**COMPETENCY BASED STANDARD**

**ELECTRICAL TRADE SECTOR**



**GENERAL ELECTRICIAN**

**Job Title**

**ISCO 7411**

**Second Strengthening Technical and Vocational Education and Training (SSTVET) Project**

**ADB Grant 0503-LAO**

**CERTIFICATE LEVEL 2 | DRAFT VERSION 1 | FEBRUARY 2018**

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**LAO PDR**

##### Occupation Area: Electrical Equipment Installers and Repairers

#####  ISCO 741

**Job Title: Building and Related Electricians**

 **ISCO 7411**

**Competency Standard: General Electrician**

 **ISCO 7411.1**

**nlvqf: 2**

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# Foreword

In order to ensure that the LAO PDR grows competitively over the coming years, we need to establish an ethos of excellence in everything that we do. This includes, particularly the Education & Employment sectors, as symbolized by Technical Vocational Education & Training (TVET).

Research has shown that countries without a functioning and effective TVET system will lose out in the competitiveness ratings, with a consequence negative impact on growth etc.

## Project Title

 Second Strengthening Technical Vocational Education & Training (SSTVET) in LAO PDR

## Project Donor & Number

ADB Grant No. 0503-LAO

#  Purpose of this competency standard

The Purpose of the Competency Standard for the GENERAL ELECTRICIAN **Level I** is to provide a framework for Competency Based Training (CBT) Programmes resulting in Competent ELECTRICIANS to support the Electrical service and repair industry/sector in Lao PDR.

The GENERAL ELECTRICIAN **Level 2** is defined in reference to the Prime Minister Decree Number 0036/PM published in 2011, the Ministry of Education and Sport Decree Number 4697/MoES11 published 9 December 2011, the Manual for Developing Competency Standards published December 2011 and the ASEAN Regional Qualification Framework in TVET.

# Competency Standard/ Qualification/ Job Description

This Competency, Standards/ Qualification of GENERAL ELECTRICIAN 2 provide a structured occupational outcome for domestic & commercial ELECTRICIANS.

# Job description

This qualification covers the skills and knowledge in Basic, Common & Core Competencies required by the Electrical Trade industry/sector for GENERAL ELECTRICIANS to Install, repair and maintain the electrical systems and components of residential, commercial and industrial buildings. It is suitable for entry into the Electrical Trade industry/sector at **NVQF Level 2** in Lao PDR

Person deemed competent in this qualification:

* has theoretical knowledge in Electrical Installation
* has a range of well-developed skills on Electrical Installation to install, repair and maintain
* work on jobs requiring minimal tolerance
* be responsible for the entrusted equipment
* solve routine work problems using basic methods, tools materials and information

**Job roles/employment outcomes**

The Certificate **Level 2** in GENERAL ELECTRICIAN is intended to prepare new employees or recognize and develop existing workers who are performing electrical installation and repair tasks in the Electrical industry/sector.

Employment outcomes targeted by this qualification is GENERAL ELECTRICIAN

**Application**

The qualification is in line with CBT principles and is suitable for a Lao PDR Apprenticeship pathway

Where common/core units of competency are packaged to suit a particular industry sector or occupational outcome, Registered Training Organizations (RTOs) might issue, for example, a:

Certificate I in General Electrician (specializing Electrical Installation)

It should be noted that a qualification with a specialization does not change the title of the qualification

**CAREER PATH INFORMATION**

Career path into the qualification

This qualification may be accessed by direct entry. from Secondary Schools (level 9 or 12) or anybody with partial Secondary Education that meets the entry requirements.

Career path from the qualification

Further training pathways from this qualification include Certificate II within the Electrical Trade training package qualifications.

# Outline of this Competency Standard

This Competency Standard contains ***Units of Competency*** as detailed within. These **Units** form the basis for CBT Learning Programmes for Electrical Installation. Each **Unit** contains the required **Elements of Competency**. Each **Unit** being able to stand alone when applied in a work situation.

Each **Unit** can be amended in content or structure to meet the evolving needs of the ELECTRICIANS. Changes and amendments to this Competency Standard will be made in line with the existing Quality Assurance Procedures as approved by the appropriate authority.

This Competency Standard is structured in line with the approved Manual for Developing Competency Standards, developed as a part of the STVET programme. For Quality Assurance purposes, each Unit is coded in line with the example below:

**Code Example**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Occupation | Job | Sub Sector | Level  | Unit Type | Unit No. | Version No |
| Electrical Equipment Installers and Repairers | Building and Related Electricians | Electrician, General  | NLVQF Skills Level number 1 |  Competency type -1- Basic | Unit No under the type of competency | Release version  |
| 741 | 7411 | 1 | 2 | 1 | 001 | 01 |

Code example above displayed as:

741.7411.121.001.01

**ISCO Minor Group –**

741 – Electrical Equipment Installers and Repairers

742 – Electronics and Telecom

**ISCO Unit Groups**

7411- Building and Related Electrician

7412 – Electrical Mechanics and Fitters

7413 – Electrical Line Installers and Repairers

**Lao standard code occupation under 7411 - Electrical Sub-Sectors**

1 - General Electrician

2 - Building Electrician

3 - Ship Electrician

4 - Stage Studio Electrician

5 - Electrician Maintenance and Support

NLVQF Skills Level Number

1 - Semi Skilled Worker

2. – Skilled Worker

3. - Advance Skilled Worker

4 - Supervisor level

Each Competency Standard for a Job contains a mix of Units structured as follows:

**Type 1 - Basic Units** – Cover a range of Occupations

**Type 2 - Common Units** – Common to jobs in the Electrical Industry/sector

**Type 3 - Core Units** – Technical & Specific to this job

# BASIC UNITS OF COMPETENCY

###### Lead workplace communication

|  |  |
| --- | --- |
| **Unit Code** | 741.7411.121.001.01 |
| **Unit Descriptor** | *This unit of Basic Worker Competencies covers the knowledge, skills and attitudes required to lead in the dissemination and discussion of ideas, information and issues in the workplace.* |

Elements & Performance Criteria

|  |  |
| --- | --- |
| **ELEMENTS** | PERFORMANCE CRITERIA***Italicized*** terms are elaborated in the Range of Variables |
| 1. Communicate information about workplace processes
 | * 1. Appropriate ***communication method*** is selected
	2. Multiple operations involving several topics areas are communicated accordingly
	3. Questions are used to gain extra information
	4. Correct sources of information are identified
	5. Information is selected and organized correctly
	6. Verbal and written reporting is undertaken when required
	7. Communication skills are maintained in all situations
 |
| 1. Lead workplace discussions
 | * 1. Response to workplace issues are sought
	2. Response to workplace issues are provided immediately
	3. Constructive contributions are made to workplace discussions on such issues as production, quality and safety
	4. Goals/objectives and action plan undertaken in the workplace are communicated
 |
| 1. Identify and communicate issues arising in the workplace
 | * 1. Issues and problems are identified as they arise
	2. Information regarding problems and issues are organized coherently to ensure clear and effective communication
	3. Dialogue is initiated with appropriate personnel
	4. Communication problems and issues are raised as they arise
 |

Range of Variables

|  |  |
| --- | --- |
| **VARIABLES** | **RANGE** |
| 1. Methods of communication
 | * 1. Non-verbal gestures
	2. Verbal
	3. Face to face
	4. Two-way radio
	5. Speaking to groups
	6. Using telephone
	7. Written
	8. Internet
 |
| VARIABLES | RANGE |
| 1. Written notices and instructions
 | It may refer to:* 1. Handwritten and printed material
	2. Internal memos
	3. External communications
	4. Electronic mail
	5. Briefing notes
	6. General correspondence
	7. Marketing materials
	8. Journal articles
 |
| 1. Organizational Guidelines
 | It may include:* 1. Information documentation procedures
	2. Company policies and procedures
	3. Organization manuals
	4. Service manual
 |

Evidence Guide

|  |  |
| --- | --- |
| **ASPECTS OF COMPETENCY** | **EVIDENCE REQUIREMENTS** |
| 1. Critical aspects of Competency
 | Assessment requires evidence that the candidate:* 1. Dealt with a range of communication/information at one time
	2. Made constructive contributions in workplace issues
	3. Sought workplace issues effectively
	4. Responded to workplace issues promptly
	5. Presented information clearly and effectively written form
	6. Used appropriate sources of information
	7. Asked appropriate questions
	8. Provided accurate information
 |
| 1. Underpinning knowledge
 | * 1. Organization requirements for written and electronic communication methods
	2. Effective verbal communication methods
 |
| 1. Underpinning Skills
 | * 1. Organize information
	2. Understand and convey intended meaning
	3. Participate in variety of workplace discussions
	4. Comply with organization requirements for the use of written and electronic communication method
 |
| 1. Resource Implications
 | The following resources should be provided:* 1. Variety of Information
	2. Communication tools
	3. Simulated workplace
 |
| 1. Methods of Assessment
 | Competency may be assessed through:-* 1. Direct Observation
	2. Interview

Assessment of knowledge & underpinning skills may be combined*Evidence provided for Competency determination will be Valid, Sufficient & Current* |
| 1. Context for Assessment
 | * 1. Competency may be assessed in the workplace or in an accredited workplace environment
	2. Competency assessment must be undertaken in accordance with the Lao PDR CBT assessment guidelines
 |

###### Lead small teams

|  |  |
| --- | --- |
| **Unit Code** | ***741.7411.121.02.01*** |
| **Unit Descriptor** | *This Unit covers the Skills Knowledge & Attitudes required to lead small teams including setting and maintaining team and individual performance standards.* |

