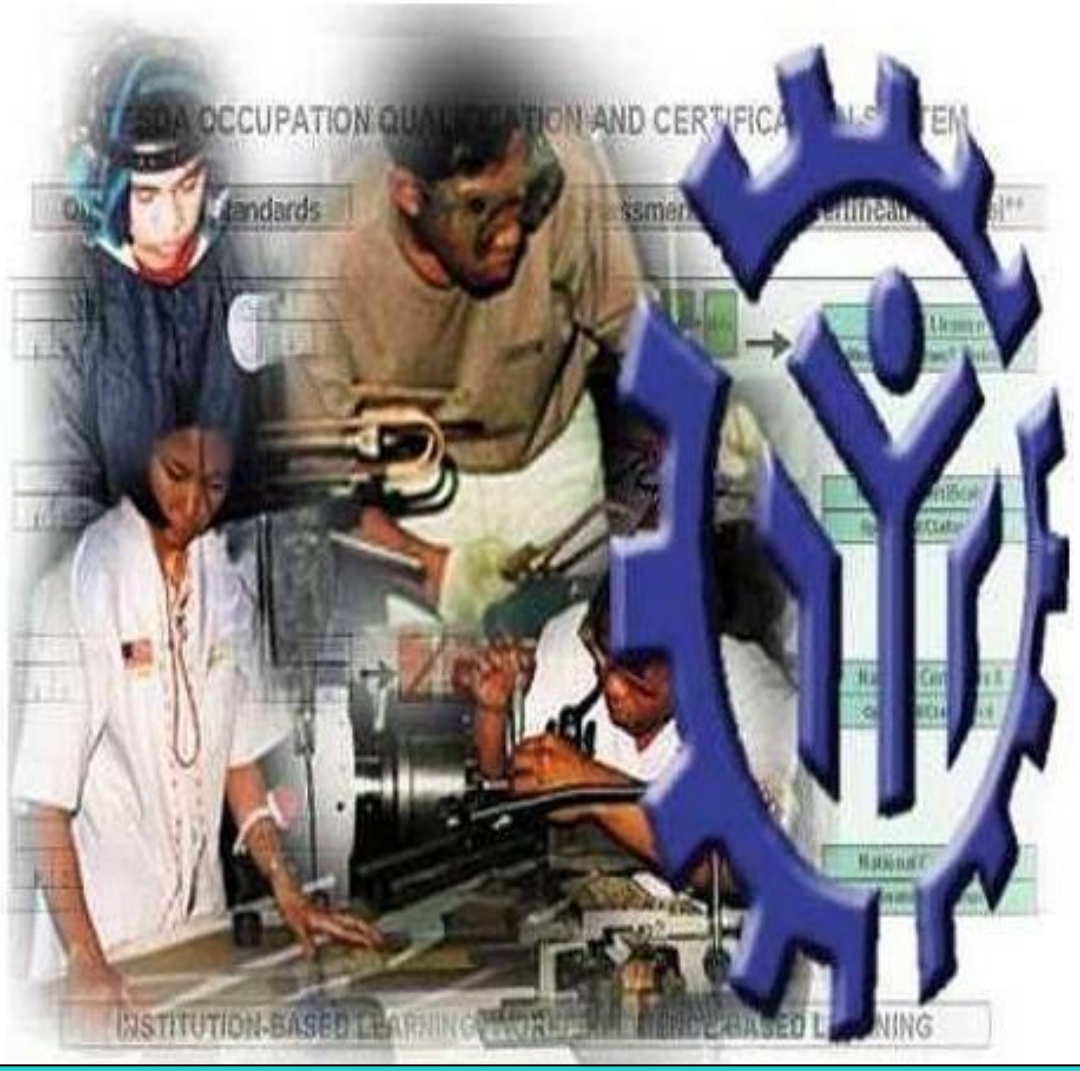
COMPETENCY STANDARDS

SOLAR NIGHT LIGHT AND POST LAMP ASSEMBLY AND INSTALLATION SERVICES LEVEL II



ELECTRICAL AND ELECTRONICS SECTOR

TECHNICAL EDUCATION AND SKILLS DEVELOPMENT AUTHORITY
Calubian National Vocational School, Brgy. Cabalquinto, Calubian, Leyte

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 Competency Standards (CS) serve as basis for the:

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

Each CS has two sections:

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

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

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ELECTRICAL AND ELECTRONICS SECTOR

SOLAR NIGHT LIGHT AND POST LAMP ASSEMBLY AND INSTALLATION SERVICES LEVEL II

COMPETENCY STANDARDS FOR

SOLAR NIGHT LIGHT AND POST LAMP ASSEMBLY AND INSTALLATION SERVICES LEVEL II

SECTION 1: SOLAR NIGHT LIGHT AND POST LAMP ASSEMBLY AND INSTALLATION SERVICES LEVEL II QUALIFICATION

The **SOLAR NIGHT LIGHT AND POST LAMP ASSEMBLY AND INSTALLATION SERVICES LEVEL II** Qualification consists of competencies that a person must achieve to enable him/her to perform site assessment, check solar night light and post lamp components and materials compliance, assemble, install and commission solar night light and post lamp and prepare documentation requirements for solar night light and post lamp installation**.**

The units of competency comprising this qualification include the following:

CODE	BASIC COMPETENCIES
400311210	Participate in workplace communication
400311211	Work in a team environment
400311212	Solve/address general workplace problems
400311213	Develop career and life decisions
400311214	Contribute to workplace innovation
400311215	Present relevant information
400311216	Practice occupational safety and health policies and procedures
400311217	Exercise efficient and effective sustainable practices in the workplace
400311218	Practice entrepreneurial skills in the workplace
CODE	**COMMON COMPETENCIES**
ELC311205	Use Hand Tools
ELC311201	Perform Mensuration and Calculation
ELC311202	Prepare and Interpret Technical Drawing
ELC311204	Apply Quality Standards
ELC311206	Terminate and Connect Electrical Wiring and Electronic Circuits
CODE	**CORE COMPETENCIES**
AB-ELC-0803713724301	Perform site assessment
AB-ELC-0803713724302	Check solar night light and post lamp components and materials compliance
AB-ELC-0803713724303	Assemble Solar Night Light and Post Lamp
AB-ELC-0803713724304	Install Solar Night Light and Post Lamp
AB-ELC-0803713724305	Prepare documentation requirements for solar night light and post lamp installation

A person who has achieved this Competency Standard is competent to be:

- Solar Night Light and Post Lamp Assembler/Installer

SECTION 2 COMPETENCY STANDARDS

This section gives the details of the contents of the basic, common, and core units of competency required in **SOLAR NIGHT LIGHT AND POST LAMP ASSEMBLY AND INSTALLATION SERVICES LEVEL II.**

BASIC COMPETENCIES

UNIT OF COMPETENCY : PARTICIPATE IN WORKPLACE COMMUNICATION

UNIT CODE : 400311210

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to gather, interpret and convey information in response to workplace requirements.

ELEMENTS	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Obtain and convey workplace information	1.1 Specific and relevant information is accessed from ***appropriate sources*** 1.2 Effective questioning, active listening and speaking skills are used to gather and convey information 1.3 Appropriate ***medium*** is used to transfer information and ideas 1.4 Appropriate non- verbal communication is used 1.5 Appropriate lines of communication with supervisors and colleagues are identified and followed 1.6 Defined workplace procedures for the location and ***storage*** of information are used 1.7 Personal interaction is carried out clearly and concisely.	1.1 Effective verbal and nonverbal communication 1.2 Different modes of communication 1.3 Medium of communication in the workplace 1.4 Organizational policies 1.5 Communication procedures and systems 1.6 Lines of Communication 1.7 Technology relevant to the enterprise and the individual's work responsibilities 1.8 Workplace etiquette	1.1 Following simple spoken language 1.2 Performing routine workplace duties following simple written notices 1.3 Participating in workplace meetings and discussions 1.4 Preparing work- related documents 1.5 Estimating, calculating and recording routine workplace measures 1.6 Relating/ Interacting with people of various levels in the workplace 1.7 Gathering and providing basic information in response to workplace requirements 1.8 Basic business writing skills 1.9 Interpersonal skills in the workplace 1.10 Active-listening skills

ELEMENTS	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Perform duties following workplace instructions	2.1 Written notices and instructions are read and interpreted in accordance with organizational guidelines 2.2 Routine written instruction are followed based on established procedures 2.3 Feedback is given to workplace supervisor based instructions/ information received 2.4 ***Workplace interactions*** are conducted in a courteous manner 2.5 Where necessary, clarifications about routine workplace procedures and matters concerning conditions of employment are sought and asked from ***appropriate sources*** 2.6 Meetings outcomes are interpreted and implemented	2.1 Effective verbal and non-verbal communication 2.2 Different modes of communication 2.3 Medium of communication in the workplace 2.4 Organizational/ Workplace policies 2.5 Communication procedures and systems 2.6 Lines of communication 2.7 Technology relevant to the enterprise and the individual's work responsibilities 2.8 Effective questioning techniques (clarifying and probing) 2.9 Workplace etiquette	2.1 Following simple spoken instructions 2.2 Performing routine workplace duties following simple written notices 2.3 Participating in workplace meetings and discussions 2.4 Completing work-related documents 2.5 Estimating, calculating and recording routine workplace measures 2.6 Relating/ Responding to people of various levels in the workplace 2.7 Gathering and providing information in response to workplace requirements 2.8 Basic questioning/querying 2.9 Skills in reading for information 2.10 Skills in locating

ELEMENTS	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Complete relevant work-related documents	3.1 Range of ***forms*** relating to conditions of employment are completed accurately and legibly 3.2 Workplace data is recorded on standard workplace forms and documents 3.3 Errors in recording information on forms/ documents are identified and acted upon 3.4 Reporting requirements to supervisor are completed according to organizational guidelines	3.1 Effective verbal and non-verbal communication 3.2 Different modes of communication 3.3 Workplace forms and documents 3.4 Organizational/ Workplace policies 3.5 Communication procedures and systems 3.6 Technology relevant to the enterprise and the individual's work responsibilities	3.1 Completing work-related documents 3.2 Applying operations of addition, subtraction, division and multiplication 3.3 Gathering and providing information in response to workplace requirements 3.4 Effective record keeping skills

RANGE OF VARIABLES

VARIABLES	RANGE
1. Appropriate sources	May include: 1.1. Team members 1.2. Supervisor/Department Head 1.3. Suppliers 1.4. Trade personnel 1.5. Local government 1.6. Industry bodies
2. Medium	May include: 2.1. Memorandum 2.2. Circular 2.3. Notice 2.4. Information dissemination 2.5. Follow-up or verbal instructions 2.6. Face-to-face communication 2.7. Electronic media (disk files, cyberspace)
3. Storage	May include: 3.1. Manual filing system 3.2. Computer-based filing system
4. Workplace interactions	May include: 4.1. Face-to-face 4.2. Telephone 4.3. Electronic and two-way radio 4.4. Written including electronic means, memos, instruction and forms 4.5. Non-verbal including gestures, signals, signs and diagrams
5. Forms	May include: 5.1. HR/Personnel forms, telephone message forms, safety reports

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1. Prepared written communication following standard format of the organization 1.2. Accessed information using workplace communication equipment/systems 1.3. Made use of relevant terms as an aid to transfer information effectively 1.4. Conveyed information effectively adopting formal or informal communication
2. Resource Implications	**The following resources should be provided:** 2.1. Fax machine 2.2. Telephone 2.3. Notebook 2.4. Writing materials 2.5. Computer with Internet connection
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1. Demonstration with oral questioning 3.2. Interview 3.3. Written test 3.4. Third-party report
4. Context for Assessment	4.1. Competency may be assessed individually in the actual workplace or through an accredited institution

UNIT OF COMPETENCY: WORK IN A TEAM ENVIRONMENT

UNIT CODE **400311211**

UNIT DESCRIPTOR **:** This unit covers the skills, knowledge and attitudes to identify one's roles and responsibilities as a member of a team.

