • Oral questioning • Written exam • Laboratory exercises • Simulation exercises	24 hours
	1.3. Replace conductors/ wires	1.3.1. Lecture and discussion on: ○ Types and sizes of conductors/ wires ○ Proper use of compression connectors and splicing materials and tools. ○ Splicing techniques ○ Armoring and tying of conductors 1.3.2. Stringing (Payout) activity	• Lecture • Discussion • Demonstration • Viewing multimedia • Hands on practice	• Demonstration • Oral questioning • Written exam • Laboratory exercises	8 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		1.3.3. Tensioning activity 1.3.4. Armoring and tying activity		• Simulation exercises	
2. Install/ replace single-, three- or vee-phase distribution line equipment and devices	2.1. Plan and prepare for installation/ replacement work	2.1.1. Lecture and discussion on: ○ Uses and specifications of single-, three- or vee-phase distribution line equipment and devices. ○ Safety procedures for installing single-, three- or vee-phase distribution line equipment and devices.	• Lecture • Discussion • Demonstration • Viewing multimedia • Hands on practice	• Demonstration • Oral questioning • Written exam • Laboratory exercises • Simulation exercises	8 hours
	2.2. Install single-, three- or vee-phase line equipment and accessories	2.2.1. Lecture and demonstration on: ○ Types of lifting equipment. ○ Types of single-, three- or vee-phase line equipment and devices. ○ Line equipment and accessories installation procedures 2.2.2. Installation of lifting devices 2.2.3. Installation of pole clamp or bracket 2.2.4. Perform boring, if needed 2.2.5. Installation of line equipment and accessories	• Lecture • Discussion • Demonstration • Viewing multimedia • Hands on practice	• Demonstration • Oral questioning • Written exam • Laboratory exercises • Simulation exercises	8 hours
	2.3. Tap/ Connect single-, three- or vee-phase line equipment and devices to distribution line	2.3.1. Lecture and demonstration on: ○ Kinds of connectors. ○ Tapping and connection procedure of single-, three- or vee-phase equipment and devices. ○ Proper grounding procedure for single-, three- or vee-phase equipment and devices. 2.3.2. Installation of connectors/jumpers between line conductors and equipment 2.3.3. Installation of grounding for equipment 2.3.4. Perform line tapping or connection	• Lecture • Discussion • Demonstration • Viewing multimedia • Hands on practice	• Demonstration • Oral questioning • Written exam • Laboratory exercises • Simulation exercises	8 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
3. Install/ replace single-, three- or vee-phase consumer service connection facility	3.1. Plan and prepare for work	3.1.1. Lecture and discussion on: ○ Uses and specifications of single-, three- or vee-phase consumer service devices. ○ Safety procedures for installing single-, three- or vee-phase consumer service devices.	• Lecture • Discussion • Demonstration • Viewing multimedia • Hands on practice	• Demonstration • Oral questioning • Written exam • Laboratory exercises • Simulation exercises	4 hours
	3.2. Install/ Replace Service Drop	3.2.1. Lecture and discussion on: ○ Kinds of service drop accessories. ○ Types of service drop cables. ○ Safety procedures for proper installation/ replacement of service drop 3.2.2. Installation of service drop accessories and cables in conformity with road vertical clearances	• Lecture • Discussion • Demonstration • Viewing multimedia • Hands on practice	• Demonstration • Oral questioning • Written exam • Laboratory exercises • Simulation exercises	8 hours
	3.3. Install/ Replace single-, three- or vee-phase KWH meter	3.3.1. Lecture and discussion on: ○ Types of KWH meter. ○ Safety procedures for proper installation/ replacement of single-, three- or vee-phase KWH meter. ○ 5-S principles 3.3.2. Installation/replacement of single-, three- or vee-phase KWH meter ○ Socket-type ○ Bottom connected	• Lecture • Discussion • Demonstration • Viewing multimedia • Hands on practice	• Demonstration • Oral questioning • Written exam • Laboratory exercises • Simulation exercises	4 hours
4. Conduct vegetation clearing along distribution system	4.1. Plan, assess and prepare for work	4.1.1. Lecture and discussion on: ○ Types of trimming/ pruning tools and equipment. ○ Possible hazards encountered during clearing operation. ○ Traffic and road safety regulations and standards 4.1.2. Assessment of area to be cleared	• Lecture • Discussion • Demonstration • Viewing multimedia • Hands on practice	• Demonstration • Oral questioning • Written exam • Laboratory exercises	1 hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
				• Simulation exercises	
	4.2. Undertake clearing of vegetation	4.2.1. Lecture and discussion on: ○ Relevant occupational safety requirements in clearing of vegetation. ○ Road signage, barriers, warning devices. ○ Proper handling of pruning/ trimming tools and equipment 4.2.2. Installation/placement of signage and barricades 4.2.3. Perform trimming or pruning activity 4.2.4. Operate trimming or pruning tools and equipment 4.2.5. Checking of clearances from distribution line	• Lecture • Discussion • Demonstration • Viewing multimedia • Hands on practice	• Demonstration • Oral questioning • Written exam • Laboratory exercises • Simulation exercises	4 hours
	4.3. Complete pruning activity	4.3.1. Lecture and discussion on: ○ Waste disposal management regulations ○ Proper lifting or moving loads procedures. ○ Principles of good housekeeping 4.3.2. Removal of prunings and waste materials 4.3.3. Perform manual handling techniques in lifting or moving loads 4.3.4. Cleaning of trimming /pruning tools and equipment 4.3.5. Prepare accomplishment report as required	• Lecture • Discussion • Demonstration • Viewing multimedia • Hands on practice	• Demonstration • Oral questioning • Written exam • Laboratory exercises • Simulation exercises	3 hours
Supervised Industry Training (SIT)					24 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 performance of all specified competencies.