Elements & Performance Criteria

|  |  |
| --- | --- |
| **ELEMENT** | **PERFORMANCE CRITERIA*****Italicized*** terms are elaborated in the Range of Variables |
| 1. Provide team leadership
 | 1.1. ***Work requirements*** are identified and presented to team members1. Reasons for instructions and requirements are communicated to team members
	1. *Team members’ queries and concerns are recognized*, discussed and dealt with.
 |
| 1. Assign responsibilities
 | * 1. Duties, and responsibilities are allocated having regard to the skills, knowledge and aptitude required to undertake the assigned task according to company policy.
	2. Duties are allocated having regard to individual preference, domestic and personal considerations, whenever possible.
 |
| 1. Set performance expectations for team members
 | * 1. Performance expectations are established based on client needs and according to assignment requirements.
	2. Performance expectations are based on individual team members duties and area of responsibility.
	3. Performance expectations are discussed and disseminated to individual team members.
 |
| 1. Supervise team performance
 | * 1. Monitoring of performance takes place against defined performance criteria and/or assignment instructions and corrective action taken if required.
	2. Team members are provided with feedback, positive support and advice on strategies to overcome any deficiencies
	3. Performance issues which cannot be rectified or addressed within the team are referenced to appropriate personnel according to employer policy
	4. 4.4 Team members are kept informed of any changes in the priority allocated to assignments or tasks which might impact on client/customer needs and satisfaction
	5. Team operations are monitored to ensure that employer/client needs and requirements are met
	6. Follow-up communication is provided on all issues affecting the team.
	7. All relevant documentation is completed in accordance with company procedures
 |

 Range of Variables

|  |  |
| --- | --- |
| **VARIABLES** | **RANGE** |
| 1. Work requirements
 | 1.1. Client Profile1.2 Assignment instructions |
| 1. Team member’s concerns
 | * 1. Shift details
 |
| 1. Monitor performance
 | * 1. Formal process
	2. Informal process
 |
| 1. Feedback
 | * 1. Formal process
	2. Informal process
 |
| 1. Performance issues
 | * 1. Work output
	2. Work quality
	3. Team participation
	4. Compliance with workplace protocols
	5. Safety
	6. Customer service
 |

 Evidence guide

|  |  |
| --- | --- |
| **ASPECTS OF COMPETENCY** | **EVIDENCE REQUIREMENTS** |
| 1. Critical Aspects of Competency
 | Assessment requires evidence that the candidate has:1. Maintained or improved individuals and/or team performance given a variety of possible scenario.
	1. Assessed and monitored team and individual performance against set criteria.
	2. Represented concerns of a team and individual to next

level of management or appropriate specialist and to negotiate on their behalf.* 1. Allocated duties and responsibilities, having regard to individual’s knowledge, skills and aptitude and the needs of the tasks to be performed
	2. Set and communicated performance expectations for a range of tasks and duties within the team and provided feedback to team members.
 |
| 1. Underpinning knowledge
 | * 1. Company policies and procedures.
	2. Relevant legal requirements.
	3. How performance expectations are set
	4. Methods of Monitoring Performance
	5. Client expectations
	6. Team member’s duties and responsibilities
 |
| 1. Underpinning skills
 | 1. Communication skills required for leading teams.
	1. Informal performance counseling skills.
	2. Team building skills.
	3. Negotiating skills
 |
| 1. Resource implications
 | The following resources should be provided;* 1. Access to relevant workplace or accredited simulated environment where assessment can take place.
	2. Materials relevant to the proposed activity or task.
 |
| 1. Methods of assessment
 | Competency may be assessed through:* 1. Observation of work, simulation and/or role play involving the participation of individual member to the attainment of organizational goal
	2. Case studies and scenarios as a basis for discussion of issues and strategies in teamwork.

*Evidence provided for competency determination will be Valid, Sufficient & Current* |
| 1. Context of assessment
 | 1. Competency assessment may occur in workplace or any accredited centre/ environment.
	1. Assessment shall be observed while task are being

undertaken whether individually or in-group.* 1. Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines
 |
|  |  |

###### WORK WITH OTHERS

|  |  |
| --- | --- |
| **UNIT CODE:** | 741.7411.121.003.01 |
| **UNIT DESCRIPTOR:** This competency unit includes the knowledge, skills and attitudes required in working with others. This unit specifically involves developing effective workplace relationship and contributing to work group activities. |

Elements & Performance Criteria

|  |  |
| --- | --- |
| **ELEMENTS** | **PERFORMANCE CRITERIA***(Italicized items are elaborated in the range of variables).*. |
| 1. Develop effective workplace relationship
 | * 1. ***Duties and responsibilities*** are done in a positive manner to promote cooperation and good relationship
	2. Assistance is sought from ***workgroup*** when difficulties arise and addressed through discussions
	3. ***Feedback*** provided by others in the team is encouraged, acknowledged and acted upon
	4. Differences in personal values and beliefs are respected and acknowledged in the development
 |
| 1. Contribute to work group activities
 | * 1. ***Support is provided to team members*** to ensure workgroup goals are met
	2. Constructive contributions to workgroup goals and tasks are made according to ***organizational requirements***
	3. Information relevant to work is shared with team members to ensure designated goals are met
 |

**Range of Variables**

|  |  |
| --- | --- |
| **VARIABLES** | **RANGE** |
| 1. Duties and responsibilities
 | It may refer to:* 1. Job description and employment arrangements
	2. Organization’s policy relevant to work role
	3. Organizational structures
	4. Supervision and accountability requirements including OHS
	5. Code of conduct
 |
| 1. Work group
 | t may refer to:* 1. Supervisor or manager
	2. Peers/work colleagues
	3. Other members of the organization
 |
| 1. Feedback
 | May include but not limited to:* 1. Formal/Informal performance appraisal
	2. Obtaining feedback from supervisors and colleagues and clients
	3. Personal, reflective behavior strategies
	4. Routine organizational methods for monitoring service delivery
 |
| 1. Support is provided to team members
 | May include but not limited to:* 1. Explaining/clarifying
	2. Helping colleagues
	3. Providing encouragement
	4. Providing feedback to another team member
	5. Undertaking extra tasks if necessary
 |
| 1. Organizational requirements
 | May include but not limited to:* 1. Goals, objectives, plans, system and processes
	2. Legal and organization policy/guidelines
	3. OHS policies, procedures and programs
	4. Ethical standards
	5. Defined resources parameters
	6. Quality and continuous improvement processes and standards
 |

**Evidence Guide**

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| --- | --- |
| Critical aspects of Competency | Assessment requires evidence that the candidate:* 1. Provided support to team members to ensure goals are met
	2. Acted on feedback from clients and colleagues
	3. Accessed learning opportunities to extend own personal work competencies to enhance team goals and outcomes
 |
| Underpinning knowledge and attitudes | The relevant legislation that affects operations, especially with regards to safety Reasons why cooperation and good relationships are importantKnowledge of the organization’s policies, plans and proceduresUnderstanding how to elicit and interpret feedbackKnowledge of workgroup member’s responsibilities and dutiesImportance of demonstrating respect and empathy in dealings with colleaguesUnderstanding of how to identify and prioritize personal development opportunities and options |
| Underpinning *skills* | Ability to read and understand the organization’s policies and work proceduresWriting simple instructions for particular routine tasksInterpreting information gained from correspondenceCommunication skills to request advice, receive feedback and work with a teamPlanning skills to organized work priorities and arrangementTechnology skills including the ability to select and use technology appropriate to a taskAbility to relate to people from a range of social, cultural and ethnic backgrounds |
| Resource implications | The following resources should be provided:Access to relevant workplace or appropriately simulated environment where assessment can take placeMaterials relevant to the proposed activity or task |
| Method of assessment | Competency in this Unit should be assessed through:Direct observations of work activities of the individual member in relation to the work activities of the groupObservation of simulation and/or role play involving the participation of individual member to the attainment of organizational goalCase studies and scenarios as a basis for discussion of issues and strategies |
| Context for assessment | Competency may be assessed on the job or simulated environment.Assessment shall be observed while task are being undertaken whether individually or in groupAssessment must be undertaken in accordance with Lao PDR CBT assessment guidelines |

###### DEMONSTRATE POSITIVE WORK VALUES

|  |  |
| --- | --- |
| **UNIT CODE:** | 741.7411.121.004.01 |
| **UNIT DESCRIPTOR:**  This competency unit includes the knowledge, skills, and attitude required in demonstrating positive work values. This unit specifically involves defining the purpose of work, applying work values/ethics, dealing with ethical problems and maintaining integrity of conduct in the workplace. |

Elements & Performance Criteria

|  |  |
| --- | --- |
| **ELEMENTS** | **PERFORMANCE CRITERIA***(Italicized items are elaborated in the range of variables).* |
|  Define the purpose of work | * 1. One’s unique sense of purpose for working and the why’s of work are identified, reflected on and clearly defined for one’s development as a person and as a member of society.
	2. Personal mission is in harmony with company’s values
 |
| Apply work values/ethics  | * 1. ***Work values/ethics/concepts*** are classified and reaffirmed in accordance with the transparent company ethical standards, policies and guidelines.
	2. ***Work practices*** are undertaken in compliance with industry work ethical standards, organizational policy and guidelines
	3. Personal behavior and relationships with co-workers and/or clients are conducted in accordance with ethical standards, policy and guidelines.
	4. ***Company resources*** are used in accordance with transparent company ethical standard, policies and guidelines.
 |
| Deal with ethical problems | * 1. Company ethical standards, organizational policy and guidelines on the prevention and reporting of unethical conduct are accessed and applied in accordance with transparent company ethical standard, policies and guidelines.
	2. ***Work incidents/situations*** are reported and/or resolved in accordance with company protocol/guidelines.
	3. Resolution and/or referral of ethical problems identified are used as learning opportunities.

  |
| Maintain integrity of conduct in the workplace | * 1. Personal work practices and values are demonstrated consistently with acceptable ethical conduct and company’s core values.
	2. ***Instructions*** to co-workers are provided based on ethical, lawful and reasonable directives.
	3. Company values/practices are shared with co-workers using appropriate behavior and language.
 |