ELEMENTS	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Describe team role and scope	1.1 The ***role and objective of the team*** is identified from available ***sources of information*** 1.2 Team parameters, reporting relationships and responsibilities are identified from team discussions and appropriate external sources	1.1 Group structure 1.2 Group development 1.3 Sources of information	1.1 Communicating with others, appropriately consistent with the culture of the workplace 1.2 Developing ways in improving work structure and performing respective roles in the group or organization
2. Identify one's role and responsibility within a team	2.1 Individual roles and responsibilities within the team environment are identified 2.2 Roles and objectives of the team is identified from available ***sources of information*** 2.3 Team parameters, reporting relationships and responsibilities are identified based on team discussions and appropriate external sources	2.1 Team roles and objectives 2.2 Team structure and parameters 2.3 Team development 2.4 Sources of information	2.1 Communicating with others, appropriately consistent with the culture of the workplace 2.2 Developing ways in improving work structure and performing respective roles in the group or organization
3. Work as a team member	3.1 Effective and appropriate forms of communications are used and interactions undertaken with team members based on company practices. 3.2 Effective and appropriate contributions made to complement team activities and objectives, based on ***workplace context*** 3.3 Protocols in reporting are observed based on standard company practices. 3.4 Contribute to the development of team work plans based on an understanding of team's role and objectives	3.1 Communication Process 3.2 Workplace communication protocol 3.3 Team planning and decision making 3.4 Team thinking 3.5 Team roles 3.6 Process of team development 3.7 Workplace context	3.1 Communicating appropriately, consistent with the culture of the workplace 3.2 Interacting effectively with others 3.3 Deciding as an individual and as a group using group think strategies and techniques 3.4 Contributing to Resolution of issues and concerns

RANGE OF VARIABLES

VARIABLE	RANGE
1. Role and objective of team	May include: 1.1. Work activities in a team environment with enterprise or specific sector 1.2. Limited discretion, initiative and judgement maybe demonstrated on the job, either individually or in a team environment
2. Sources of information	May include: 2.1. Standard operating and/or other workplace procedures 2.2. Job procedures 2.3. Machine/equipment manufacturer's specifications and instructions 2.4. Organizational or external personnel 2.5. Client/supplier instructions 2.6. Quality standards 2.7. OHS and environmental standards
3. Workplace context	May include: 3.1. Work procedures and practices 3.2. Conditions of work environments 3.3. Legislation and industrial agreements 3.4. Standard work practice including the storage, safe handling and disposal of chemicals 3.5. Safety, environmental, housekeeping and quality guidelines

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1. Worked in a team to complete workplace activity 1.2. Worked effectively with others 1.3. Conveyed information in written or oral form 1.4. Selected and used appropriate workplace language 1.5. Followed designated work plan for the job
2. Resource Implications	**The following resources should be provided:** 2.1. Access to relevant workplace or appropriately simulated environment where assessment can take place 2.2. Materials relevant to the proposed activity or tasks
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1. 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 3.4 Socio-drama and socio-metric methods 3.5 Sensitivity techniques 3.6 Written Test
4. Context for Assessment	4.1. Competency may be assessed in workplace or in a simulated workplace setting 4.2. Assessment shall be observed while task are being undertaken whether individually or in group

UNIT OF COMPETENCY: SOLVE/ADDRESS GENERAL WORKPLACE PROBLEMS

UNIT CODE : 400311212

UNIT DESCRIPTOR: This unit covers the knowledge, skills and attitudes required to apply problem-solving techniques to determine the origin of problems and plan for their resolution. It also includes addressing procedural problems through documentation, and referral.

ELEMENTS	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify routine problems	1.1 Routine **problems or procedural problem** areas are identified 1.2 Problems to be investigated are defined and determined 1.3 Current conditions of the problem are identified and documented	1.1 Current industry hardware and software products and services 1.2 Industry maintenance, service and helpdesk practices, processes and procedures 1.3 Industry standard diagnostic tools 1.4 Malfunctions and resolutions	1.1 Identifying current industry hardware and software products and services 1.2 Identifying current industry maintenance, services and helpdesk practices, processes and procedures. 1.3 Identifying current industry standard diagnostic tools 1.4 Describing common malfunctions and resolutions. 1.5 Determining the root cause of a routine malfunction
2. Look for solutions to routine problems	2.1 Potential solutions to problem are identified 2.2 Recommenda-tions about possible solutions are developed, **documented**, ranked and presented to ***appropriate person*** for decision	2.1 Current industry hardware and software products and services 2.2 Industry service and helpdesk practices, processes and procedures 2.3 Operating systems 2.4 Industry standard diagnostic tools 2.5 Malfunctions and resolutions. 2.6 Root cause analysis	2.1 Identifying current industry hardware and software products and services 2.2 Identifying services and helpdesk practices, processes and procedures. 2.3 Identifying operating system 2.4 Identifying current industry standard diagnostic tools 2.5 Describing common malfunctions and resolutions. 2.6 Determining the root cause of a routine malfunction
3. Recommend solutions to problems	3.1 Implementation of solutions are **planned** 3.2 Evaluation of implemented solutions are planned 3.3 Recommended solutions are documented and submit to appropriate person for confirmation	3.1 Standard procedures 3.2 Documentation produce	3.1 Producing documentation that recommends solutions to problems 3.2 Following established procedures

RANGE OF VARIABLES

VARIABLE	RANGE
1. Problems/ Procedural Problem	May include: 1.1 Routine/non – routine processes and quality problems 1.2 Equipment selection, availability and failure 1.3 Teamwork and work allocation problem 1.4 Safety and emergency situations and incidents 1.5 Work-related problems outside of own work area
2. Appropriate person	May include: 2.1 Supervisor or manager 2.2 Peers/work colleagues 2.3 Other members of the organization
3. Document	May include: 3.1 Electronic mail 3.2 Briefing notes 3.3 Written report 3.4 Evaluation report
4. Plan	May include: 4.1 Priority requirements 4.2 Coordination and feedback requirements 4.3 Safety requirements 4.4 Risk assessment 4.5 Environmental requirements

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Determined the root cause of a routine problem 1.2 Identified solutions to procedural problems. 1.3 Produced documentation that recommends solutions to problems. 1.4 Followed established procedures. 1.5 Referred unresolved problems to support persons.
2. Resource Implications	2.1. Assessment will require access to a workplace over an extended period, or a suitable method of gathering evidence of operating ability over a range of situations.
3. Methods of Assess-ment	**Competency in this unit may be assessed through:** 3.1 Case Formulation 3.2 Life Narrative Inquiry 3.3 Standardized test 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 Competency may be assessed individually in the actual workplace or simulation environment in TESDA accredited institutions.

UNIT OF COMPETENCY: DEVELOP CAREER AND LIFE DECISIONS

UNIT CODE : 400311213

UNIT DESCRIPTOR : This unit covers the knowledge, skills, and attitudes in managing one's emotions, developing reflective practice, and boosting self-confidence and developing self-regulation.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Manage one's emotion	1.1 **Self-management strategies** are identified 1.2 Skills to work independently and to show initiative, to be conscientious, and persevering in the face of setbacks and frustrations are developed 1.3 Techniques for effectively handling negative emotions and **unpleasant situation i**n the workplace are examined	1.1 Self-management strategies that assist in regulating behavior and achieving personal and learning goals (e.g. Nine self-management strategies according to Robert Kelley) 1.2 Enablers and barriers in achieving personal and career goals 1.3 Techniques in handling negative emotions and unpleasant situation in the workplace such as frustration, anger, worry, anxiety, etc.	1.1 Managing properly one's emotions and recognizing situations that cannot be changed and accept them and remain professional 1.2 Developing self-discipline, working independently and showing initiative to achieve personal and career goals 1.3 Showing confidence, and resilience in the face of setbacks and frustrations and other negative emotions and unpleasant situations in the workplace

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Develop reflective practice	2.1 Personal strengths and achievements, based on self-assessment strategies and teacher feedback are contemplated 2.2 Progress when seeking and responding to feedback from teachers to assist them in consolidating strengths, addressing weaknesses and fulfilling their potential are monitored 2.3 Outcomes of personal and academic challenges by reflecting on previous problem solving and decision making strategies and feedback from peers and teachers are predicted	2.1 Basic SWOT analysis 2.2 Strategies to improve one's attitude in the workplace 2.3 Gibbs' Reflective Cycle/Model (Description, Feelings, Evaluation, Analysis, Conclusion, and Action plan)	2.1 Using the basic SWOT analysis as self-assessment strategy 2.2 Developing reflective practice through realization of limitations, likes/ dislikes; through showing of self-confidence 2.3 Demonstrating self-acceptance and being able to accept challenges
3. Boost self-confidence and develop self-regulation	3.1 Efforts for continuous self-improvement are demonstrated 3.2 Counter-productive tendencies at work are eliminated 3.3 Positive outlook in life are maintained.	3.1 Four components of self-regulation based on Self-Regulation Theory (SRT) 3.2 Personality development concepts 3.3 Self-help concepts (e. g., 7 Habits by Stephen Covey, transactional analysis, psycho-spiritual concepts)	3.1 Performing effective communication skills – reading, writing, conversing skills 3.2 Showing affective skills – flexibility, adaptability, etc. 3.3 Self-assessment for determining one's strengths and weaknesses

RANGE OF VARIABLES

VARIABLE	RANGE
1. Self-management strategies	May include: 1.1 Seeking assistance in the form of job coaching or mentoring 1.2 Continuing dialogue to tackle workplace grievances 1.3 Collective negotiation/bargaining for better working conditions 1.4 Share your goals to improve with a trusted co-worker or supervisor 1.5 Make a negativity log of every instance when you catch yourself complaining to others 1.6 Make lists and schedules for necessary activities
2. Unpleasant situation	May include: 2.1 Job burn-out 2.2 Drug dependence 2.3 Sulking

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Express emotions appropriately 1.2 Work independently and show initiative 1.3 Consistently demonstrate self-confidence and self-discipline
2. Resource Implications	**The following resources should be provided:** 2.1. Access to workplace and resource s 2.2. Case studies
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1. Demonstration or simulation with oral questioning 3.2. Case problems involving work improvement and sustainability issues 3.3. Third-party report
4. Context for Assessment	4.1. Competency assessment may occur in workplace or any appropriately simulated environment

UNIT OF COMPETENCY: CONTRIBUTE TO WORKPLACE INNOVATION

UNIT CODE : 400311214

UNIT DESCRIPTOR : This unit covers the knowledge, skills and Attitudes required to make a pro-active and positive contribution to workplace innovation.