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:

    - 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.

    - **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.

3.3 TRAINEE ENTRY REQUIREMENTS

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

1. Must be a holder of certificate in or have completed training in Electric Power Distribution Line Construction NC II
2. Can communicate in oral and written language
3. Must be physically fit to undergo training

This list does not include specific institutional requirements such as written entrance exam, and other that may be required of the trainees by the school or training center delivering TVET program.

3.4 LIST OF TOOLS, EQUIPMENT AND MATERIALS

Recommended list of tools, equipment and materials for the training of 20 trainees for Electric Power Operation and Maintenance NC III:

TOOLS			EQUIPMENT		
QTY	**UNIT**	**ITEM**	**QTY**	**UNIT**	**ITEM**
2	units	Ordinary shovel	10	sets	Pole climbing equipment
2	units	Spoon shovel, 7 ft	4	units	Hole digger
2	units	Straight shovel, 7 ft.	1	unit	Telescopic ladder
2	units	Digging/tamping bar, 8', forge steel	1	pc.	KWH meter, 3-phase, bottom connected or socket type
2	units	Bolt cutter, 24" & 36", steel handle	3	units	DX transformer, 10 KVA, (busted) double bushing
2	units	Butting board (1"x6"x7" wood or steel)	1	unit each	Boom truck (with auger & man lift) and/or basket truck
2-25	meters	Bull line (3/4"∅ manila or polypropylene rope)	1	unit	Block and tackle, single, 5", 3/8" MSL 227 kg.
2	units	Rachet, 1.5 tons	1	unit	Double block, 5", 3/8", MSL 338 kg.
1	unit	Cant hook	1	unit	Stringing roller & block, brass steel
4	units	Auger bit, ¾", 5/8" & 11/16"∅	1	set	Grounding cluster, 3-phase, 15kV
4	units	Pole pike, assorted size			
2	sets	Pole Jenny (salagunting), 14 ft.			**Personal Protective Equipment (PPE)**
2	sets	Pole Jenny (salagunting), 18 ft.	10	pcs.	Hard hat/safety hat (full brim)
2	units	Cum-a-long (wire group)	10	pairs	Safety spectacles
1	unit	Conductor rack	10	pairs	Working gloves
1	unit	Transformer gin	10	pcs.	Full-body harness with big hook lanyard
2-60	ft. length	Hand line (1/2"∅ rope)	10	sets	Maong jacket, long sleeve
4	pcs.	Dead end loop clamp	10	pairs	Rubber gloves, 15 kV insulation
8	pcs.	Hot line clamp for 1/0 ACSR	10	pairs	Safety shoes, high cut with heels
2	units	Crimping tool, hydraulic			
2	units	Pruning saw, diff. sizes			
1	unit	Chainsaw, 24"			
2	units	Scythe			
		HANDTOOLS			
10	pcs.	Linemen's pliers, 9", insulated handle			
10	pcs.	Adjustable wrench, 12"			
10	pcs.	Ballpen hammer, 2 lbs; forge steel			
10	pcs.	Screw driver, 12", flat			
10	pcs.	Adjustable wrench, 12", forge steel			
10	pcs.	Skinning knife, 2 ¼", insulated			
10	pcs.	Canvas bag			
10	pcs.	Multi-tester			