Range of Variables

|  |  |
| --- | --- |
| **VARIABLES** | **RANGE** |
| 1. Work values/ethics/ concepts
 | May include but are not limited to:* 1. Commitment/ Dedication
	2. Sense of urgency
	3. Sense of purpose
	4. Love for work
	5. High motivation
	6. Orderliness
	7. Reliability
	8. Competence
	9. Dependability
	10. Goal-oriented
	11. Sense of responsibility
	12. Being knowledgeable
	13. Loyalty to work/company
	14. Sensitivity to others
	15. Compassion/Caring attitude
	16. Balancing between family and work
	17. Sense of nationalism
 |
| 1. Work practices
 | May include but not limited to:* 1. Quality of work
	2. Punctuality
	3. Efficiency
	4. Effectiveness
	5. Productivity
	6. Resourcefulness
	7. Innovativeness/Creativity
	8. Cost consciousness
	9. 5S
	10. Attention to details
 |
| 1. Company resources
 | May include:* 1. Consumable materials
	2. Equipment/Machineries
	3. Human
	4. Time
	5. Financial resources
 |
| 1. Incidents/situations
 | May include:* 1. Violent/intense dispute or argument
	2. Gambling
	3. Use of prohibited substances
	4. Pilferages
	5. Damage to person or property
	6. Vandalism
	7. Falsification
	8. Bribery
	9. Sexual Harassment
	10. Blackmail
 |
| 1. Instructions
 | Includes:* 1. Verbal
	2. Written
 |

Evidence Guide

|  |  |
| --- | --- |
| 1. Critical aspects of

competency | Assessment requires evidence that the candidate:* 1. Identified one’s unique sense of purpose for working
	2. Clarified and affirmed work values/ethics/concepts consistently in the workplace
	3. Demonstrated work practices satisfactorily and consistently in compliance with industry work ethical standards, organizational policy and guidelines
	4. Demonstrated personal behaviour and relationships with co-workers and/or clients consistent with ethical standards, policy and guidelines.
	5. Followed company ethical standards, organizational policy and guidelines on the prevention and reporting of unethical conduct/behaviour
 |
| 1. Underpinning Knowledge and attitude
 | * 1. Occupational health and safety
	2. Work values and ethics
	3. Company performance and ethical standards
	4. Company policies and guidelines
	5. Fundamental rights at work including gender sensitivity
	6. Work responsibilities/job functions
	7. Corporate social responsibilities
	8. Company code of conduct/values
	9. Balancing work and family responsibilities
 |
| 1. Underpinning skills
 | * 1. Showing interpersonal skills
	2. Applying communication skills
	3. Performing self-awareness, understanding and acceptance
	4. Applying good manners and right conduct
 |
| 1. Resource implications
 | The following resources should be provided:* 1. Workplace or assessment location
	2. Case studies/Scenarios
 |
| 1. Method of assessment
 | Competency in this Unit should be assessed through:* 1. Portfolio Assessment
	2. Interview
	3. Third Party Reports
 |
| 1. Context for assessment
 | * 1. Competency may be assessed on the job or simulated environment.
	2. Assessment shall be observed while task are being undertaken whether individually or in group
	3. Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines
 |

###### PRACTICE HOUSEKEEPING PROCEDURES

|  |  |
| --- | --- |
| **UNIT CODE:** | 741.7411.121.005.01 |
| **UNIT DESCRIPTOR:**  This competency unit includes the knowledge, skills, and attitude required in practicing housekeeping procedures. This unit specifically involves sorting and removing unnecessary items, arranging items, maintaining work area, tools and equipment, following standardized work process and procedures and performing work spontaneously |

Elements & Performance Criteria

|  |  |
| --- | --- |
| **ELEMENTS** | **PERFORMANCE CRITERIA***(Italicized items are elaborated in the range of variables).* |
| 1. Sort and remove unnecessary items  | * 1. Reusable, recyclable materials are sorted in accordance with company/office procedures
	2. ***Unnecessary items*** are removed and disposed of in accordance with company or office procedures
 |
| 2. Arrange items  | * 1. Items are arranged in accordance with company/office housekeeping procedures
	2. Work area is arranged according to job requirements
	3. Activities are prioritized based on instructions.
	4. Items are provided with clear and visible ***identification*** ***marks*** based on procedure
	5. Safety equipment and evacuation passages are kept clear and accessible based on instructions
 |
| 3. Maintain work area, tools and equipment  | * 1. Cleanliness and orderliness of work area is maintained in accordance with company/office procedures
	2. Tools and equipment are cleaned in accordance with manufacturer’s instructions/manual
	3. ***Minor repairs*** are performed on tools and equipment in accordance with manufacturer’s instruction/manual
	4. Defective tools and equipment are reported to immediate supervisor
 |
| 4. Follow standardized work process and procedures  | * 1. Materials for common use are maintained in designated area based on procedures
	2. Work is performed according to standard work procedures
	3. Abnormal incidents are reported to immediate supervisor
 |
| 5. Perform work spontaneously  | * 1. Work is performed as per instruction
	2. Company and office ***decorum*** are followed and complied with
	3. Work is performed in accordance with occupational health and safety (OHS) requirements
 |

Range of Variables

|  |  |
| --- | --- |
| **VARIABLES** | **RANGE** |
| 1. Unnecessary items
 | May include but are not limited to:* 1. Non-recyclable materials
	2. Unserviceable tools and equipment
	3. Pictures, posters and other materials not related to work activity
	4. Waste materials
 |
| 1. Identification marks
 | Includes:* 1. Labels
	2. Tags
	3. Color coding
 |
| 1. Minor repair
 | May include but not limited to:* 1. Replacement of parts
	2. Application of lubricants
	3. Sharpening of tools
	4. Tightening of nuts, bolts and screws
 |
| 1. Decorum
 | * 1. Company/ office rules and regulations
	2. Company/ office uniform
	3. Behavior
 |

Evidence Guide

|  |  |
| --- | --- |
| 1. Critical aspects of competency
 | Assessment requires evidence that the candidate:* 1. Practiced the basic procedures of 5S
 |
| 1. Underpinning Knowledge and attitude
 | * 1. Principles of 5S
	2. Work process and procedures
	3. Safety signs and symbols
	4. General OH&S principles and legislation
	5. Environmental requirements relative to work safety
	6. Accident/Hazard reporting procedures
 |
| 1. Underpinning skills
 | * 1. Performing basic communication skills
	2. Carrying-out Interpersonal skills
	3. Reading skills required to interpret instructions
	4. Reporting/recording accidents and potential hazards
 |
| 1. Resource implications
 | The following resources must be provided:* 1. Facilities
	2. Materials tools and equipment necessary for the activity
 |
| 1. Methods of assessment
 | Competency must be assessed through:* 1. Third party report
	2. Interview
	3. Demonstration with questioning
 |
| 1. Context for assessment
 | * 1. Competency may be assessed on the job or simulated environment.
	2. Assessment shall be observed while tasks are being undertaken whether individually or in group
	3. Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines
 |

# COMMON UNITS OF COMPETENCY

###### Prepare construction materials & tools

***Common***

|  |  |
| --- | --- |
| **Unit Code** | 741.7411.121.001.01 |
| **Unit Descriptor** | *This unit of Common Competency covers the knowledge, skills and attitudes for identifying, requesting and receiving construction materials and tools.*  |

Elements & Performance Criteria

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| --- | --- |
| **ELEMENTS** | PERFORMANCE CRITERIA***Italicized*** terms are elaborated in the Range of Variables |
| 1. Identify materials
 | * 1. ***Materials*** are listed as per job requirements
	2. ***Quantity and description of materials*** conform with the job requirements
	3. ***Tools and accessories are identified*** according to job requirements
 |
| 1. Requisition materials
 | * 1. Materials and tools needed are requested according to the list prepared
	2. Request is done as per company standard operating procedures (SOP)
	3. Substitute materials and tools are provided without sacrificing cost and quality of work
 |

***Unit 1 Prepare construction materials & tools***

***Common***

Range of Variables

|  |  |
| --- | --- |
| **VARIABLES** | **RANGE** |
| 1. Materials and Tools
 | * 1. Electrical supplies
	2. Structural
	3. Plumbing
	4. Welding/pipefitting
	5. Carpentry
	6. Masonry
 |
| 1. Description of Materials and Tools
 | * 1. Brand name
	2. Size
	3. Capacity
	4. Kind of application
 |
| 1. Company standard procedures
 | * 1. Job order
	2. Requisition slip
	3. Borrower slip
 |

***Unit 1 Prepare construction materials & tools***

***Common***

Evidence Guide

|  |  |
| --- | --- |
| **ASPECTS OF COMPETENCY** | **EVIDENCE REQUIREMENTS** |
| 1. Critical aspects of competency
 | Assessment requires evidence that the candidate:* 1. Listed materials and tools according to quantity and job requirements
	2. Requested materials and tools according to the list prepared and as per company SOP
	3. Inspected issued materials and tools as per quantity and job specifications
	4. Tools provided with appropriate safety devices
 |
| 1. Underpinning knowledge

  | * 1. Types and uses of construction materials and tools
	2. Different forms
	3. Requisition procedures
	4. Concrete materials preparation & mixes
	5. Plaster materials preparation & mixes
	6. Equipment types & functions
	7. Brick & block types, functions & usage
 |
| 1. Underpinning skills
 | * 1. Preparing materials and tools
	2. Proper handling of tools and equipment
	3. Following instructions
	4. Concrete materials & mixing
	5. Plaster materials & mixing
	6. Brick & block handling
	7. Tools & equipment handling
 |
| 1. Resource implications
 | The following resources should be provided:* 1. Workplace location
	2. Materials relevant to the unit of competency
	3. Technical plans, drawings and specifications relevant to the activities
 |
| 1. Methods of assessment
 | Competency in this unit can be assessed through:* 1. Direct observation
	2. Questioning

*Evidence provided for competency determination will be Valid, Sufficient & Current* |
| 1. Context of assessment
 | * 1. Competency may be assessed in the work place or in an accredited centre.
	2. Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines
 |

###### OBSERVE PROCEDURES, SPECIFICATIONS & MANUALS OF INSTRUCTION

|  |  |
| --- | --- |
| Unit Code | 741.7411.121.002.01 |
| Unit Descriptor | This unit covers the Skills, Knowledge and Attitudes required in identifying, interpreting, applying services to specifications and manuals and storing manuals. |