ELEMENTS	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify opportunities to do things better	1.1 ***Opportunities for improvement*** are identified proactively in own area of work. 1.2 ***Information*** are gathered and reviewed which may be relevant to ideas and which might assist in gaining support for idea.	1.1 Roles of individuals in suggesting and making improvements. 1.2 Positive impacts and challenges in innovation. 1.3 Types of changes and responsibility. 1.4 Seven habits of highly effective people.	1.1 Identifying opportunities to improve and to do things better. Involvement. 1.2 Identifying the positive impacts and the challenges of change and innovation. 1.3 Identifying examples of the types of changes that are within and outside own scope of responsibility
2. Discuss and develop ideas with others	2.1 ***People who could provide input*** to ideas for improvements are identified. 2.2 Ways of approaching people to begin sharing ideas are selected. 2.3 Meeting is set with relevant people. 2.4 Ideas for follow up are review and selected based on feedback. 2.5 ***Critical inquiry method*** is used to discuss and develop ideas with others.	2.1 Roles of individuals in suggesting and making improvements. 2.2 Positive impacts and challenges in innovation. 2.3 Types of changes and responsibility. 2.4 Seven habits of highly effective people.	2.1 Identifying opportunities to improve and to do things better. Involvement. 2.2 Identifying the positive impacts and the challenges of change and innovation. 2.3 Providing examples of the types of changes that are within and outside own scope of responsibility 2.4 Communicating ideas for change through small group discussions and meetings.

ELEMENTS	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Integrate ideas for change in the workplace	3.1 Critical inquiry method is used to integrate different ideas for change of key people. 3.2 Summarizing, analyzing and generalizing skills are used to extract salient points in the pool of ideas. 3.3 ***Reporting skills*** are likewise used to communicate results. 3.4 ***Current Issues and concerns*** on the systems, processes and procedures, as well as the need for simple innovative practices are identified.	3.1 Roles of individuals in suggesting and making improvements. 3.2 Positive impacts and challenges in innovation. 3.3 Types of changes and responsibility. 3.4 Seven habits of highly effective people. 3.5 Basic research skills.	3.1 Identifying opportunities to improve and to do things better. Involvement. 3.2 Identifying the positive impacts and the challenges of change and innovation. 3.3 Providing examples of the types of changes that are within and outside own scope of responsibility. 3.4 Communicating ideas for change through small group discussions and meetings. 3.5 Demonstrating skills in analysis and interpretation of data.

RANGE OF VARIABLES

VARIABLES	RANGE
1. Opportunities for improvement	May include: 1.1 Systems. 1.2 Processes. 1.3 Procedures. 1.4 Protocols. 1.5 Codes. 1.6 Practices.
2. Information	May include: 2.1 Workplace communication problems. 2.2 Performance evaluation results. 2.3 Team dynamics issues and concerns. 2.4 Challenges on return of investment 2.5 New tools, processes and procedures. 2.6 New people in the organization.
3. People who could provide input	May include: 3.1 Leaders. 3.2 Managers. 3.3 Specialists. 3.4 Associates. 3.5 Researchers. 3.6 Supervisors. 3.7 Staff. 3.8 Consultants (external) 3.9 People outside the organization in the same field or similar expertise/industry. 3.10 Clients
4. Critical inquiry method	May include: 4.1 Preparation. 4.2 Discussion. 4.3 Clarification of goals. 4.4 Negotiate towards a Win-Win outcome. 4.5 Agreement. 4.6 Implementation of a course of action. 4.7 Effective verbal communication. See our pages: Verbal Communication and Effective Speaking. 4.8 Listening. 4.9 Reducing misunderstandings is a key part of effective negotiation. 4.10 Rapport Building. 4.11 Problem Solving. 4.12 Decision Making. 4.13 Assertiveness. 4.14 Dealing with Difficult Situations.
5. Reporting skills	May include: 5.1 Data management. 5.2 Coding. 5.3 Data analysis and interpretation. 5.4 Coherent writing. 5.5 Speaking.

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Identified opportunities to do things better. 1.2 Discussed and developed ideas with others on how to contribute to workplace innovation. 1.3 Integrated ideas for change in the workplace. 1.4 Analyzed and reported rooms for innovation and learning in the workplace.
2. Resource Implications	The following resources should be provided: 2.1 Pens, papers and writing implements. 2.2 Cartolina. 2.3 Manila papers.
3. Methods of Assessment	Com etency in this unit may be assessed through: 3.1 Psychological and behavioral Interviews. 3.2 Performance Evaluation. 3.3 Life Narrative Inquiry. 3.4 Review of portfolios of evidence and third-party workplace reports of on-the-job performance. 3.5 Sensitivity analysis. 3.6 Organizational analysis. 3.7 Standardized assessment of character strengths and virtues applied.
4. Context for Assessment	4.1 Competency may be assessed individually in the actual workplace or simulation environment in TESDA accredited institutions.

UNIT OF COMPETENCY : **PRESENT RELEVANT INFORMATION**

UNIT CODE : **400311215**

UNIT DESCRIPTOR : This unit of covers the knowledge, skills and attitudes required to present data/information appropriately.

ELEMENTS	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Gather data/ information	1.1 Evidence, facts and information are collected 1.2 Evaluation, terms of reference and conditions are reviewed to determine whether data/information falls within project scope	1.1 Organizational protocols 1.2 Confidentiality 1.3 Accuracy 1.4 Business mathematics and statistics 1.5 Data analysis techniques/ procedures 1.6 Reporting requirements to a range of audiences 1.7 Legislation, policy and procedures relating to the conduct of evaluations 1.8 Organizational values, ethics and codes of conduct	1.1 Describing organizational protocols relating to client liaison 1.2 Protecting confidentiality 1.3 Describing accuracy 1.4 Computing business mathematics and statistics 1.5 Describing data analysis techniques/ procedures 1.6 Reporting requirements to a range of audiences 1.7 Stating legislation, policy and procedures relating to the conduct of evaluations 1.8 Stating organizational values, ethics and codes of conduct
2. Assess gathered data/ information	2.1 Validity of data/ information is assessed 2.2 Analysis techniques are applied to assess data/ information. 2.3 Trends and anomalies are identified 2.4 ***Data analysis techniques*** and procedures are documented 2.5 Recommenda-tion s are made on areas of possible improvement.	2.1 Business mathematics and statistics 2.2 Data analysis techniques/ procedures 2.3 Reporting requirements to a range of audiences 2.4 Legislation, policy and procedures relating to the conduct of evaluations 2.5 Organizational values, ethics and codes of conduct	2.1 Computing business mathematics and statistics 2.2 Describing data analysis techniques/ procedures 2.3 Reporting requirements to a range of audiences 2.4 Stating legislation, policy and procedures relating to the conduct of evaluations 2.5 Stating organizational values, ethics and codes of conduct

ELEMENTS	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Record and present information	3.1 Studied data/information are recorded. 3.2 Recommendations are analyzed for action to ensure they are compatible with the project's scope and terms of reference. 3.3 Interim and final reports are analyzed and outcomes are compared to the criteria established at the outset. 3.4 Findings are presented to stakeholders.	3.1 Data analysis techniques/ procedures 3.2 Reporting requirements to a range of audiences 3.3 Legislation, policy and procedures relating to the conduct of evaluations 3.4 Organizational values, ethics and codes of conduct	3.1 Describing data analysis techniques/ procedures 3.2 Reporting requirements to a range of audiences 3.3 Stating legislation, policy and procedures relating to the conduct of evaluations 3.4 Stating organizational values, ethics and codes of conduct practices

RANGE OF VARIABLES

VARIABLES	RANGE
1. Data analysis techniques	May include: 1.1. Domain analysis 1.2. Content analysis 1.3. Comparison technique

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Determine data / information 1.2 Studied and applied gathered data/information 1.3 Recorded and studied data/information These aspects may be best assessed using a range of scenarios 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	**Specific resources for assessment** 2.1. Evidence of competent performance should be obtained by observing an individual in an information management role within the workplace or operational or simulated environment.
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1. Written Test 3.2. Interview 3.3. Portfolio 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: PRACTICE OCCUPATIONAL SAFETY AND HEALTH POLICIES AND PROCEDURES

UNIT CODE 400311216

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to identify OSH compliance requirements, prepare OSH requirements for compliance, and perform tasks in accordance with relevant OSH policies and procedures

ELEMENTS	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify OSH compliance requirements	1.1 Relevant ***OSH requirements, regulations, policies and procedures*** are identified in accordance with workplace policies and procedures 1.2 OSH activity non-conformities are conveyed to ***appropriate personnel*** 1.3 ***OSH preventive and control requirements*** are identified in accordance with OSH work policies and procedures	1.1. OSH preventive and control requirements 1.2. Hierarchy of Controls 1.3. Hazard Prevention and Control 1.4. General OSH principles 1.5. Work standards and procedures 1.6. Safe handling procedures of tools, equipment and materials 1.7. Standard emergency plan and procedures in the workplace	1.1. Communication skills 1.2. Interpersonal skills Critical thinking skills 1.4. Observation skills
2. Prepare OSH requirements for compliance	2.1 OSH work activity material, tools and equipment requirements are identified in accordance with workplace policies and procedures 2.2. Required OSH materials, tools and equipment are acquired in accordance with workplace policies and procedures 2.3. Required OSH materials, tools and equipment are arranged/ placed in accordance with OSH work standards	2.1. Resources necessary to execute hierarchy of controls 2.2. General OSH principles 2.3. Work standards and procedures 2.4. Safe handling procedures of tools, equipment and materials 2.5. Different OSH control measures	2.1. Communication skills 2.2. Estimation skills 2.3. Interpersonal skills 2.4. Critical thinking skills 2.5. Observation skills 2.6. Material, tool and equipment identification skills

ELEMENTS	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Perform tasks in accordance with relevant OSH policies and procedures	3.1 Relevant OSH work procedures are identified in accordance with workplace policies and procedures 3.2 Work Activities are executed in accordance with OSH work standards 3.3 ***Non-compliance work activities*** are reported to *appropriate personnel*	3.1. OSH work standards 3.2. Industry related work activities 3.3. General OSH principles 3.4. OSH Violations Non-compliance work activities	3.1 Communication skills 3.3 Interpersonal skills 3.4 Troubleshooting skills 3.5 Critical thinking skills 3.6 Observation skills