HARDWARE/ ACCESSORIES					
QTY	**UNIT**	**ITEM**	**QTY**	**UNIT**	**ITEM**
6	pcs.	Cross arm, wood or steel, 10 ft. or 8 ft.	2	pcs.	Anchor rod 5/8"∅, Twin eye
12	pcs.	Pin insulator	2	pcs.	Anchor rod 5/8"∅, Single eye
12	pcs.	Steel pin	4	pcs.	Spool insulator, 1 ¾"
12	sets	Armor rod for # 1/0 AWG, ACSR	2	pcs.	Spool insulator, 3"
30	meters	# 1/0 AWG, ACSR	1	pc.	Ground rod 5/8x8'
50	pcs.	Strand of # 1/0 ACSR two (2) meters length	1	pc.	Ground rod clamp
2	pcs.	Pole, wood (tanalized), 40 ft., cl 2	4	pcs.	Eye bolt 5/8x10"
1	pc.	Pole, wood (tanalized), 35 ft., cl 2	12	pcs.	Eye bolt 5/8x12"
2	pcs.	Pole, wood (tanalized), 30 ft., cl 3	8	pcs.	Dead end loop clamp for 1/0 ACSR
1	pc.	Pole, wood (tanalized), 25 ft., cl 3	80	meters	Conductor ACSR, #1/0
8	pcs.	Cross-arm, 8 ft.	20	meters	Conductor ACSR, #4/0
3	pcs.	Pin insulator	40	meters	Conductor ACSR, #2
38	pcs.	Suspension insulator 6"	60	meters	Guy wire, 3/8"∅
18	pcs.	Dead end strain clamp, 1/0 ACSR	4	pcs.	Machine bolt, 5/8"x12
2	pcs.	Pole top pin	2	pcs.	V-brace, 60" span
12	pcs.	Double arming bolt 5/8x22"	4	pcs.	Machine bolt, ½ x 6"
14	pcs.	Eye nut, oval 5/8"	10	meters	Ground wire, 3 strand
1	pc.	Single upset bolt 5/8x10"	30	pcs.	Staple wire
1	pc.	Double upset bolt 5/8x10"	60	pcs.	Washer square, 1 3/16" hole, 2 ¼ x 2 ¼ x 3/16
2	pcs.	Pipe spacer 5/8"∅	60	pcs.	Lock nut 5/8"
12	pcs.	Ordinary brace, 28"	4	pcs.	Lock nut ½"
13	pcs.	Log screw	2	pcs.	Square washer 4"x4"
5	pcs.	Malleable guy attachment	4	pcs.	Anchor shackle
2	pcs.	Guy hook	15	meters	Duplex Wire, #6
2	pcs.	Guy plate	2	pcs.	Service Grip, secondary
10	pcs.	Three bolt clamp	6	meters	Insulated copper, #2 connector
2	pcs.	Guy grip, 3/8∅guy wire	1	pc.	Fuse cut-out with lighting arrester combination
4	pcs.	Dead-end strain clamp, 4/0"	3	pcs.	Compression connector, #1/0 - #2 ACSR
2	pcs.	Anchor log, 4 ft.	2	pcs.	Compression connector, #1/0 - #6 ACSR
2	pcs.	Anchor expanding			

3.5 TRAINING FACILITIES

Recommended space requirements for the various teaching/learning areas are as follows:

TEACHING/LEARNING AREAS	SIZE IN METERS (M)	AREA IN SQ. M	QTY	TOTAL AREA IN SQ. M
Lecture Area	8 x 10	80	1	80
Laboratory Area (field-based – 6 poles minimum)				500
Learning Resource Area	5 x 6	30	1	30
Clinic/Multi-purpose Area	4 x 5	20	1	20
Wash ,Toilet & Locker Room	3 x 5	15	1	15
Total				645
Facilities / Equipment / Circulation				195
Total Area				**840**

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

3.6 TRAINERS QUALIFICATIONS

Electric Power Distribution Operation and Maintenance NC III

- Holder of National TVET Trainer's Certificate (NTTC) Level 1 in Electric Power Distribution Operation and Maintenance NC III
- Must have at least 3-years relevant supervisory experience in distribution line works within the last 10 years, e.g. Line Supervisor/Lead Lineworker
- Must have completed the Basic Occupational Safety and Health (BOSH) Course and/or related Electrical Safety Training conducted by OSHC and DOLE accredited Safety Training Organizations
- Must be physically fit

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

SECTION 4 ASSESSMENT AND CERTIFICATION ARRANGEMENTS

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 The National Qualification of **ELECTRIC POWER DISTRIBUTION LINE OPERATION AND MAINTENANCE NC III** shall be obtained when a candidate demonstrate competence in all units of competency listed in Section 1. Successful candidates shall be awarded a National Certificate signed by the TESDA Director General.

4.1.2 The Qualification of **Electric Power Distribution Operation and Maintenance NC III** can be attained by demonstration of competence through project-type assessment covering all the units required.

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

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

4.1.4.1 Graduates of training on Electric Power Distribution Operation and Maintenance NC III;

4.1.4.2 Graduates of upgrading training on distribution line installation/construction, operation and maintenance from enterprise/s and an NC Holder in Electrical Power Distribution Line Construction NC II;

4.1.4.3 Existing NC holders in Electrical Power Distribution Line Construction NC II and has at least 3 years of work experience in distribution line installation/construction, operation and maintenance.

4.1.5 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 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 `

4.2.2 Accredited Assessment Center. Only Assessment Center accredited by TESDA is authorized to conduct competency assessment. Assessment centers undergo a quality assured procedure for accreditation before they are authorized by TESDA to manage the assessment for National Certification.

4.2.3 Accredited Competency Assessor. Only accredited competency assessor is authorized to conduct assessment of competence. Competency assessors undergo a quality assured system of accreditation procedure before they are authorized by TESDA to assess the competencies of candidates for National Certification.

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

19) **Resource Implication -** refer 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

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

21) **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

22) **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

23) **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

24) **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. **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. **Anchor Rod** – used for securing a machine, structure or part to masonry or other material.
3. **Block and Tackle -** is a combination or set of single or several sheaved blocks used to obtain a mechanical advantage in handling heavy loads**.**
4. **Cable Height Meter** - to determine the height of overhead cables
5. **Conductor –** is a conductive material usually made of aluminum or copper used to carry current along the overhead transmission or distribution line
6. **De-energized** – where electrical energy has been discharged through a mechanically secure connection to an effective ground potential
7. **Distribution system** – operating system which delivers energy from substation to customers and generally operates between 2400 volts to 34,500 volts.
8. **Energized** – capable of delivering energy by reason of being dynamically alive or charged
9. **Fault indicators –** device which indicates a defect or abnormal condition in a conductor
10. **Fiberglass reinforced plastic (ERP) tool –** insulated live-line tools; also known as hot stick, (see also Hot stick).
11. **Full Body Harness** - form of protective equipment designed to protect a person from injury due to falling
12. **Grounding** – placing interconnected parts at ground/earth potential
13. **Grounding Cluster** – used to protect personnel working in de-energized lines, from induced voltage, fault current feed, lightning strikes, erroneous switching & accidental contact with adjacent lines
14. **Ground line maintenance work –** refers to activities in the ground done by transmission line personnel which do not require climbing activity
15. **Groundworks** - a person working at ground level in support of a Line worker working overhead.
16. **Guy Wires –** high tensile steel wire attached to an anchor point which is installed to offset a conductor tension and equipment load**.**
17. **Guy-wire assembly** -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.
18. **Handline** - used for lifting or lowering small objects and also for holding equipment away from the pole as it is being raised
19. **Hazard** - a dangerous condition, potential or inherent, that can bring about an interruption or interfere with the expected orderly progress of an activity. It is any

work materials, equipment, methods or practices that have the potential to cause harm to life, health, property or environment.