Elements & Performance Criteria

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| --- | --- |
| ELEMENTS | PERFORMANCE CRITERIAItalicized terms as elaborated in the Rang of Variables |
| Identify and access manuals/ specifications | Appropriate manuals are identified and accessed as per job requirementsVersion and date of manual are checked to ensure that correct specification and procedures are identified  |
| Interpret manuals/ specifications | Relevant sections, chapters of specifications/ manuals are located in relation to the work to be conductedInformation and procedure in the manual are interpreted in accordance with industry practices |
| Apply information in manuals/ specifications | Work steps are correctly identified in accordance with manufacturer's specification and Job requirementsManual data are applied according to the given taskAll correct sequencing and adjustments are interpreted in accordance to the manual or specifications |
| Store manuals | Manual or specification is stored appropriately to prevent damage, ready access and updating of information when required in accordance with company requirements |

Range of Variables

|  |  |
| --- | --- |
| VARIABLES | RANGE |
| Manuals and Information | Regulatory legislative requirements pertaining to the Electrical industry including Lao Design RulesRepair manual/handbook issued by company/manufacturer/component supplier Specification data/manual/handbook issued by company/manufacturer/component supplierPeriodic Service Maintenance Data manual/handbook issued by company/manufacturer/component supplierTools, workshop-, test equipment and OHS user manual and service guide issued by company/manufacturer/component supplier |
| Applications | Manuals used for System/components may be fitted to:Light vehiclesAgro-MachineryOutdoor power equipmentMarine craftPlant |
| Company/ workshop standard operating procedures | Manuals and Information used for Company/workshop standard operating procedures include:Written instructions issued by authorized personalJob order slipSpare parts ordering form |

Evidence Guide

|  |  |
| --- | --- |
| Critical aspects of Competency | Assessment requires evidence that the candidate:Listed materials and tools according to quantity and job requirements Requested materials and tools according to the list prepared and as per company standard operating proceduresInspected issued materials and tools as per quantity and job specificationsTools provided with appropriate safety devices |
| Underpinning knowledge and attitudes | Types and uses of construction materials and toolsDifferent formsRequisition procedures |
| Underpinning skills | Preparing materials and toolsProper handling of tools and equipmentFollowing instructions |
| Resource implications | The following resources should be provided:Workplace locationMaterials relevant to the unit of competencyTechnical data/manual/handbook and specifications relevant to the activities |
| Method of assessment | Competency in this Unit may be assessed through:Direct observation and oral questioningEvidence provided for competency determination will be Valid, Sufficient & Current |
| Context for assessment | Competency may be assessed on the job or simulated environment.Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines |

INTERPRET TECHNICAL DRAWING & PLANS

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| --- | --- |
| 741.7411.121.003.01 | 741.7411.121.003.01 |
| Unit Descriptor | This unit covers the Skills, Knowledge and Attitudes required in analyzing and interpreting symbols, data and work plan based on the required performance standards. |

Elements & Performance Criteria

|  |  |
| --- | --- |
| ELEMENTS | PERFORMANCE CRITERIAItalicized terms as elaborated in the Rang of Variables |
| Analyze signs, symbols and data | Technical plans are obtained according to job requirementsSigns, symbols and data are identified according to job specificationsSigns symbols and data are determined according to classification or as appropriate in drawing |
| Interpret technical drawings and plans | Necessary tools, materials and equipment are identified according to the drawing & planComponents, assemblies or objects are recognized as requiredDimensions are identified as appropriate to the planSpecification details are matched with existing/available resources and in line with job requirementsFree hand sketches produced in line with needs |

Range of Variables

|  |  |
| --- | --- |
| VARIABLES | RANGE |
| Technical Drawing/ Plans | Technical Drawing/Plans including but not limited to:Welding plansWelding Procedures Specifications (WPS)Auto mechanic plansAgro-Machinery plansMotorbike plansElectrical wiring plansOHS work plans Plans, schematic diagrams in Company/manufacturer/component supplier repair, specification data and Periodic Service Maintenance Data manual/handbook |
| Applications | Including but not limited to:Argo Machinery Mechanic and RepairAuto Mechanic and RepairMotorbike Mechanic and RepairWelding |
| Drawing | Drawing symbolsAlphabet of linesOrthographic views3.3.1 Front view3.3.2 Right side view/left side view3.3.3 Top view3.3.4 PictorialSchematic diagramElectrical drawingsStructural drawingsWelding drawingWelding symbols |
| Tools and materials | Including but not limited to:CompassDividerRulersTrianglesDrawing tablesComputer |

Evidence Guide

|  |  |
| --- | --- |
| Critical aspects of Competency | Assessment requires evidence that the candidate:Identified and determined signs, symbols and data according to work plan, job requirements and classificationsIdentified tools and equipment in accordance with job requirementsListed supplies and materials according to blueprint specificationsDrawn work plan following specificationsDemonstrated ability to determine job specifications based on working / technical drawing |
| Underpinning knowledge and attitudes | TRADE MATHEMATICSLinear measurementDimensionUnit conversionBLUEPRINT READING AND PLAN SPECIFICATIONElectrical, mechanical plan, symbols and abbreviationsDrawing standard symbolsTRADE THEORYBasic technical drawingTypes technical plansVarious types of drawingsNotes and specifications |
| Underpinning skills | Interpreting drawing/orthographic drawingInterpreting technical plansMatching specification details with existing resourcesFollowing instructionsHandling of drawing instruments |
| Resource implications | The following resources should be provided:Workplace location or simulated work areaDrawings and specification relevant to taskMaterials and instrument relevant to proposed activity |
| Method of assessment | Competency in this Unit should be assessed through:Direct ObservationQuestions/InterviewWritten test related to underpinning knowledgeEvidence provided for competency determination will be Valid, Sufficient & Current |
| Context for assessment | Competency assessment may occur in the workplace or in any appropriate simulated environment Assessment shall be observed while task are being undertaken whether individually or in group Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines |

###### Interpret technical drawings & plans

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| --- | --- |
| **Unit Code** | 741.7411.121.003.01 |
| **Unit Descriptor** | *This Unit covers the Skills Knowledge & Attitudes required when analysing and interpreting symbols, data in drawings and work plan.*  |

Elements & Performance Criteria

|  |  |
| --- | --- |
| **ELEMENTS** | **PERFORMANCE CRITERIA*****Italicized*** terms are elaborated in the Range of Variables |
| Analyze signs, symbols and data | * 1. ***Technical plans*** are obtained according to job requirements
	2. Signs, symbols and data are identified according to job specifications
	3. Signs symbols and data are determined according to ***classification*** or as appropriate in ***drawing***
 |
| Interpret technical drawings and plans | * 1. Necessary ***tools, materials*** and equipment are identified according to the ***plan***
	2. Supplies and materials are listed according to specifications
	3. Components, assemblies or objects are recognized as required
	4. Dimensions are identified as appropriate to the plan
	5. Specification details are matched with existing/available resources and in line with job requirements.
	6. Work plan is drawn following the specifications
 |
| Apply freehand sketching | * 1. Where applicable, correct freehand sketching is produced in accordance with the job requirements
 |

Range of Variables

|  |  |
| --- | --- |
| **VARIABLES** | **RANGE** |
| Technical Plans | Including but not limited to:1.1 Electrical plans1.2 Structural plans1.3 Architectural plans1.4 Plumbing plans1.5 Welding Procedures Specifications (WPS) |
| Work plan | 2.1 Job requirements2.2 Installation instructions2.3 Components instruction |
| Classification | Including but not limited to:3.1 Electrical3.2 Mechanical3.3 Plumbing |
| Drawing | 4.1. Welding Symbols4.2. Drawing symbols.1. Alphabet of lines
	1. Orthographic views
	2. Front view
	3. Right side view/left side view
	4. Top view
	5. Pictorial
	6. Schematic diagram
	7. Electrical drawings
	8. Structural drawings
	9. Plumbing drawings
	10. Water
	11. Sewerage/Drainage
	12. Ventilation
 |
| Tools & material | Including but not limited to;* 1. Compass
	2. Divider
	3. Rulers
	4. Triangles
	5. Drawing tables
	6. Computer
 |

Evidence Guide

|  |  |
| --- | --- |
| **ASPECTS OF COMPETENCY** | **EVIDENCE REQUIREMENTS** |
| Critical aspects of competency | * 1. Identified and determined signs, symbols and data according to work plan, job requirements & classifications
	2. Identified tools and equipment & materials in accordance with job requirements.
	3. Listed supplies and materials according to blueprint Specifications
	4. Completed work plan following specifications.
	5. Demonstrated ability to determine job specifications based on working / technical drawing
 |
| Underpinning knowledge | * 1. Mathematics
* 2.1.1 Linear measurement
* 2.1.2 Dimension
* 2.1.3 Unit conversion
	1. Reading Drawings & Plans
		+ Electrical, mechanical plan, symbols and abbreviations
		+ Drawing standard symbols
	2. Trade Theory
		+ Basic technical drawing
		+ Types technical plans
		+ Various types of drawings
* 2.3.4 Notes and specifications
 |
| Underpinning skills | 1. Interpreting drawing/orthographic drawings
	1. Interpreting technical plans
	2. Matching specification details with existing resources
	3. Following instructions
	4. Handling of drawing instruments
 |
| Resource implications | * 1. Workplace
	2. Drawings and specification relevant to task
	3. Materials and instrument relevant to proposed activity
 |
| Methods of assessment | * 1. Direct observation
	2. Questioning

*Evidence provided for competency determination will be Valid, Sufficient & Current* |
| Context of assessment | * 1. Competency may be assessed in the work place or in an accredited centre.
	2. Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines
 |

###### USE MATHEMATICAL CONCEPTS & TECHNIQUES

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| Unit Code | 741.7411.121.004.01 |
| Unit Descriptor | This Unit covers the Skills, Knowledge and Attitudes required in the application of mathematical concepts and techniques. |