RANGE OF VARIABLES

VARIABLE	RANGE
1. OSH Requirements, Regulations, Policies and Procedures	May include: 1.1 Clean Air Act 1.2 Building code 1.3 National Electrical and Fire Safety Codes 1.4 Waste management statutes and rules 1.5 Permit to Operate 1.6 Philippine Occupational Safety and Health Standards 1.7 Department Order No. 13 (Construction Safety and Health) 1.8 ECC regulations
2. Appropriate Personnel	May include: 2.1 Manager 2.2 Safety Officer 2.3 EHS Offices 2.4 Supervisors 2.5 Team Leaders 2.6 Administrators 2.7 Stakeholders 2.8 Government Official 2.9 Key Personnel 2.10 Specialists 2.11 Himself
3. OSH Preventive and Control Requirements	May include: 3.1 Resources needed for removing hazard effectively 3.2 Resources needed for substitution or replacement 3.3 Resources needed to establishing engineering controls 3.4 Resources needed for enforcing administrative controls 3.5 Personal Protective equipment
4. Non OSH-Compliance Work Activities	May include non-compliance or observance of the following safety measures: 4.1 Violations that may lead to serious physical harm or death 4.2 Fall Protection 4.3 Hazard Communication 4.4 Respiratory Protection 4.5 Power Industrial Trucks 4.6 Lockout/Tag-out 4.7 Working at heights (use of ladder, scaffolding) 4.8 Electrical Wiring Methods 4.9 Machine Guarding 4.10 Electrical General Requirements 4.11 Asbestos work requirements 4.12 Excavations work requirements

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1. Convey OSH work non-conformities to appropriate personnel 1.2. Identify OSH preventive and control requirements in accordance with OSH work policies and procedures 1.3. Identify OSH work activity material, tools and equipment requirements in accordance with workplace policies and procedures 1.4. Arrange/Place required OSH materials, tools and equipment in accordance with OSH work standards 1.5. Execute work activities in accordance with OSH work standards 1.6. Report OSH activity non-compliance work activities to appropriate personnel
2. Resource Implications	**The following resources should be provided:** 2.1 Facilities, materials tools and equipment necessary for the activity
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Observation/Demonstration with oral questioning 3.2 Third party report
4. Context for Assessment	4.1 Competency may be assessed in the work place or in a simulated work place setting

UNIT OF COMPETENCY: **EXERCISE EFFICIENT AND EFFECTIVE SUSTAINABLE PRACTICES IN THE WORKPLACE**

UNIT CODE : 400311217

UNIT DESCRIPTOR : This unit covers knowledge, skills and attitude to identify the efficiency and effectiveness of resource utilization, determine causes of inefficiency and/or ineffectiveness of resource utilization and Convey inefficient and ineffective environmental practices.

ELEMENTS	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify the efficiency and effectiveness of resource utilization	1.1 Required resource utilization in the workplace is measured using appropriate techniques 1.2 Data are recorded in accordance with workplace protocol 1.3 Recorded data are compared to determine the efficiency and effectiveness of resource utilization according to established ***environmental work procedures***	1.1. Importance of Environmental Literacy 1.2. Environmental Work Procedures 1.3. Waste Minimization 1.4. Efficient Energy Consumptions	1.1 Recording Skills 1.2 Writing Skills 1.3 Innovation Skills
2. Determine causes of inefficiency and/or ineffectiveness of resource utilization	2.1 Potential causes of inefficiency and/or ineffectiveness are listed 2.2 Causes of inefficiency and/or ineffectiveness are identified through deductive reasoning 2.3 Identified causes of inefficiency and/or ineffectiveness are validated thru established environmental procedures	2.1 Causes of environmental inefficiencies and ineffectiveness	2.1 Deductive Reasoning Skills 2.2 Critical thinking 2.3 Problem Solving 2.4 Observation Skills
3. Convey inefficient and ineffective environmental practices	3.1 Efficiency and effectiveness of resource utilization are reported to *appropriate personnel* 3.2 Concerns related resource utilization are discussed with appropriate personnel 3.3 Feedback on information/ concerns raised are clarified with appropriate personnel	3.1 Appropriate Personnel to address the environmental hazards 3.2 Environmental corrective actions	3.1 Written and Oral Communication Skills 3.2 Critical thinking 3.3 Problem Solving 3.4 Observation Skills 3.5 Practice Environmental Awareness

RANGE OF VARIABLES

VARIABLE	RANGE
1. Environmental Work Procedures	May include: 1.1 Utilization of Energy, Water, Fuel Procedures 1.2 Waster Segregation Procedures 1.3 Waste Disposal and Reuse Procedures 1.4 Waste Collection Procedures 1.5 Usage of Hazardous Materials Procedures 1.6 Chemical Application Procedures 1.7 Labeling Procedures
2. Appropriate Personnel	May include: 2.1 Manager 2.2 Safety Officer 2.3 EHS Offices 2.4 Supervisors 2.5 Team Leaders 2.6 Administrators 2.7 Stakeholders 2.8 Government Official 2.9 Key Personnel 2.10 Specialists 2.11 Himself

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1. Measured required resource utilization in the workplace using appropriate techniques 1.2. Recorded data in accordance with workplace protocol 1.3. Identified causes of inefficiency and/or ineffectiveness through deductive reasoning 1.4. Validate the identified causes of inefficiency and/or ineffectiveness thru established environmental procedures 1.5. Report efficiency and effectives of resource utilization to appropriate personnel 1.6. Clarify feedback on information/concerns raised with appropriate personnel
2. Resource Implications	**The following resources should be provided:** 2.1 Workplace 2.2 Tools, materials and equipment relevant to the tasks 2.3 PPE 2.4 Manuals and references
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Demonstration 3.2 Oral questioning 3.3 Written examination
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 : PRACTICE ENTREPRENEURIAL SKILLS IN THE WORKPLACE

UNIT CODE : 400311218

UNIT DESCRIPTOR: This unit covers the outcomes required to apply entrepreneurial workplace best practices and implement cost-effective operations

ELEMENTS	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Apply entrepreneurial workplace best practices	1.1 Good ***practices*** relating to workplace operations are observed and selected following workplace policy. 1.2 Quality procedures and practices are complied with according to workplace requirements. 1.3 Cost-conscious habits in ***resource utilization*** are applied based on industry standards.	1.1 Workplace best practices, policies and criteria 1.2 Resource utilization 1.3 Ways in fostering entrepreneurial attitudes: 1.3.1 Patience 1.3.2 Honesty 1.3.3 Quality-consciousness 1.3.4 Safety-consciousness 1.3.5 Resourcefulness	1.1 Communication skills 1.2 Complying with quality procedures
2. Communicate entrepreneurial workplace best practices	2.1 Observed Good practices relating to workplace operations are communicated to **appropriate person**. 2.2 Observed quality procedures and practices are communicated to appropriate person 2.3 Cost-conscious habits in ***resource utilization*** are communicated based on industry standards.	2.1 Workplace best practices, policies and criteria 2.2 Resource utilization 2.3 Ways in fostering entrepreneurial attitudes: 2.3.1 Patience 2.3.2 Honesty 2.3.3 Quality-consciousness 2.3.4 Safety-consciousness 2.3.5 Resourcefulness	2.1 Communication skills 2.2 Complying with quality procedures 2.3 Following workplace communication protocol

ELEMENTS	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Implement cost-effective operations	3.1 Preservation and optimization of workplace resources is implemented in accordance with enterprise policy 3.2 Judicious use of workplace tools, equipment and materials are observed according to manual and work requirements. 3.3 Constructive contributions to office operations are made according to enterprise requirements. 3.4 Ability to work within one's allotted time and finances is sustained.	3.1 Optimization of workplace resources 3.2 5S procedures and concepts 3.3 Criteria for cost-effectiveness 3.4 Workplace productivity 3.5 Impact of entrepreneurial mindset to workplace productivity 3.6 Ways in fostering entrepreneurial attitudes: - Quality-consciousness - Safety-consciousness	3.1 Implementing preservation and optimizing workplace resources 3.2 Observing judicious use of workplace tools, equipment and materials 3.3 Making constructive contributions to office operations 3.4 Sustaining ability to work within allotted time and finances

RANGE OF VARIABLES

VARIABLE	RANGE
1.Good practices	May include: 1.1 Economy in use of resources 1.2 Documentation of quality practices
2.Resources utilization	May include: 2.1 Consumption/ use of consumables 2.2 Use/Maintenance of assigned equipment and furniture 2.3 Optimum use of allotted /available time

EVIDENCE GUIDE

1. Critical aspects of competency	**Assessment requires evidence that the candidate:** 1.1 Demonstrated ability to identify and sustain cost-effective activities in the workplace 1.2 Demonstrated ability to practice entrepreneurial knowledge, skills and attitudes in the workplace.
2. Resource Implications	The following resources should be provided: 2.1 Simulated or actual workplace 2.2 Tools, materials and supplies needed to demonstrate the required tasks 2.3 References and manuals 2.3.1 Enterprise procedures manuals 2.3.2 Company quality policy
3. Methods of Assessment	**Competency in this unit should be assessed through:** 3.1 Interview 3.2 Third-party report
4.Context of Assessment	4.1 Competency may be assessed in workplace or in a simulated workplace setting 4.2 Assessment shall be observed while tasks are being undertaken whether individually or in-group

COMMON COMPETENCIES

UNIT TITLE : USE HAND TOOLS

UNIT CODE : ELC311205

UNIT DESCRIPTOR: This unit covers the knowledge, skills and attitudes on the safe use, handling and maintenance of tools.