20. **Hazardous** - an atmosphere that may expose employees to the risk of death, atmosphere incapacitation, impaired ability to self-rescue unaided, injury, or acute illness.
21. **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.
22. **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.”
23. **Hot stick** - an insulated stick, usually made of fiberglass, which is used to work energized overhead conductors and operate electrical equipment that is overhead, underground and pad mounted.
24. **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. 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.
25. **Line to line clearance** – refers to the distance of live conductors to another live conductor.
26. **Line to ground clearance** - refers to the distance of live conductors to the ground
27. **Line worker** - 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.
28. **Low voltage** – less than 1000 volts, used for connection between a residential or small commercial customer and the utility.
29. **Medium Voltage** (Distribution) – between 1000 volts (1 kV) and to about 33 kV, used for distribution in urban and rural areas.
30. **Lock-out and tag-out** – procedure to prevent unauthorized operation of equipment
31. **Maintenance programs** – preventive or pro-active programs to ensure reliability of system
32. **Meggering** – to apply potential to test electrical equipment for continuity and insulation
33. **Metering equipment** – equipment used to track customer consumption of electricity for billing purposes
34. **Personal Protective Equipment (PPE) -** refers to protective clothing, helmets, goggles, or other garment or equipment designed to protect line personnel from job-related occupational hazards

35. **Pole Dressing** – refers to installation of structure components, such as cross arms, insulators and etc.
36. **Potential** – latent energy (potential presence of voltage)
37. **Pole Setting** – refers to pole positioning, pole erection and pole facing.
38. **Primary –** voltage above 751 volts alternating current (distribution system)
39. **Rigging –** is the term used to describe the process of moving/lifting both heavy and light loads using rope, blocks, and other special equipment.
40. **Right of way (ROW)** – the legal right, established by usage or grant, to pass along a specific route through grounds or property belonging to another.
41. **Risks -** a probability or threat of damage, injury, liability, loss or any other negative occurrence that is caused by external or internal vulnerabilities, and that may be avoided through preemptive action.
42. **Secondary –** voltage 750 volts alternating current, and below (distribution system)
43. **Sectionalize –** to isolate or separate sections of line
44. **Slings** - provide a method of attaching rigging tools to structures or equipment. They can be made of rope, webbing or steel. Some slings are made with a continuous loop while others are made with an eye on each end.
45. **Slope Protection –** The protection of an embankment slope against wave action or erosion.
46. **Structure** – a device used to support conductors or cables and related equipment; for example, poles and towers
47. **Switching** – an operation that affects or modifies the status of a system
48. **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.
49. **Voltage Detector**- is a sensor used to detect presence of electricity in a wire.

ANNEX A - COMPETENCY MAP

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**	**Operate a personal computer**

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	Plan transmission line maintenance job	Install emergency restoration structure (ERS)
Inspect/Assess transmission line components' conditions	Implement transmission line maintenance works	Inspect transmission line, poles, towers and appurtenances	Erect distribution line poles	Climb pole and install pole assembly/conductors	Install distribution line equipment and devices	Install consumer service connection facility
Conduct initial root cause analysis	Perform ground transmission line works	Perform overhead maintenance works	Install/construct new transmission line structures	Perform overhead transmission line works	Install emergency restoration structure (ERS)	Perform earth ground resistance testing
Plan assigned maintenance work	Supervise transmission line maintenance work	Erect electric distribution pole	Install single-phase distribution line equipment and devices	Climb pole and install pole top assembly and conductors	Install single-phase consumer service connection facility	Replace electric distribution pole, pole top assembly and conductors
Install/Replace single-, three- or vee-phase distribution line equipment and devices	Install/Replace single-, three- or vee-phase consumer service connection facility	Conduct vegetation clearing along distribution system	Perform onsite assessment and testing of installed electric distribution line equipment and devices	Troubleshoot faults and implement solution on electric power distribution system	Supervise operation and maintenance on electric power distribution system	

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