Elements & Performance Criteria

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| --- | --- |
| ELEMENTS | PERFORMANCE CRITERIAItalicized terms as elaborated in the Rang of Variables |
| Identify mathematical tools and techniques to solve problem | Problem areas are identified based on given conditionMathematical techniques are selected based on the given problem |
| Apply mathematical procedure/solution | Mathematical techniques are applied based on the problem identifiedMathematical computations are performed to the level of accuracy required for the problemResults of mathematical computation is determined and verified based on job requirements |
| Analyze results  | Result of application is reviewed based on expected and required specifications and outcomeAppropriate action is applied in case of error |

|  |  |
| --- | --- |
| VARIABLES | RANGE |
| Mathematical techniques | Should be included, but are not limited to:Four fundamental operationsMeasurementsUse/Conversion of units of measurementsUse of standard formulas |
| Appropriate action | Review in the use of mathematical techniques (e.g. recalculation, re-modeling)Report error to immediate superior for proper action |

Range of Variables

Evidence Guide

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| --- | --- |
| Critical aspects of Competency | Assessment requires evidence that the candidate:Identified, applied and reviewed the use of mathematical concepts and techniques to workplace problems |
| Underpinning knowledge and attitudes | Fundamental operation (addition, subtraction, division, multiplication)Measurement systemPrecision and accuracyBasic measuring tools/devices |
| Underpinning skills | Applying mathematical computationsUsing calculatorUsing different measuring tools |
| Resource implications | The following resources should be provided:Workplace location or simulated work areaCalculatorBasic measuring toolsCase Problems |
| Method of assessment | Competency in this Unit should be assessed through:Interview/ oral questioningDemonstration on simulated situationWritten/Oral examinationEvidence provided for competency determination will be Valid, Sufficient & Current |
| Context for assessment | Competency should be assessed in the workplace or simulated environment. Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines |

###### Maintain tools & equipment

|  |  |
| --- | --- |
| **Unit Code** | 741.7411.121.005.01 |
| **Unit Descriptor** | *This Unit covers the Skills Knowledge & Attitudes required when checking the condition of tool & equipment, performing preventive maintenance and storing of tools and equipment.* |

Elements & Performance Criteria

|  |  |
| --- | --- |
| **ELEMENTS** | **PERFORMANCE CRITERIA*****Italicized*** terms are elaborated in the Range of Variables |
| Check condition of tools & equipment  | * 1. Materials, tools and equipment are identified according to classification and job requirements
	2. Non-functional tools and equipment are

segregated and labeled according to classification* 1. Safety of tools and equipment are observed in accordance with manufacturer's instructions
	2. Condition of PPE are checked in accordance

with manufacturer's instructions |
| Perform basic maintenance | * 1. Appropriate lubricants are identified according to

types of equipment* 1. Tools and equipment are lubricated according to preventive maintenance schedule or manufacturer's specifications
	2. Measuring instruments are checked and

calibrated in accordance with manufacturer’s instructions* 1. Tools are cleaned and lubricated according to standard operating procedures
	2. Defective instruments, equipment and

accessories are inspected and replaced according to manufacturer’s specifications* 1. Tools are inspected, repaired and replaced after use
	2. Work place is cleaned and kept in safe state in

line with SOP, QMS & OHS regulations |
| Store tools & equipment | * 1. Inventory of tools, instruments and equipment are conducted and recorded as per company practices
	2. Tools and equipment are stored safely in appropriate locations in accordance with

manufacturer's specifications or SOP, OHS, QMS |

Range of Variables

|  |  |
| --- | --- |
| **VARIABLES** | **RANGE** |
| Materials | Including but not limited to;-* 1. Lubricants
	2. Cleaning materials
	3. Rust remover
	4. Rugs
	5. Spare parts
 |
| Tools & equipment | Including but not limited to;-* 1. Cutting tools - hacksaw, crosscut saw, rip saw
	2. Boring tools - auger, brace, grinlet, hand drill
	3. Holding tools - vise grip, C-clamp, bench vise
	4. Threading tools - die and stock, taps
	5. Measuring instruments/equipmentn
 |
| PPE | Including but not limited to;-* 1. Goggles
	2. Gloves
	3. Safety shoes
	4. Aprons/Coveralls
 |
| Forms | * 1. Maintenance schedule forms
	2. Requisition slip
	3. Inventory form
	4. Inspection form
	5. Reporting form
 |

Evidence Guide

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| --- | --- |
| **ASPECTS OF COMPETENCY** | **EVIDENCE REQUIREMENTS** |
| 1. Critical Aspects of Competency
 | Assessment requires that the candidates has;-* 1. Selected and used appropriate processes, tools and equipment to carry out task
	2. Identified functional and non-functional tools and equipment
	3. Checked, lubricated and calibrated tools, equipment and instruments according to manufacturer’s specifications
	4. Replaced defective tools, equipment and their accessories
	5. Observed and applied safe handling of tools and equipment and safety work practices
	6. Prepared and submitted inventory report, where applicable
	7. Maintained workplace in accordance with OHSA regulations
	8. Stored tools and equipment safely in appropriate locations and in accordance with company practices
 |
| 1. Underpinning Knowledge
 | ***Safety Practices**** 1. Use of PPE
	2. Handling of tools and equipment
	3. Good housekeeping

***Materials Tools & equipment**** 1. Types and uses of lubricants
	2. Types and uses of cleaning materials
	3. Types and uses of measuring instruments and equipment.

***Preventative maintenance**** 1. Methods and techniques
	2. Procedures
 |
| 1. Underpinning skills
 | * 1. Preparing maintenance materials, tools and equipment
	2. Proper handling of tools and equipment
	3. Performing preventive maintenance
	4. Following instructions
 |
| 1. Resource implications
 | The following resources should be provided:* 1. Workplace
	2. Maintenance schedule
	3. Maintenance materials, tools and equipment relevant to the proposed activity/task
 |
| 1. Methods of assessment
 | * 1. Direct observation
	2. Questioning

*Evidence provided for competency determination will be Valid, Sufficient & Current* |
| 1. Context of assessment
 | * 1. Competency may be assessed in the work place or in an accredited centre.
	2. Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines
 |

###### PERFORM MENSURATION AND CALCULATION

|  |  |
| --- | --- |
| Unit Code | 741.7411.121.006.01 |
| Unit Descriptor | This unit covers the Skills, Knowledge and Attitudes required in identifying and measuring objects based on the required performance standards. |

Elements & Performance Criteria

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| --- | --- |
| ELEMENTS | PERFORMANCE CRITERIAItalicized terms as elaborated in the Rang of Variables |
| Select measuring instruments | Object or component to be measured is identified, classified and interpreted according to the appropriate regular ***geometric shape*** and job requirementsCorrect specifications are obtained from relevant sourcesAppropriate measuring tools/ instruments are selected/identified as per object to be measured or job requirements |
| Carry out measurements and calculations | Accurate ***measurements*** are obtained according to job requirements***Calculation*** needed to complete work tasks are performed using the four basic process of addition (+), subtraction (-), multiplication (x) and division (/) including but not limited to: trigonometric functions, algebraic computationsCalculations involving fractions, percentages and mixed numbers are used to complete workplace tasksNumerical computation is self-checked and corrected for accuracyInstruments are read to the limit of accuracy of the toolSystems of measurement identified and converted according to job requirements/ISOObject or component are measured according to job requirements |

Range of Variables

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| --- | --- |
| VARIABLES | RANGE |
| Geometric shape | Including but is not limited to:Round SquareRectangularTriangleSphereConical |
| Measuring instruments | Including but not limited to:Micrometer (In-out, depth)Vernier caliper (out, inside)Dial gaugePlastic gaugeStraight edgeThickness gaugeTorque gaugeTelescopic gaugeTry-squareProtractorCombination gaugeSteel ruleVoltmeterAmmeterOhmmeterGauges (pressure and vacuum)Thermometers |
| Measurements and calculations | Kinds of part mensuration include:LinearVolumeAreaWattageVoltageResistanceAmperageFrequencyImpedanceDisplacementInside diameterOutside diameterCircumferenceLengthThicknessTaperOut of roundnessEnd play/thrust clearance |
| Applications | Mensuration including but not limited to:Argo Machinery Mechanic and RepairAuto Mechanic and RepairMotorbike Mechanic and RepairWelding |

Evidence Guide

|  |  |
| --- | --- |
| Critical aspects of Competency | Assessment requires that the candidate:Selected and prepared appropriate measuring instruments in accordance with job requirementsPerformed measurements and calculations according to job requirements/ ISO |
| Underpinning knowledge and attitudes | TRADE MATHEMATICS / MENSURATIONFour fundamental operationLinear measurementDimensionsUnit conversionRatio and proportionTrigonometric functionsAlgebraic equations |
| Underpinning skills | Performing calculation by addition, subtraction, multiplication and division; trigonometric functions and algebraic equationsVisualizing objects and shapesInterpreting formulas for volume, areas, perimeters of plane and geometric figuresProper handling of measuring instruments |
| Resource implications | The following resources should be provided:Workplace location or simulated work areaProblems to solveMeasuring instrument appropriate to carry out tasksInstructional materials relevant to the propose activityAssessment of underpinning knowledge and practical skills may be combined |
| Method of assessment | Competency should be assessed through:Direct Observation on actual workplaceWritten test/questioning to underpinning knowledgeEvidence provided for competency determination will be Valid, Sufficient & Current |
| Context for assessment | Competency may be assessed on the job or simulated environment.Assessment shall be observed while task are being undertaken whether individually or in groupAssessment must be undertaken in accordance with Lao PDR CBT assessment guidelines |

###### Apply OHS requirements in the Construction Industry

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| --- | --- |
| **Unit Code** | 741.7411.121.007.01 |
| **Unit Descriptor** | *This unit of Common Competency covers the knowledge, skills and attitudes for OHS within any sector of the Construction Industry.* |