ELEMENT	PERFORMANCE CRITERIA ***Italicized Bold*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Plan and prepare for tasks to be undertaken	1.1. Tasks to be undertaken are properly identified 1.2. Appropriate ***hand tools*** are identified and selected according to the task requirements	**SCIENCE** 1.1. Planning and preparing activity 1.2. Electronics hand tools and their uses 1.3. Function, operation and common faults in electronics hand tools	1.1 Preparing required tasks 1.2 Communication skills 1.3 Using hand tools properly
2. Prepare hand tools	2.1. Appropriate hand tools are checked for proper operation and safety 2.2. Unsafe or faulty tools are identified and marked for repair according to standard company procedure	**SCIENCE** 2.1 Checking and safety requirements in handling tools 2.2 Standard procedures in checking, identification and marking of safe or unsafe/ faulty tools	2.1 Identifying and checking hand tools 2.2 Marking of safe or unsafe/ faulty hand tools
3. Use appropriate hand tools and test equipment	3.1. Tools are used according to tasks undertaken 3.2. All safety procedures in using tools are observed at all times and appropriate ***personal protective equipment*** (PPE) are used 3.3. Malfunctions, unplanned or unusual events are reported to the supervisor	**SCIENCE** 3.1 Safety requirements in using electronics hand tools and test equipment 3.2 Electronics hand tools for adjusting, dismantling, assembling, finishing, and cutting. 3.3 Processes, Operations, Systems 3.3.1 Proper usage and care of hand tools 3.3.2 Types and uses of test equipment 3.3.3 Common faults in the use of hand tool	3.1Reading skills required to interpret work instruction and numerical skills 3.2Using PPE properly 3.3Problem solving in emergency situation
4. Maintain hand tools	4.1. Tools are not dropped to avoid damage 4.2. Routine ***maintenance*** of tools undertaken according to standard operational procedures, principles and techniques 4.3. Tools are stored safely in appropriate locations in accordance with manufacturer's specifications or standard operating procedures	**SCIENCE** 4.1 Safety requirements in maintenance of hand tools 4.2 Processes, Operations, Systems 4.2.1 Maintenance of tools 4.2.2 Storage of hand tools	4.1 Checking and cleaning hand tools 4.2 Storing hand tools properly

RANGE OF VARIABLES

VARIABLE	RANGE
1. Hand tools	May include: 1.1. Hand tools for adjusting, dismantling, assembling, finishing, and cutting. Tool set includes the following but not limited to: screw drivers, pliers, punches, wrenches, files
2. Personal Protective Equipment (PPE)	May include: 2.1. Gloves 2.2. Protective eyewear 2.3. Apron/overall
3. Maintenance	May include: 3.1. Cleaning 3.2. Lubricating 3.3. Tightening 3.4. Simple tool repairs 3.5. Hand sharpening 3.6. Adjustment using correct procedures

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1. Demonstrated safe working practices at all times 1.2. Communicated information about processes, events or tasks being undertaken to ensure a safe and efficient working environment 1.3. Planned tasks in all situations and reviewed task requirements as appropriate 1.4. Performed all tasks to specification 1.5. Maintained and stored tools in appropriate location
2. Methods of Assessment	Competency in this unit must be assessed through: 2.1. Observation 2.2. Oral questioning
3. Resource Implication	Tools may include the following but not limited to: 3.1. Screw drivers 3.2. Pliers 3.3. Punches 3.4. Wrenches 3.5. Files The following resources should be provided: 3.1 Access to relevant workplace or appropriately simulated environments where assessment may take place. 3.2 Tools, materials, equipment based on the proposed activities or tasks
4. Context of Assessment	4.1. Assessment may be conducted in the workplace or in a simulated work environment

UNIT TITLE : PERFORM MENSURATION AND CALCULATION

UNIT CODE : ELC311201

UNIT DESCRIPTOR: This unit covers the knowledge, skills and attitudes and values needed identify, care, handle and use measuring instruments

ELEMENT	PERFORMANCE CRITERIA ***Italicized Bold*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Select measuring instruments	1.1. Object or component to be measured is identified 1.2. Correct specifications are obtained from relevant source 1.3. Measuring tools are selected in line with job requirements	**TECHNOLOGY** 1.1 Category of measuring instruments 1.2 Types and uses of measuring instruments **SCIENCE** 1.1 Shapes and Dimensions 1.2 Formulas for volume, areas, perimeters of plane and geometric figures	1.1 Identifying and selecting measuring instruments 1.2 Visualizing objects and shapes
2. Carry out measurements and calculation	2.1. Appropriate ***measuring instrument*** is selected to achieve required outcome 2.2. Accurate measurements are obtained for job 2.3. ***Calculation*** needed to complete work tasks are performed using the four basic process of addition (+), subtraction (-), multiplication (x), and division (/) Calculation involving fractions, percentages and mixed numbers are used to complete workplace tasks. 2.4 Numerical computation is self-checked and corrected for accuracy 2.5 Instruments are read to the limit of accuracy of the tool.	**MATHEMATICS** 2.1 Calculation & measurement 2.2 Four fundamental operation 2.3 Linear measurement 2.4 Dimensions 2.5 Unit conversion 2.6 Ratio and proportion	2.1 Performing calculation by addition, subtraction, multiplication and division; 2.2 Interpreting formulas for volume, areas, perimeters of plane and geometric figures 2.3 Handling of measuring instruments
3. Maintain measuring instruments	3.1. Measuring instruments are not dropped to avoid Damage. Measuring instruments are cleaned 3.2. before and after using. Proper storage of instruments undertaken according to 3.3. manufacturer's specifications and standard operating procedures.	3.1 Types of measuring instruments and their uses 3.2 Safe handling procedures in using measuring instruments 3.3 Four fundamental operation of mathematics 3.4 Formula for volume, area, perimeter and other geometric figures	3.1 Handling and maintaining measuring instruments

RANGE OF VARIABLES

VARIABLE	RANGE
1. Measuring Instruments	May include: 1.1. Straight edge 1.2. Torque gauge 1.3. Try square 1.4. Protractor 1.5. Combination gauge 1.6. Steel rule
2. Calculation	Kinds of part mensuration includes the following but not limited to: 2.1. Volume 2.2. Area 2.3. Displacement 2.4. Inside diameter 2.5. Circumference 2.6. Length 2.7. Thickness 2.8. Outside diameter 2.9. Taper 2.10. Out of roundness

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1. Selected proper measuring instruments according to tasks 1.2. Carried out measurement and calculations 1.3. Maintained and stores instruments
2. Method of assessment	Competency in this unit must be assessed through: 2.1. Observation 2.2. Oral questioning
3. Resource implication	The following resources should be provided: 3.1 Access to relevant workplace or appropriately simulated environments where assessment may take place. 3.2 Tools, materials, equipment based on the proposed activities or tasks 3.3 Measuring instruments 3.4 Straight edge 3.5 Try square 3.6 Torque gauge 3.7 Combination gauge 3.8 Steel rule
4. Context of Assessment	4.1. Assessment may be conducted in the workplace or in a simulated environment

UNIT TITLE : PREPARE AND INTERPRET TECHNICAL DRAWING

UNIT CODE : ELC311202

UNIT DESCRIPTOR: This unit covers the knowledge, skills and attitudes and values needed to prepare/interpret diagrams, engineering abbreviation and drawings, symbols, dimension.

ELEMENT	PERFORMANCE CRITERIA *Italicized Bold* terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify different kinds of technical drawings	1.1. Correct ***technical drawing*** is selected according to job requirements. 1.2. Technical drawings are segregated in accordance with the types and kinds of drawings	1.1 Types of technical drawings 1.2 Applications for technical drawing 1.3 Methods of technical drawings 1.4 Symbols 1.5 Mark up/Notation of Drawings	1.1 Reading skills required to interpret work instruction 1.2 Interpreting electrical/ electronic signs and symbols
2. Interpret technical drawing	2.1. Components, assemblies or objects are recognized as required. 2.2. ***Dimensions*** of the key features of the objects depicted in the drawing are correctly identified. 2.3. ***Symbols*** used in the drawing are identified and interpreted correctly. 2.4. Drawing is checked and validated against job requirements or equipment in accordance with standard operating procedures.	2.1 Trade Mathematics 2.1.1 Linear measurement 2.1.2 Dimension 2.1.3 Unit conversion 2.2 Blueprint Reading and Plan Specification 2.2.1 Architectural, electrical, electronics, mechanical plan, symbols and abbreviations 2.2.2 Drawing standard symbols 2.3 Trade Theory Basic technical drawing 2.3.1 Types technical plans 2.3.2 Various types of drawings 2.3.3 Notes and specifications	2.1 Interpreting drawing/ orthographic drawing 2.2 Interpreting technical plans 2.3 Matching specification details with existing resources 2.4 Safety handling of drawing instruments
3. Prepare/ make changes to electrical/ electronic schematics and drawings	3.1. Electrical/ electronic schematic is drawn and correctly identified. 3.2. Correct drawing is identified, equipment are selected and use in accordance with job requirements.	3.1 Drawing conventions 3.2 Dimensioning Conventions 3.3 Mathematics 3.3.1 Four fundamental operations 3.3.2 Percentage 3.3.3 Fraction 3.3.4 Algebra 3.3.5 Geometry	3.1 Reading skills required to interpret work instruction 3.2 Communication skills 3.3 Preparing/ making electrical/ electronic signs and symbols 3.4 Computing formulas Solar

ELEMENT	PERFORMANCE CRITERIA ***Italicized Bold*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
4. Store technical drawings and equipment/ instruments	4.1. Care and maintenance of drawings are undertaken according to company procedures. 4.2. Technical drawings are recorded and inventory is prepared in accordance with company procedures. 4.3. Proper storage of instruments is undertaken according to company procedures.	**TECHNOLOGY** 4.1 Effective ways to catalogue and store technical drawings 4.2 Manual methods of handling, storing and maintaining paper drawings 4.3 Storing drawing in digital forms 4.3.1 Scanner 4.3.2 CAD	4.1 Handling and storing of drawings 4.2 Scanning and storing drawings in digital form 4.3 Matching specification details with existing resources 4.4 Handling of drawing instruments

RANGE OF VARIABLES

VARIABLE	RANGE
1. Technical Drawings	Technical drawings include the following but not limited to: 1.1. Schematic diagrams 1.2. Charts 1.3. Block diagrams 1.4. Lay-out plans 1.5. Location plans 1.6. Process and instrumentation diagrams 1.7. Loop diagrams 1.8. System Control Diagrams
2. Dimensions	May include: 2.1. Length 2.2. Width 2.3. Height 2.4. Diameter 2.5. Angles
3. Symbols	May include: 3.1. NEC- National Electric Code 3.2. IEC -International Electro technical Commission 3.3. ASME - American Society of Mechanical Engineers 3.4. IEEE - Institute of Electrical and Electronics Engineers 3.5. ISA - Instrumentation System and Automation Society
4. Instruments/ Equipment	May include: 4.1. Components/dividers 4.2. Drawing boards 4.3. Rulers 4.4. T-square 4.5. Calculator

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1. Selected correct technical drawing in line with job requirements 1.2. Correctly identified the objects represented in the drawing 1.3. Identified and interpreted symbols used in the drawing correctly 1.4. Prepared/produced electrical/electronic drawings including all relevant specifications 1.5. Stored diagrams/equipment
2. Methods of Assessment	Competency in this unit must be assessed through: 2.1 Practical tasks involving interpretation of a range of technical drawings 2.2 Oral questioning
3. Resource implication	The following resources should be provided: 3.1 Access to relevant workplace or appropriately simulated environments where assessment may take place. 3.2 Tools, materials, equipment based on the proposed activities or tasks 3.3 Drawings, diagrams, charts and plans
4. Context of Assessment	4.1 Assessment may be conducted in the workplace or in a simulated environment

UNIT TITLE : APPLY QUALITY STANDARDS

UNIT CODE : ELC311204

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

ELEMENT	PERFORMANCE CRITERIA ***Italicized 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 ***Faults*** and any identified causes are recorded and/or reported to the supervisor concerned in accordance with workplace procedures 1.4. Faulty materials or components are replaced in accordance with workplace procedures	**SCIENCE** 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	1.1 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. In cases of deviations from specified ***quality standards***, causes are documented and reported in accordance with the workplace' standards operating procedures	**TECHNOLOGY** 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 2.2 Solution providing and decision-making

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	**SCIENCE** 3.1 Quality improvement processes 3.2 Company customers defined	3.1 Practice company process improvement procedure

RANGE OF VARIABLES

VARIABLE	RANGE
1. Materials/ components	1.1. May include: 1.1.1. wires 1.1.2. cables, soldering lead 1.1.3. electrical tape 1.2. Components may include: 1.2.1. ICs 1.2.2. Diodes
2. Faults	May include: 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. Documen-tation	May include: 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	May include: 5.1. Co-worker 5.2. Supplier 5.3. Client 5.4. Organization receiving the product or service

EVIDENCE GUIDE

1. Critical Aspect of Competency	Assessment requires that the candidate: 1.1. Carried out work in accordance with the company's standard operating procedures 1.2. Performed task according to specifications 1.3. Reported defects detected in accordance with standard operating procedures 1.4. Carried out work in accordance with the process improvement procedures
2. Method of assessment	Competency in this unit may be assessed through: 2.1 Observation with questioning 2.2 Demonstration with questioning
3. Resource implication	The following resources should be provided: 3.1 Access to relevant workplace or appropriately simulated environments where assessment may take place. 3.2 Tools, materials, equipment based on the proposed activities or tasks 3.3 Materials and component parts and equipment to be used in a real or simulated electronic production situation
4. Context of Assessment	4.1. Assessment may be conducted in the workplace or in a simulated environment.