Elements & Performance Criteria

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| --- | --- |
| **ELEMENTS** | **PERFORMANCE CRITERIA*****Italicized*** terms are elaborated in the Range of Variables |
| Identify & assess risks | * 1. Hazards in the work area are identified, assessed and reported to designated personnel.
	2. Safety risks in the work area are identified, assessed and reported to designated personnel.
	3. Safe work practices, duty of care requirements and safe work instructions are followed for controlling risks.
	4. OHS, hazard, accident or incident reports are contributed to according to workplace procedures and National OHS legislation and relevant information
 |
| Identify hazards & hazardous materials | * 1. Hazardous materials on a work site are correctly identified and, if appropriate, handled and used according to company and legislated procedures.
	2. Measures for controlling risks and construction hazards are applied effectively and immediately
	3. Hazardous materials that have safety implications for self and other workers are secured immediately they are identified, using appropriate signs and symbols.
	4. Asbestos-containing materials are identified on a work site and reported to designated personnel
 |
| Plan & prepare for safe work practices | * 1. Correct personal protective equipment and clothing for each area of construction work are identified, worn, correctly fitted, used and stored according to enterprise procedures.
	2. Selection of tools, equipment and materials, and organisation of tasks are performed in conjunction with other personnel on site and in accordance with enterprise procedures.
	3. Required barricades and signage are determined and erected at the appropriate site location.
	4. Material safety data sheets (MSDS), and job safety analysis (JSA) and safe work method statements relevant to the work to be carried out are identified and applied.
 |
| Apply safe work practices | * 1. Tasks are performed in a manner that is safe for operators, other personnel and the general community in accordance with legislative requirements, and enterprise policies and procedures.
	2. Plant and equipment guards are used in accordance with manufacturer specifications, work site regulations & standards.
	3. Procedures and relevant authorities for reporting hazards, incidents and injuries are used.
	4. Prohibited tools and equipment in areas with identified asbestos are recognised and not used.
	5. Work site safety signs and symbols are identified and followed.
	6. Work site area is cleared and maintained to prevent and protect self and others from incidents and accidents and to meet environmental requirements
 |
| Follow emergency procedures | * 1. Designated personnel are identified in the event of an emergency for communication purposes.
	2. Safe workplace procedures for dealing with accidents, various types of fire and other emergencies are followed, including identification or use, if appropriate, of fire equipment within scope of responsibilities.
	3. Emergency response and evacuation procedures are known, practised and carried out effectively when required.
	4. Emergency first aid treatment of minor injuries is carried out correctly and details of any treatment administered are reported accurately to designated personnel as soon as possible.
 |

 Range of Variables

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| --- | --- |
| **VARIABLES** | **RANGE** |
| Hazards | * 1. Chemical spills
	2. Work in confined spaces
	3. Trenches, excavations
	4. Falling objects
	5. Gasses, fires
	6. Hazardous materials
	7. Extereme temperatures
	8. Infectious diseases
	9. Handling & moving equipment
	10. Overhanging, protruding, sharp objects
 |
| Designated persons | * 1. Safety officers
	2. Managers, supervisors
	3. Materials handling licensed persons C
 |
| Safe work practices | * 1. Observing OHS practices
	2. Risk assessment & emergency procedures
	3. Use of fire-fighting equipment
 |
| Duty of care requirements | * 1. Protect others from harm
	2. National OHS regulations c
 |
| Incidents | * 1. Accidents resulting in personal injury, damage to property
	2. Events on site that require assessment and action c
 |
| Legislation | * 1. National & Provincial OHS regulations
 |
| Information, signs, symbols | * 1. Visual displayed symbols, tags, signs, instructions
	2. Event reporting documents
	3. Safety meeting records d
 |
| Hazardous materials | * 1. Asbestos
	2. Cleaning chemicals, solvents
	3. Glues
	4. Timber treatment products c
 |
| Risk control measures | * 1. Elimination, substitution, isolation
	2. Management control
	3. PPE c
 |
| PPE | Including but not limited to:-* 1. Aprons, arm guards, caps, dust masks, respirators, ear muffs, ear plugs, gloves, hard hats, reflective vests, jackets, overalls, safety glasses & goggles, steel capped boots, UV protective clothing & sunscreen
 |
| Tools, materials, equipment | Including but not limited to;-* 1. Fire-fighting equipment, breathing apparatus, first aid kit, ladders & work platforms, PPE c
 |
| Emergency equipment | Including but not limited to* 1. Contact numbers, names, locations & procedures for local emergency services c
 |

Evidence Guide

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| **ASPECTS OF COMPETENCY** | **EVIDENCE REQUIREMENTS** |
| Critical aspects of competency | A person demonstrating competency in this unit must be able to:-* 1. Locate, interpret & apply relevant information, standards & specifications
	2. Comply with a safety site plan & National & organisational OHS policy/procedures.
	3. Implement required safety actions relevant to a range of situations & in line with OHS policy and procedures
 |
| Underpinning knowledge | * 1. Basic first aid procedures
	2. OHS and Construction Terminology
	3. Knowledge of OHS communication & visual display methods including signage.
	4. Emergency response & evacuation procedures M
 |
| Underpinning skills | * 1. Recognise & respond effectively to a range of hazardous situations in the required manner
	2. Deal with hazardous situations as part of a team
	3. Communicate & report hazards & risks using a range of technologies suitable to the work environment
	4. Identify & report faults in tools, equipment and facilities.
	5. Use OHS legislation & required safety clothing & equipment
	6. Use construction tools, materials & equipment safely.
 |
| Resource implications | * 1. Induction procedures
	2. Realistic or simulated tasks covering mandatory OHS requirements
	3. Relevant specifications & work instructions
	4. Tools & equipment appropriate to applying safe work practices
	5. Support materials appropriate to activity
	6. Workplace instructions relating to safe work practices
	7. Material safety data sheets
	8. Research resources
 |
| Methods of assessment | * 1. Direct observation
	2. Questioning
	3. Portfolio

*Evidence provided for competency determination will be Valid, Sufficient & Current* |
| Context of assessment | * 1. Competency may be assessed in the work place or in an accredited centre.
	2. Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines
 |

###### Apply gender & social equity principles & policies

|  |  |
| --- | --- |
| **Unit Code** | 741.7411.121.008.01 |
| ***Unit Descriptor*** | *This unit covers the knowledge, skills and attitudes required to apply principles and policies on gender and social equity contributing to positive and productive work environment.*  |

Elements & Performance Criteria

|  |  |
| --- | --- |
| **ELEMENTS** | **PERFORMANCE CRITERIA***Italicized*terms are elaborated in the Range of Variables |
| 1. Follow guidelines or rules of conduct related to gender and social equity in the workplace | * 1. ***Workplace practices and work instructions*** relating to interacting with different social groups based on gender, ethnicity and disability are recognized and followed, and clarification is sought where necessary
	2. Relevant ***legislation, codes and national standards*** that impact on gender and social equity are recognized and followed
	3. Introduction of and amendments to guidelines in the work conduct related to gender and social fairness practices are responded to positively and promptly in accordance with organizational requirements.
 |
| 2. Contribute to improve workplace guidelines in promoting gender and social equity | 2.1 ***Suggestions*** are made to ***designated personnel*** on how to improve social interaction and communication in the workplace to better promote gender and social equity2.2 Information is gathered and improvements are suggested to help improve ***workplace guidelines and policies in promoting observing gender and social fairness***.2.3 ***Gender and social equity issues*** in the workplace practices are discussed in the workplace with colleagues and designated personnel.2.4 Contributions to the review of workplace guidelines and policies gender and social equity guidelines and policies are made within limits of responsibility |
| 3. Recognize and report suspected cases of gender and other forms of social inequity | 3.1 ***Signs and manifestations*** of gender and social inequities and its impact in the workplace are recognized.3.2 Information about or observations of a suspected problem related to gender and social inequity are reported to supervisors and appropriate authorities.3.3 Location and extent of suspected gender and social inequities is accurately ***recorded.***3.4 Reports on the effect of gender and social inequities are completed according to organizational guidelines. |

 Range of Variables

|  |  |
| --- | --- |
| **VARIABLES** | **RANGE** |
| 1. Workplace practices and work instructions
 | * 1. Social diversity awareness, recognition and analysis in the workplace
	2. Use of gender fair and socially inclusive language in dealing with co-workers and students
	3. Sexual harassment and bullying incident recording and reporting procedures
	4. Verbal instructions from persons with responsibility related to gender and social equity awareness and sensitivity
 |
| 2. Legislation, codes and national standards | 2.1 Code of Conduct on sexual harassment in TVET institutions under MoES 2.2 National Strategy for the Advancement of Women, 2005-2010 (includes goals and programmes to promote Lao women’s education, skill levels, income generating opportunities, among others2.3 Lao PDR Law on Development and Protection of Women (Among others, aims to promote women’s knowledge and competency, revolutionary morals and virtues, gender equality; seeks to eliminate all forms of discrimination against women; creates enabling conditions for women’s participation; and for women to be equal force in national protection and development2.4 Labor Law of Lao PDR, 1994 (Articles 2, 39 & 35) 2.5 Constitution of Lao PDR, 2003 (Articles 22, 24 & 27, statement on women of all ethnic groups should receive equal treatment in terms of legal rights, economic and social opportunities)2.6 National obligations to international human rights conventions (Convention on the Elimination of all Forms of Discrimination against Women (CEDAW), 1981; Convention on the Rights of the Child (CRC), 1990 |
| 3. Suggestions | 3.1 Be sensitive in terms of gender, ethnicity and disability in verbal and non-verbal communication3.2 Stop the repetition of sexist and discriminatory sex jokes 3.3 Create and share jokes that are not told at the expense of different social groups 3.4 Recognize the rights of different social groups i.e. women, different ethnic groups, the disabled to equal access to training and skills development, respectful treatment, etc. |
| 4. Designated personnel | 4.1 School Administrator4.2 Head teacher 4.3 Teacher and school staff designated as gender and social equity focal point 4.4 Workplace supervisor or other designated person |
| 5. Workplace guidelines and policies in observing gender and social fairness. | 5.1 Guiding workplace conduct against committing and reporting sexual harassment 5.2 Using language that is sensitive in terms of gender, ethnicity and disability5.3 Information on personnel policies that are aligned with national and official policies and guidelines that uphold the rights of women, ethnic groups and the disabled 5.4 Provision of separate and secure accommodations, toilets wash and resting areas for women, ethnic groups and disabled people 5.5 The designation of a gender focal point among teachers, non-teaching staff and among student population. |
| 6. Gender and social equity issues | 6.1 Sexual harassment 6.2 Bullying 6.3 Voyeurism6.4 Different forms of gender-based violence6.5 Inappropriate and discriminatory language 6.6 Sex jokes that are discriminatory against women, ethnic groups, disabled people 6.7 Discrimination in the workplace |
| 7. Signs or manifestations | 7.1 Sub-standard performance, social withdrawal of affected group or individual 7.2 Lack of motivation to advance or excel7.3 Absenteeism, intention to resign without reason 7.4 Display of fear, nervous and seemingly irrational behaviour of affected group in the presence of perpetuator |
| 8. Reported | 8.1 Verbally (face-to-face or through communication equipment) 8.2 In writing (memo, notes, faxes, email or electronic messages)8.3 Witness or third party accounts |
| 9. Recorded | 9.1 Incident report9.2 Public petitions 9.3 CCTV in the workplace |