UNIT TITLE : TERMINATE AND CONNECT ELECTRICAL WIRING AND ELECTRONICS CIRCUIT

UNIT CODE : ELC311206

UNIT DESCRIPTOR: This unit covers the knowledge, skills, (and) attitudes and values needed to terminate and connect electrical wiring and electronic circuits

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Plan and prepare for termination/ connection of electrical wiring/ electronics circuits	1.1. ***Materials*** are checked according to specifications and tasks 1.2. Appropriate ***tools and equipment*** are selected according to tasks requirements 1.3. Task is planned to ensure OH & S guidelines and procedures are followed 1.4. Electrical wiring/electronic circuits are correctly prepared for connecting/ termination in accordance with instructions and work site procedures	**SCIENCE** 1.1 Use of tools 1.2 Use of test instruments/ equipment 1.3 Electrical theory 1.4 Principals of AC and DC 1.5 OH & S guidelines and procedures 1.6 Basic electrical and electronic devices	1.1 Reading skills required to interpret work instruction 1.2 Checking materials for conformance to specifications 1.3 Checking existing and new installation site for correct location and specification
2. Terminate/ connect electrical wiring/ electronic circuits	2.1. Safety procedures in using tools are observed at all times and appropriate ***personal protective equipment*** are used 2.2. Work is undertaken safely in accordance with the workplace and standard procedures 2.3. Appropriate range of ***methods*** in termination/ connection are used according to specifications, manufacturer's requirements and safety 2.4. Correct sequence of operation is followed 2.5. ***Accessories*** used are adjusted, if necessary 2.6. Confirmed termination/connection is undertaken successfully in accordance with job specification	**SCIENCE** 2.1 Wiring techniques 2.2 OH & S principles **TECHNOLOGY** 2.1 Use of lead-free soldering technology 2.2 Surface mount soldering techniques 2.3 Specifications and methods for terminating different materials	2.1 Communication skills 2.2 Marking, tagging and labeling requirements for cables, wires, conductors and connections 2.3 Soldering techniques 2.4 Adjusting and fixing wiring supports

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Test termination/ connections of electrical wiring/ electronics circuits	3.1. Testing of all completed termination/ connections of electric wiring/ electronic circuits is conducted for compliance with specifications and regulations using appropriate procedures and equipment 3.2. Wiring and circuits are checked using specified testing procedures 3.3. Unplanned events or conditions are responded to in accordance with established procedures	**SCIENCE:** 3.1 AC and DC power supplies 3.2 Uses of diagnostic equipment 3.3 Tests for wiring and connections **TECHNOLOGY:** 3.1 Wiring support techniques and alternatives	3.1 Printed circuit board repair and techniques 3.2 Electronic assembly functional and quality testing 3.3 Testing of wiring and connections for conformance to specification

RANGE OF VARIABLES

VARIABLE	RANGE
1. Materials	Materials included the following but not limited to: 1.1.1 Soldering lead 1.1.2 Cables 1.1.3 Wires
2. Tools and equipment	2.1 Tools for measuring, cutting, drilling, and assembling/ disassembling. Tool set includes the following but not limited to: 2.1.1 Pliers 2.1.2 Cutters 2.1.3 Screw drivers 2.2 Equipment 2.2.1 Soldering gun 2.2.2 Multi-tester
3. Personal Protective Equipment	May include: 3.1 goggles 3.2 gloves 3.3 apron/overall
4. Methods	May include: 4.1 Clamping 4.2 Pin connection 4.3 Soldered joints 4.4 Plugs
5. Accessories	5.1 Accessories may include the following but not limited to: 5.1.1 brackets 5.1.2 clamps

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1. Undertook work safely and according to workplace and standard procedures 1.2. Used appropriate termination/ connection methods 1.3. Followed correct sequence in termination / connection process 1.4. Conducted testing of terminated connected electrical wiring/electronic circuits using appropriate procedures and standards
2. Methods of Assessment	Competency in this unit may be assessed through: 2.1 Observation with questioning 2.2 Oral Questioning/Interview 2.3 Practical Demonstration with questioning
3. Resource implication	The following resources should be provided: 3.5 Access to relevant workplace or appropriately simulated environments where assessment may take place. 3.2 Tools, materials, equipment based on the proposed activities or tasks 3.3 Tool set includes the following but not limited to: 3.3.1. screw drivers 3.3.2. pliers 3.3.3. cutters
4. Context of Assessment	4.1. Assessment may be conducted in the workplace or in a simulated work environment

CORE COMPETENCIES

UNIT OF COMPETENCY: **PERFORM SITE ASSESSMENT**

UNIT CODE : **AB ELC 0803713 724 3 01**

UNIT DESCRIPTOR : This unit deals with the knowledge, skills and attitudes in performing site assessment.

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	Required Knowledge	Required Skills
1. Validate parameters for the installation	1.1 Ocular survey of location/area is performed in accordance with design considerations and validated with the use of prescribed instruments 1.2 Installation parameters of the system design are validated against existing site conditions 1.3 Variances in the parameters of components, if any, are identified and noted in the installation checklist form	**SCIENCE** 1.1 Electrical & electronics drawings and symbols 1.2 Electrical & electronics components 1.3 Tools and equipment & measuring instruments 1.4 OHS Procedures **COMMUNICATION** 1.1 Communica-tion process	1.1 Interpreting electrical and electronics drawings and symbols 1.2 Using appropriate tools and equipment 1.3 Applying and following OHS procedure 1.4 Checking of components/ materials needed
2. Prepare installation data sheet	2.1 Installation layout is prepared following existing safety standards, accepted best practices, and user preferences 2.2 Components lay out is prepared according to the installation data sheet 2.3 Final layout takes into account validated parameters 2.4 Logistical considerations are taken into account and noted in the report.	**SCIENCE** 1.1 Electrical & electronics drawings and symbols 1.2 Electrical & electronics components 1.3 Tools and equipment & measuring instruments 1.4 OHS Procedures **COMMUNICATION** 1.1 Communica-tion process	1.1 Interpreting electrical and electronics drawings and symbols 1.2 Using appropriate tools and equipment 1.3 Applying and following OHS procedure 1.4 Checking of components/ materials needed

RANGE OF VARIABLES

VARIABLE	RANGE
1. Location/Area	1.1 Roof 1.2 Ground area 1.3 Ceiling 1.4 Wall 1.5 Ventilated area 1.6 Not-ventilated area 1.7 House area in square meters 1.8 Mode of Transportation/hauling 1.9 Degree of ease/difficulty of access to site 1.10 Weather data
2.Prescribed instruments	2.1 Magnetic Compass 2.2 Measuring Tapes 2.3 Altimeter 2.4 GPS 2.5 Transit 2.6 Video 2.7 Push/pull rule tape 2.7 Camera
3.Installation parameters	3.1 Work area 3.2 Shading 3.3 Structure characteristics 3.4 Soil type/condition 3.5 Flow rate of water source
4. Components	4.1 PV Module/array 4.2 Support structures 4.3 Charge Controller/regulator 4.4 Battery/battery bank 4.5 Inverter/converter 4.6 Lighting fixtures and accessories 4.7 Convenience outlets for appliances and devices 4.8 Wires and cables 4.9 Fastening fixtures
5. Logistical Considerations	5.1 Transport/hauling 5.2 Storage of materials/supplies 5.3 Security Condition 5.4 Work schedules 5.5 Access Road 5.6 Insurance requirement 5.7 Board and lodging 5.8 Food/drinking water 5.9 Travel expenses 5.10 Weather/climate 5.11 Contingency fund 5.12 Porters

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate 1.1 Performed site assessment 1.2 Validated installation design parameters 1.3 Determined locations of all components 1.4 Validated parameters for the installations 1.5 Prepared installation data sheet
2. Underpinning knowledge and attitudes	2.1 PV technology and systems 2.2 Principles of electricity 2.3 Electrical load characteristics 2.4 Safety working habits 2.5 Basic mathematical operations 2.6 System components characteristics 2.7 Instruments used in site assessment 2.8 Enterprise goals, targets, and measures 2.9 Environmental requirements 2.10 Principles of decision-making strategies and techniques 2.11 Observant/attentive to details 2.12 Honest 2.13 Courteous
3. Underpinning skills	3.1 Interpretations of installation electrical drawing 3.2 Preparing materials & instruments 3.3 Surveying skills and experience 3.4 Communication skills 3.5 Interpersonal Skills 3.6 Instrument surveying skills 3.7 Drawing specification skills 3.8 Mapping skills 3.9 Using range of formal problem-solving technique 3.10 Solution evaluation skills
4. Resource implications	The following resources must be provided: 4.1 Drawings/Specifications relevant to task 4.2 Site/location map 4.3 Materials/instruments relevant to site assessment 4.4 Forms
5. Method of assessment	Competency must be assessed through: 5.1 Demonstration and observation with question 5.2 Oral/written examination 5.3 Portfolio 5.4 Third party report
6. Context of assessment	6.1 Competency may be assessed in the workplace or in a simulated workplace 6.2 Competency assessment must be undertaken in accordance with the endorsed TESDA assessment guidelines

UNIT OF COMPETENCY: **CHECK SOLAR NIGHT LIGHT AND POST LAMP COMPONENTS AND MATERIALS COMPLIANCE**

UNIT CODE : **AB ELC 0803713 724 3 02**

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitude in checking PV components/materials compliance prior to installation.

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	Required Knowledge	Required Skills
1. Identify components/ materials and specifications for inspection/ testing	1.1 Components/Materials are listed as per job requirements 1.2 Component/Material specifications are listed for inspection/testing 1.3 Components/materials are identified in line with job order requirements 1.4 Components/materials are inspected for damage in line with enterprise requirements 1.5 Damaged component/materials and accessories are recorded/noted and reported to supervisor	**SCIENCE** 1.1 Electrical & electronics drawings and symbols 1.2 Electrical & electronics components 1.3 Tools and equipment & measuring instruments 1.4 OHS Procedures **COMMUNICATION** 1.1 Communica-tion process	1.1 Interpreting electrical and electronics drawings and symbols 1.2 Using appropriate tools and equipment 1.3 Applying and following OHS procedure 1.4 Checking of components/ materials needed
2. Interpret manuals	2.1 Relevant sections and 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 to the job requirement 2.3 Testing procedure are prepared according to the manufacturers' specifications. 2.4 Manuals of components/materials and accessories are interpreted in line manufacturer/supplier/specification	**SCIENCE** 1.1 Electrical & electronics manuals **COMMUNICATION** 1.1 Communica-tion process	1.1 Interpreting electrical and electronics drawings and symbols 1.2 Using appropriate manuals

3. Identify and prepare test instruments	3.1 Test instruments are listed as per job order requirement 3.2 Test instrument specifications are complied with in accordance to the test procedure requirement	**SCIENCE** 3.1 Electrical & electronics manuals 3.2. Electrical & electronics instruments **COMMUNICATION** 3.3 Communica-tion process	3.1 Interpreting electrical and electronics drawings and symbols 3.2 Using appropriate Electrical & electronics instruments
4. Inspect/test components and materials	4.1 Testing procedures are identified in accordance with the manufacturer's specifications 4.2 Tests results are recorded in material testing forms 4.3 Inspection/Testing is accomplished without causing damage to components and materials and injury to self and others 4.4 Task is performed using Personal Protective Equipment (PPE)	**SCIENCE** 4.1 Electrical & electronics manuals 4.2. Electrical & electronics instruments 4.3 Identifying proper PPE **COMMUNICATION** 4.3 Communica-tion process	4.1 Interpreting electrical and electronics drawings and symbols 4.2 Using appropriate Electrical & electronics instruments 4.3 Using appropriate PPE
5. Report test results	5.1 Test results are evaluated against the manufacturer's specifications 5.2 Report is made on the compliance or non-compliance of the material according to manufacturer's specifications	**COMMUNICATION** 4.3 Communica-tion process	
6. Notify completion of work	6.1 Final checks are made to ensure that work conforms with instructions and job requirements 6.2 Supervisor is notified upon completion of work 6.3 Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage in accordance with established procedures 6.4 Work area is cleaned up and made safe according to occupational health and safety (OH & S) regulation	**COMMUNICATION** 4.3 Communica-tion process	

RANGE OF VARIABLES

VARIABLE	RANGE
1. Components materials	1.1 PV Module/array 1.2 Support structures 1.3 Charge Controller/regulator 1.4 Battery/battery bank 1.5 Inverter/converter 1.6 Lighting fixtures and accessories 1.7 Convenience outlets for appliances and devices 1.8 Wires and cables 1.9 Fastening fixtures
2. Specifications	2.1 Voltage 2.2 Current 2.3 Voltage settings 2.4 Specific gravity 2.5 Illumination of lights 2.6 International Electro-technical Commission (IEC) and other certifying bodies 2.7 Dimension (length, diameter/size, thickness) 2.8 IP/NEMA outdoor ratings (tropicalized, sunlight-resistant)
3. Test instruments	3.1 Voltmeter 3.2 Ammeter 3.3 Variable Power Supply 3.4 Hydrometer 3.5 Lux meter 3.6 Multi-meter 3.7 Clamp meter
4. Test procedures	4.1 Measurement of terminal voltage 4.2 Measurement of current flow 4.3 Measurement of voltage settings of charge controller/regulator 4.4 Measurement of specific gravity of battery electrolyte solution 4.5 Measurement of illumination output of lights
5. Personal protective equipment (PPE)	5.1 Goggles 5.2 Rubber gloves 5.3 Safety shoes 5.4 Leather apron 5.5 Hard hat

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate 1.1 Identified and selected components/materials 1.2 Checked quality and ratings of test equipment 1.3 Inspected/Tested components/materials 1.4 Reported and replaced defective materials and tools to supervisor 1.5 Checked PV components and materials compliance 1.6 Identified and prepare test instruments 1.7 Interpreted manuals 1.8 Inspected PV components and materials for damage in line with job requirement
2. Underpinning knowledge and attitudes	2.1 Basic principles of electricity 2.2 Electrical measuring instruments 2.3 Basic mathematics 2.4 IEC and other certifying body standards 2.5 IP/NEMA standards 2.6 Product Standards (PS) 2.7 Selection and usage of tools 2.8 Personal Protective Equipment (PPE) 2.9 Types and uses of PV components/materials 2.10 Different forms 2.11 Requisition procedure 2.12 Types of PV specifications and tools 2.13 Common materials 2.14 Common damage to PV components/materials/ accessories 2.15 Safety Conscious 2.16 Observant/Attentive to details 2.17 Safety conscious 2.18 Honest 2.19 Patience
3. Underpinning skills	3.1 Visual assessment of components/materials 3.2 Preparing materials/tools/tests 3.3 Using test instruments, tools, and equipment 3.4 5S Skills 3.5 Reading and interpreting manufacturer's specifications and manuals 3.6 Mathematical skills 3.7 Proper handling of PV components/materials 3.8 Following instructions
4. Resource implications	The following resources MUST be provided: 4.1 Workplace location 4.2 Tools and equipment appropriate for the activity 4.3 Manufacturer's manual 4.4 Personal Protective Equipment (PPE) 4.5 Inspection/testing instruments 4.7 PV Components/materials appropriate for electrical installation lay-out

5. Method of assessment	Competency must be assessed through: 5.1 Demonstration and observation with question 5.2 Written/oral examination 5.3 Portfolio 5.4 Third party
6. Context of assessment	6.1 Competency may be assessed in the workplace or in a simulated workplace 6.2 Competency assessment must be undertaken in accordance with the endorsed TESDA assessment guidelines

UNIT OF COMPETENCY: **ASSEMBLE SOLAR NIGHT LIGHT AND POST LAMP**

UNIT CODE : **AB ELC 0803713 724 3 03**

UNIT DESCRIPTOR : This module covers the knowledge, skills, and attitude required to assemble solar night light and post lamp.

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	Required Knowledge	Required Skills
1. Plan and prepare work	1.1 Electrical drawings are read and interpreted to determine job order requirements 1.2 Type and quantity of ***system components*** and other materials are identified in line with job order requirements 1.3 ***Tools, equipment*** and ***materials*** are selected in line with job order requirements 1.4 ***Personal protective equipment (PPE)*** are identified and selected in line with safety requirements 1.5 Instructions in preparation for work activity are communicated clearly and confirmed to ensure that the instructions are understood. 1.6 Procedure for planning and preparation of work is checked to ensure that it is done correctly and in accordance to established company standards procedure to ensure safety. 1.7 All components/materials needed to the work are obtained and estimated according to established procedures and plans	**SCIENCE** 1.1 Electrical & electronics drawings and symbols 1.2 Electrical & electronics components 1.3 Tools and equipment & measuring instruments 1.4 OHS Procedures **COMMUNICATION** 1.1 Communica-tion process	1.1 Interpreting electrical and electronics drawings and symbols 1.2 Using appropriate tools and equipment 1.3 Applying and following OHS procedure 1.4 Checking of components/ materials needed

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	Required Knowledge	Required Skills
2. Assemble solar night light and post lamp	2.1 Safety procedures are followed based on ***regulations*** 2.2 Personal protective equipment (PPE) needed to complete job order requirements are obtained according to established procedures 2.3 Pre-installation procedures are performed as per manufacturer's recommendation 2.4 Procedures for installation of Solar Nightlight and Post Lamp are performed in line with job order requirements 2.5 Schedule of work is followed based on agreed time and quality standards 2.6 Ongoing checking of quality of work is undertaken in accordance with instructions and requirements 2.7 Conductors/wires are terminated/splice in accordance with existing Solar Nightlight and Post Lamp based on industry standards 2.8 Installation of Solar Nightlight and Post Lamp is accomplished without causing damage to components, materials, supplies and minimum wastage, and injury to self/others.	**SCIENCE** 2.1 Understanding OHS Procedures 2.2 Pre- Installation procedures 2.3 Installation procedures 2.4 Read and Interpret diagram	2.1 Demonstrate and apply Installation procedures 2.2 Use of PPE 2.3 Splice electrical and electronics cables 2.4 Designing Printed Circuit Board (PCB) 2.5 Perform etching procedures on PCB 2.6 Perform soldering and desoldering of components

RANGE OF VARIABLES

VARIABLE	RANGE
1. System Components	May include: 1.1 Solar Module(s) 1.2 Support structures 1.3 Battery/battery bank 1.4 Wires and accessories 1.5 Protective devices such as: 1.5.1 Disconnect switch 1.5.2 Diodes 1.6 Lighting fixtures and accessories 1.7 Printed Circuit Board (PCB) 1.8 Etching Solution
2. Tools, Equipment and Materials	May include: 2.1 Tools: 2.1.1 Screwdrivers 2.1.2 Pliers 2.1.3 Wrenches 2.1.4 Hammer 2.1.5 Electrician's knife 2.1.6 Hacksaw 2.1.7 Electric drill 2.1.8 Wire Stripper 2.1.9 Soldering Iron/Gun 2.1.10 Soldering Stand 2.1.11 Desoldering Pump 2.1.12 Light Magnifying Lamp 2.1.13 Plastic Tong 2.2 Equipment (Measuring instruments) 2.2.1 Multimeter 2.3 Ladder/scaffolding 2.4 Materials 2.4.1 Etching Solution 2.4.2 Pencil 2.4.3 Electrical Tape 2.4.4 Masking Tape 2.4.5 Rubberized Tape 2.4.6 LED Lamp 2.4.7 Slide Switch 2.4.8 Resistors 2.4.9 Transistors 2.4.10 Diodes 2.4.11 Printed Circuit Board (PCB) 2.4.12 Plastic Basin 2.4.13 Soldering Lead 2.4.14 Assorted Drill Bits

3. Personal Protective Equipment (PPE)	May include: 3.1 Rubber gloves 3.2 Hard hat 3.3 Goggles 3.4 Electrician's holster 3.5 Surgical Gloves 3.6 Face Mask 3.7 First Aid Kit 3.8 Safety Shoes
4.Regulations	May include: 4.1 ECC Compliance 4.2 Philippine Electrical Code 4.3 DOE Standards and Requirements 4.4 Regulations on OC 4.5 Solar safety, health & environment code of practice

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Planned the commissioning procedure and prepared the necessary tools, equipment, supplies and materials necessary to conduct the activity 1.2 Performed pre-installation procedures as per manufacturer's recommendation 1.3 Performed procedures for installation of Solar Nightlight and Post Lamp in line with job order requirements 1.4 Notified completion of work to supervisor and customer. 1.5 Undertaken final inspection to ensure the installation met job order requirements
2. Resource Implications	The following resources should be provided: 4.1 Actual site or workplace with Solar Nightlight and Post Lamp to be commissioned 4.2 Tools, measuring instruments, and materials appropriate for Solar Nightlight and Post Lamp commissioning 4.3 Electrical installation drawings and installation data sheet 4.4 Forms ● Commissioning document ● Acceptance document 4.5 Personal protective equipment (PPE)
3. Methods of Assessment	Competency must be assessed through: 1.1 Demonstration with oral questioning 1.2 Written examination 1.3 Interview
4. Context of Assessment	6.1 Competency may be assessed in the workplace or in a simulated workplace 6.2 Competency assessment must be undertaken in accordance with the endorsed TESDA assessment guidelines

UNIT OF COMPETENCY: **INSTALL SOLAR NIGHT LIGHT AND POST LAMP**

UNIT CODE **: AB ELC 0803713 724 3 04**

UNIT DESCRIPTOR : This module covers the knowledge, skills, and attitude required to install solar night light and post lamp.