Evidence Guide

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| --- | --- |
| **ASPECTS OF COMPETENCY** | **EVIDENCE REQUIREMENTS** |
| 1. Critical aspects of Competency
 | * 1. Demonstrated knowledge of workplace practices and work instructions.
	2. Described relevant legislations, codes and national standards related to gender and social equity issues in the workplace
	3. Followed workplace practices, policies and guidelines related to gender and social equity
	4. Contributed to improve workplace guidelines in promoting gender and social equity
	5. Recognized and reported on suspected cases of gender and other forms of social inequity
	6. Reported, recorded or became aware of the need to report and document lack of compliance with guidelines and policies on gender and social fairness in the workplace
 |
| 1. Underpinning Knowledge
 | * 1. Relevant legislation from all levels of government on gender and other social equity issues involving ethnic groups and disability
	2. Relevant gender and social equity official legislation, policies and workplace practices and procedures
	3. Good practice approaches relevant to work area particularly in regard to observance of and compliance with guidelines and policies that uphold and promote gender and social equity.
	4. Gender and other social equity issues, especially in regard to sexual harassment and gender and other discrimination in the workplace
	5. Gender issues in TVET areas traditionally not associated with women
	6. General work place practices and their potential impact on the gender and other dimensions of social equity.
 |
| 1. Underpinning Skills
 | 1. Discuss and explain gender and other social equity issues in TVET
2. Communicate with co-workers and students in an inclusive manner that respects the rights of the different groups that constitute the workplace and the classroom
3. Recognize signs and manifestations of sexual harassment and other forms of gender-based violence in the workplace and in the classroom
4. Follow workplace directions and instructions
5. Ability to report and document cases of sexual harassment and other forms of gender-based violence and violence directed at other disadvantaged groups
 |
| 4. Resource Implications | 4.1 Induction procedures4.2.Realistic or simulated tasks covering mandatory OHS requirements4.3. Relevant specifications & work instructions4.4.Tools & equipment appropriate to applying safe work practices4.5.Support materials appropriate to activity4.6.Workplace instructions relating to safe work practices4.7.Material safety data sheets4.8.Research resources |
| 5. Methods of Assessment | Competency may be assessed through:1. Written or oral Examination
2. Interview or Third Party Reports
3. Certificate of attendance in basic sensitization workshop on gender and other social equity issues

*Evidence provided for competency determination will be Valid, Sufficient & Current* |
| 6. Context for Assessment | 6.1. Competency may be assessed in the work place or in an accredited centre.6.2. Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines |

# CORE UNITS OF COMPETENCY

###### Perform maintenance & troubleshooting work

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| --- | --- |
| **Unit Code** | 741.7411.123.003.01 |
| **Unit Descriptor** | *This Unit covers the Skills Knowledge & Attitudes required in performing maintenance, troubleshooting and repair work.* |

Elements & Performance Criteria

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| --- | --- |
| 1. Plan, prepare & coordinate maintenance work
 | * 1. ***Maintenance work schedule*** is prepared in accordance with machine/equipment operating time/condition
	2. Work instructions are prepared according to machine’s manual and established enterprise procedures
	3. ***Materials, tools, equipment, testing devices, permits & PPE*** needed are identified and requested & obtained in line SOP
	4. **Potential hazards** are identified for prevention
	5. Relevant department/personnel are informed on the schedule of work according to SOP.
 |
| 1. Maintain electrical equipment & systems
 | * 1. Safety policies and procedures are followed in accordance with OSH and enterprise procedures
	2. ***Electrical system or equipment parts*** are maintained according to manufacturer & SOP
	3. Worn-out/malfunctioning systems or equipment parts are identified and replaced in accordance with manufacturer’s requirements/SOP.
	4. Maintenance report is compiled, approved & actioned
 |
| 1. Troubleshoot faults in electrical equipment & systems
 | * 1. Indicators/Symptoms of fault or failure are identified.
	2. Necessary electrical test on the system or equipment is performed in accordance with established procedure or according to manufacturers guidelines.
	3. Extent of the fault to include the time to accomplish the job and the spare parts needed is estimated according to extent of damage.
	4. Other works associated with the problem are coordinated with other concerned group.
	5. Details of fault, possible cause, corrective action, recommendation to eliminate the problem are recorded accordingly.
 |
| 1. Record work completion
 | * 1. Supervisor notified upon completion of work.
	2. Performance tests are made to ensure that work conforms to instructions and job requirements.
	3. Tools, equipment and any surplus materials are cleaned, checked and returned to storage area in accordance with established procedures.
	4. Service report is prepared and submitted to supervisor
 |

Range of Variables

|  |  |
| --- | --- |
| **VARIABLES** | **RANGE** |
| 1. Maintenance work
 | * 1. Preventive
	2. Corrective/Breakdown
	3. Routine
	4. Predictive
	5. Condition based
 |
| 1. Materials
 | Includes but not limited to;-* 1. Contact cleaner
	2. Insulating varnish/materials
	3. Carbon brushes
	4. Sand paper
	5. Waste rugs
	6. Electrical tapes
	7. Warning tags, Signages, Lockout/tagout
	8. Lubricants
	9. Motor cleaner
	10. Insulating oil
	11. Coolant
 |
| 1. Tools, equipment & testing devices
 | * 1. Electrician’s hand tools
* Pliers
* Screwdrivers
* Wrenches
* Wire splicers
* Knives
* Bolt/Cable cutter
* Knockout puncher
* Torque wrench
	1. Testing instruments/devices
* Multi-tester (VOM)
* Insulation resistance tester (Megger)
* High potential tester
* Low resistance tester
* Phase sequence meter
* Ammeter
* Torque meter
	1. Equipment
* Labeling machine
* Vacuum cleaner
* Air blower
* Dryer
* Welding machine
* Pressure washer
* Vacuum pump
 |
| 1. PPE
 | Includes but not limited to;-* 1. Working gloves
	2. Safety shoes
	3. Hard hat
	4. Face shield
	5. Insulating mat
	6. Lockout tags
	7. Safety goggles
	8. Safety belt
	9. Safety ladder
 |
| 1. Hazards
 | Includes but not limited to:-* 1. Live wires
	2. Oil spill
	3. Chemical hazards
	4. Flammable materials
	5. Sources of energy
	6. Moving machine parts
	7. Sharp/pointed objects
	8. Noise hazards
	9. Confined space
 |
| 1. Electrical equipment/system parts
 | Includes but not limited to;-* 1. Electrical
* Carbon brushes
* Brush holders
* Slip ring
* Commutators
* Contactors
* Relays
* Circuit breakers
* Wires
* Timers
* Switches and push buttons
* Indicating lamps
* Terminal blocks
* Sensors
	1. Mechanical
* Bearings, Bushings, Shafts
* Filters
* Bolts and nuts
* Belts, Pulleys, Couplings, Gears
 |
| 1. Electrical Measuring Instruments
 | Includes but not limited to;-* 1. Multi-tester (VOM/DMM)
	2. Insulation resistance tester (Megger)
	3. High potential tester
	4. Low resistance tester
	5. Phase sequence meter
	6. Ammeter
 |
| 1. Maintenance records
 | Includes but not limited to;-* 1. Electrical plans
	2. Equipment electrical diagrams
	3. Historical records, Log books
* Job orders
* Commissioning test record
* Preventive Maintenance schedules
* Corrective Maintenance records
* Manufacturer’s maintenance guides
* Equipment breakdown records
* Periodic monitoring data
* Service reports
 |
| 1. Quality Management Systems
 | * 1. ISO 9001
	2. QS 9000
	3. TS 16949
	4. ISO 14000
	5. ISO14001
 |
| 1. Problem indicators
 | Includes but not limited to;-* 1. Heating of parts
	2. Loose connections
	3. Burned or exposed parts
	4. Malfunction of logic controls
	5. Abnormal/Unusual Noise/Smell/vibration
	6. Intermittent operation
	7. High current reading
	8. Tripping of breakers
 |
| 1. Electrical testing
 | Includes but not limited to;-* 1. Continuity test
	2. Electrical insulation test
	3. Earth resistance test
	4. Phase sequence test
	5. Load test
	6. Winding resistance test
	7. Free running test
 |
| 1. Testing Mechanical & electronic
 | Includes but not limited to;-* 1. Mechanical works
	2. Computer programs
	3. Communication systems
 |
| 1. Performance testing
 | * 1. Simulation Test/No-Load Test
	2. Phase sequence
	3. Actual Operation
	4. Temperature rise
 |