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	Required Knowledge	Required Skills
1. Commission solar night light and post lamp system	1.1 Occupational Health and Safety (OHS) procedures are followed during ***commissioning*** 1.2 Each ***system components*** and the whole system are checked if operational and are installed according to established procedures and job order requirements 1.3 Corrective measures or rectifications on the installation are made in line with established procedures 1.4 Solar Nightlight and Post Lamp is activated according to commissioning Procedures 1.5 ***Personal protective equipment (PPE)*** needed to complete job order requirements are obtained according to established procedures 1.6 ***Tools, measuring instruments and materials*** needed for commissioning are obtained according to established procedures 1.7 ***Regulations*** and workplace safety and hazard control practices and procedures are clarified and explained based on organization procedures	**COMMUNICATION** 1.1 Basic Communication principles **SCIENCE** 2.1 Basic Housekeeping procedure 2.2 Knowledge on Checking plans & drawings, instructions & requirements 2.3 Understan-ding industry procedures	1.1 Apply health and safety procedures 1.2 Carry out in checking plans & drawings 1.3 Perform housekeeping procedures 1.4 Proper use of PPE 1.5 Perform Troubleshootin g procedures

2. Carry out completion of work	2.1 Final inspection is under-taken to ensure that commissioning of Solar Nightlight and Post Lamp meets job requirements 2.2 Commissioning document is accomplished and written report is prepared using the prescribed format and submitted to the supervisor 2.3 Work completed is notified to a supervisor and customer according to established procedure 2.4 Proper housekeeping is observed and practiced in accordance with occupational health and safety standards 2.5 Customer is oriented on the use of the installed system according to company procedures and manufacturer's instruction.	**COMMUNICATION** 2.1 Basic Communication principles **SCIENCE** 2.2 Basic Housekeeping procedures 2.3 Knowledge in proper inspection on completed works. 2.4 Understan-ding commi-ssionning principles & processes	2.1 Apply health and safety procedures 2.2 Carry out in checking plans & drawings 2.3 Perform housekeepi ng procedures 2.4 Proper use of PPE 2.5 Perform Trouble shooting procedures 2.6 Apply commi-ssioning principles & processes

RANGE OF VARIABLES

VARIABLE	RANGE
1. Commissioning	1.1 PV module/array functional test 1.2 Charge controller/Regulator functional test 1.3 Battery functional test 1.4 Load Test 1.5 High potential test
2. System Components	May include: 2.1 Solar Module(s) 2.2 Support structures 2.3 Battery/battery bank 2.4 Wires and accessories 2.5 Protective devices such as: 1.5.1 Disconnect switch 1.5.2 Diodes 2.6 Lighting fixtures and accessories 2.7 Printed Circuit Board (PCB) 2.8 Etching Solution

3. Personal Protective Equipment (PPE)	May include: 3.1 Rubber gloves 3.2 Hard hat 3.3 Goggles 3.4 Electrician's holster 3.5 Safety belts 3.6 Safety clothes/pants 3.7 High visibility vest 3.8 Surgical Gloves 3.9 Face Mask 3.10 First Aid Kit 3.11 Safety Shoes
4. Tools, Equipment and Materials	May include: 4.1 Tools: 4.1.1 Screwdrivers 4.1.2 Pliers 4.1.3 Wrenches 4.1.4 Hammer 4.1.5 Electrician's knife 4.1.6 Hacksaw 4.1.7 Electric drill 4.1.8 Wire Stripper 4.1.9 Soldering Iron/Gun 4.1.10 Soldering Stand 4.1.11 Desoldering Pump 4.1.12 Light Magnifying Lamp 4.1.13 Plastic Tong 4.2 Equipment (Measuring instruments) 4.2.1 Multimeter 4.3 Ladder/scaffolding 4.4 Materials 4.4.1 Etching Solution 4.4.2 Pencil 4.4.3 Electrical Tape 4.4.4 Masking Tape 4.4.5 Rubberized Tape 4.4.6 LED Lamp 4.4.7 Slide Switch 4.4.8 Resistors 4.4.9 Transistors 4.4.10 Diodes 4.4.11 Printed Circuit Board (PCB) 4.4.12 Plastic Basin 4.4.13 Soldering Lead 4.4.14 Assorted Drill Bits

5.Safety Regulations	May include but are not limited to: 5.1 Clean Air Act 5.2 Building code 5.3 National Electrical and Fire Safety Codes 5.4 Waste management statutes and rules 5.5 Philippine Occupational Safety and Health Standards 5.6 DOLE regulations on safety legal requirements 5.7 ECC regulations

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Demonstrated commissioning procedures according to established procedures and job order requirements 1.2 Undertaken ongoing checking of quality of work ~~is~~ in accordance with instructions and requirements 1.3 Terminated/spliced conductors/wires in accordance with existing Solar Nightlight and Post Lamp based on industry standards 1.4 Accomplished installation of Solar Nightlight and Post Lamp without causing damage to components, materials, supplies and minimum wastage, and injury to self/others.
4. Resource Implications	The following resources should be provided: 4.1 Actual site or workplace with Solar Nightlight and Post Lamp to be commissioned 4.2 Tools, measuring instruments, and materials appropriate for Solar Nightlight and Post Lamp commissioning 4.3 Electrical installation drawings and installation data sheet 4.4 Forms ● Commissioning document ● Acceptance document 4.5 Personal protective equipment (PPE)
5. Methods of Assessment	Competency must be assessed through: 5.1 Demonstration with questioning 5.2 Observation with questioning
6. Context of Assessment	6.1 Competency may be assessed in the workplace or in a simulated workplace 6.2 Competency assessment must be undertaken in accordance with the endorsed TESDA assessment guidelines

UNIT OF COMPETENCY: **PREPARE DOCUMENTATION REQUIREMENTS FOR SOLAR NIGHT LIGHT AND POST LAMP INSTALLATION**

UNIT CODE **: AB ELC 0803713 724 3 05**

UNIT DESCRIPTOR : This module covers the knowledge, skills, and attitude required in preparing documentation requirements for solar night light and post lamp installation.

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	Required Knowledge	Required Skills
1. Carry out complete documentation of work	1.1 Proper documentation is accomplished and written report is prepared using the **prescribed format** and submitted to the supervisor 1.2 Complete documentation is notified to a supervisor and customer according to established procedure	**COMMUNICATION** 1.1 Basic Communication principles **SCIENCE** 2.1 Knowledge in proper inspection on completed works. 2.2 Understanding documentation/forms required for proper documentation.	2.1 Identify proper forms/documents needed in the documentation process 2.2 Carry out proper documentation process

RANGE OF VARIABLES

VARIABLE	RANGE
1. Prescribe Format	May include but not limited to: 1.1 IEC 62446-1:2016+A1:2018 1.2 ISO 15387:2005 1.3 ISO - 27.160

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Demonstrated proper documentation procedures in accordance to established procedures 1.2 Undertaken double checking of data in accordance with instructions and requirements 1.3 Accomplished documentation of installation of solar nightlight and post lamp
4. Resource Implications	The following resources should be provided: 4.1 Actual site or workplace with Solar Nightlight and Post Lamp to be documented 4.2 Tools, measuring instruments, and materials appropriate for Solar Nightlight and Post Lamp commissioning 4.3 Forms ● Document template
5. Methods of Assessment	Competency must be assessed through: 5.1 Demonstration with questioning 5.2 Observation with questioning
6. Context of Assessment	6.1 Competency may be assessed in the workplace or in a simulated workplace 6.2 Competency assessment must be undertaken in accordance with the endorsed TESDA assessment guidelines

GLOSSARY OF TERMS:

1. **Assembly -** is a group of components that are put together to create a finished product or sub-assembly.
2. **Basic Competencies** - are the skills and knowledge that everyone needs for work
3. **Battery** – a device that stores electricity typically rated in Ampere-hours.
4. **Capacitor -** a device used to store an electric charge, consisting of one or more pairs of conductors separated by an insulator.
5. **Certificate of Competency (COC)** - is a certification issued to individuals who pass the assessment for a single unit or cluster of units of competency
6. **Commission documents –** means all reports, schedules, registrations, forms, statements, information and other documents filed by the Company with the Commission pursuant to the reporting requirements.
7. **Commissioning -** a process may be applied not only to new projects but also to existing units and systems subject to expansion, renovation.
8. **Common Competencies** - are the skills and knowledge needed by all people working in a particular industry
9. **Critical aspects of competency** - refers to the evidence that is essential for successful performance of the unit of competency
10. **Desoldering -** removal of solder and components from a circuit board for troubleshooting, repair, replacement, and salvage.
11. **Etching -** is a traditional printmaking technique that involves using strong acid or mordant to cut into the unprotected parts of a metal surface to create a design in intaglio (incised) in the metal.
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. **Load** – are devices such as lighting fixtures, appliances, or the likes that requires electricity.
14. **Performance Criteria** - are evaluative statements that specify what is to be assessed and the required level of performance
15. **Photovoltaic (PV)** – a technology that uses a solar module in order to convert light or energy from the sun to electricity.
16. **Printed Circuit Board (PCB) -** is used to mechanically support and electrically connect electronic components using conductive pathways, tracks or signal traces etched from copper sheets laminated onto a non-conductive substrate. It is also referred to as printed wiring board (PWB) or etched wiring board.
17. **PV Module** – a device composed of solar cells that convert light or energy from the sun to electricity.
18. **Range of Variables** - describes the circumstances or context in which the work is to be performed
19. **Resource Implications** - refers to the resources needed for the successful performance of the work activity described in the unit of competency. It includes work environment and conditions, materials, tools and equipment
20. **Termination -** The act by means of which an electrical connection to an apparatus is established; specifically a prepared joint or connection between a cable, cord or conductor and a point in an electrical circuit such as a terminal or connection point.

Such terminations include soldering, crimping, clamping, wire wrapping, insulation piercing/compression.

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ROPO ABDD FOCAL PERSONS