Evidence Guide

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| --- | --- |
| 1. Critical aspects of competency
 | Assessment requires evidence that the candidate has;-* 1. Identified faults causes using maintenance troubleshooting procedures
	2. Analyzed and interpreted electrical machine circuit diagram
	3. Interpreted and analyzed periodic monitoring data
	4. Demonstrated understanding on the use of electrical testing equipment
	5. Demonstrated understanding on final inspection procedures
	6. Coordinated effectively with others to ensure safe and effective work operations
	7. Applied OHS in the workplace
	8. Reported maintenance & troubleshooting outcomes in line with SOP
 |
| 1. Underpinning knowledge
 | * 1. Lao Electrical Code (LEC) requirements
	2. Maintenance and troubleshooting procedures
	3. Standard operating procedure in energizing electrical system
	4. Mensuration
	5. Interpretation of electrical plans/shop drawings
	6. Interpretation of indicating instrument readings and test instruments
	7. Electrical Laws and principles
	8. Sensors/Actuators
	9. Computer Operations-Basic Computer Operation
	10. Pneumatics and Electro-Pneumatics
	11. Types of potential hazards
	12. OHS Safety practices
 |
| 1. Underpinning skills
 | * 1. Interpreting plan and details
	2. Tracing circuits
	3. Performing basic first-aid
	4. Practicing safe working habits
	5. Using test instruments
	6. Troubleshooting skills
	7. Application of maintenance procedures
	8. Preparing/obtaining materials, PPE, tools, equipment and testing devices in line with established procedures
	9. Estimating the time required to accomplish the job (depending on extent of damage)
	10. Evaluating condition of damage
	11. Selecting prevention and/or control measures
	12. Proper handling of equipment, tools, materials and consumables
	13. Operating computers
	14. Communication skills
 |
| 1. Resource implications
 | The following resources should be provided;-* 1. Workplace location
	2. Tools, equipment and materials appropriate to maintenance and troubleshooting relevant to the task
	3. Drawings and specifications relevant to the task
	4. Service report form
 |
| 1. Methods of assessment
 | Competency can be assessed through;-* 1. Direct observation
	2. Questioning
	3. Portfolio

*Evidence provided for competency determination will be Valid, Sufficient & Current* |
| 1. Context of assessment
 | * 1. Competency may be assessed in the work place or in an accredited centre.
	2. Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines.
 |

###### Assemble & Install electric motor control systems

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| --- | --- |
| **Unit Code** | 741.7411.123.002.01 |
| **Unit Descriptor** | *This Core Unit covers the Skills Knowledge & Attitudes required in the assembly & installation of electrical control systems.* |

Elements & Performance Criteria

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| --- | --- |
| **ELEMENTS** | **PERFORMANCE CRITERIA*****Italicized*** terms are elaborated in the Range of Variables |
| 1. Check type & purpose of electrical control system
 | * 1. Provided ***Wiring diagrams*** and layout/shop drawings are interpreted in accordance with job requirements
	2. Estimated work schedule is planned & verified in line with SOP
	3. Correct rating, quantity, sizes and type of ***control components*** & wiring devices and other materials are identified in line with job requirements
	4. Correct size and ***degree of protection*** of enclosures are verified in line with job requirements
 |
| 1. Verify quality of materials, tools & equipment
 | * 1. Tools, equipment and testing instruments provided are verified in line with job requirements/SOP
	2. Defective/Sub-standard electrical materials are identified and processed in line with SOP
	3. Correct PPE are identified and selected in line with safety requirements
	4. Inspection reports on quality of electrical materials and tools are provided in line with SOP
 |
| 1. Assemble & install electrical control systems
 | * 1. Electrical components & devices are mounted or installed according to drawings, plans, specifications and Lao Electric Code/ standards
	2. Electrical control components are wired correctly in accordance with wiring diagrams and LEC standards
	3. Work schedule is followed in line with schedule & SOP
	4. Preliminary & final checks/tests are conducted.
 |
| 1. Installation completion process
 | * 1. Supervised performance tests are made to ensure that work conforms to instructions and job requirements.
	2. Tools, equipment and any surplus materials are cleaned, checked and returned to storage in accordance with established procedures.
	3. Waste materials and hazardous substances are disposed of in accordance with environmental rules and regulations & OHS
 |

Range of Variables

|  |  |
| --- | --- |
| **VARIABLES** | **RANGE** |
| 1. Wiring diagrams
 | * 1. Power circuits
	2. Control circuits
	3. Relay technology c
 |
| 1. Control components & wiring devices
 | Includes but not limited to:-* 1. Circuit breakers/Fuses
	2. Magnetic Contactors
	3. Relays
	4. Power Cabinet or MCC
	5. Timers
	6. Terminal Blocks/Lugs
	7. Pilot lamps
	8. Actuators
	9. Push buttons
	10. Selector Switches
	11. Cable duct
	12. Din rail
	13. Wire Strap
	14. Wire Markers
	15. Cable Tie
	16. Tie Mount
	17. Cable Glands/Grommet
	18. Conductors
	19. Insulators
 |
| 1. Protection standards
 | * 1. LEC standards
	2. Nema Standards 1,2,3/3R,4/4X,6,11,12
	3. IEC Standards
	4. International Protection (IP)
	5. Product Standards
 |
| 1. Testing instruments & tools
 | * 1. Tools
* Pliers
* Screw drivers
* Wrenches
* Wire splicers/strippers
* Electrician knives
* Electric Hand drill
* Hand or electric taping/threading
* Hack saw
* Files – miscellanious
* Manual/Hydraulic puncher
* Measuring tools (e.g. Push-pull meter)
* Crimping tools
* Soldering tools
* Manual/Hydraulic pipe bender
* Manual/Electrical Pipe Threader/Reamer
* High speed cutter
	1. Testing Instruments
* Multi-tester
* Clamp ammeter
* Insulation resistance tester
* Ground resistance tester
* Earth leakage tester
* Harmonic meter
* Phase Sequence Tester
 |
| 1. PPE
 | * 1. Proper working clothes
	2. Working gloves
	3. Safety shoes
	4. Gas/Dust mask
	5. Hard hat
	6. Safety goggles
 |
| 1. Specifications & ratings
 | * 1. Brand/Make
* Classification/Type
	1. Rating
* Voltage
* Current
* Power
* Frequency
* Temperature Rise
* Service factor
* Degree of protection
* Utilization category
* Harmonics
	1. Phase
	2. Range (Tools must be specific)
	3. Identified accessories
 |
| 1. Jointing
 | * 1. Splicing and joining of electrical conductor
	2. Soldering electrical conductors
	3. Solderless electrical connectors
	4. Creepage distances
	5. Clearances
 |
| 1. Check/test procedures
 | * 1. Mechanical
* Board/Panel properly leveled
* Doors opened/closed with ease.
* Paint not easily scratched/removed
* Tightness of bolts and nuts
* Type of protection
* Cleanliness
* Cable trays
	1. Electrical
* Conductor size or Cross-section
* Conductor Color Coding
* Cables laid to avoid risk of short circuit
* Grounding busbar conductor
* Voltage Clearances/Creepage Distances
* Control Voltage
* High Voltage Test
* Insulation Test
* Continuity Test/Contact Resistance Test
* Correct use of wire markers & terminals
 |
| 1. Performance testing
 | * 1. Simulation Test/No Load Test
	2. Phase sequence
	3. Actual Operation
	4. Temperature rise
 |

Evidence Guide

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| --- | --- |
| **ASPECTS OF COMPETENCY** | **EVIDENCE REQUIREMENTS** |
| 1. Critical aspects of competency
 | * 1. Demonstrated understanding/interpretation on diagrams, symbols and work instructions
	2. Demonstrated understanding of proper use of materials, tools and testing instruments for assembly of electrical control system
	3. Selected and used correct personal protective equipment
	4. Demonstrated correct procedures for installation and wiring of electrical control components
	5. Demonstrated understanding on proper testing procedures
	6. Followed work schedule
	7. Demonstrated good work attitude
 |
| 1. Underpinning knowledge
 | * 1. Materials use and specification
	2. Economic use of materials
	3. Safe working habits/Safety procedures
	4. Lao Electrical Code (LEC) requirements
	5. Electrical control components and devices
	6. Correct procedures in assembling electrical control system
	7. Mensuration
	8. Cleaning of worksite, tools and equipment
 |
| 1. Underpinning skills
 | * 1. Reading & interpreting electrical diagrams and work instructions correctly
	2. Verifying materials, tools and testing instruments
	3. Following wiring diagrams
	4. Safe handling of materials
	5. Proper using of hand tools
	6. Splicing of conductors
	7. Dressing/harnessing of wires
	8. Terminating and insulating of wires
	9. Storing excess materials
	10. Checking quality of work
	11. Communicating skills (both written and oral)
	12. Measuring techniques/skills
	13. Estimating quantity/bill of materials
	14. Preparing request forms for supplies/materials/tools and equipment.
 |
| 1. Resource implications
 | The following resources should be provided:-* 1. Workplace location
	2. Tools and equipment appropriate to assembly of electrical control system
	3. Materials relevant to the activity
	4. Wiring diagrams, layout/shop drawings and specifications relevant to the task
 |
| 1. Methods of assessment
 | Competency can be assessed through:-* 1. Direct observation
	2. Questioning
	3. Portfolio

*Evidence provided for competency determination will be Valid, Sufficient & Current* |
| 1. Context of assessment
 | * 1. Competency may be assessed in the work place or in an accredited centre.
	2. Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines.
 |

***Core***

|  |  |
| --- | --- |
| **Unit Code** | ***741.7411.033.02.01*** |
| **Unit Descriptor** | *This Unit of Competency covers the skills, knowledge and attitudes required when installing bus ways or bus ducts, fittings, boxes, and under floor ducts..*  |

***Unit 2 Elements & Performance Criteria***

|  |  |
| --- | --- |
| **ELEMENTS** | **PERFORMANCE CRITERIA*****Italicized*** terms are elaborated in the Range of Variables |
| Select materials | * 1. Technical drawings are interpreted to determine job requirements
	2. ***Correct type and quantity of ducts*** are identified in line with job requirements
	3. ***Tools and equipment*** are selected in line with job requirements
	4. Correct ***PPE*** are identified and selected in line with safety requirements.
 |
| Install bus & floor ducts | * 1. Safety procedures are followed
	2. Correct procedures for installation of bus and under-floor ducts are performed in line with job requirements
	3. Schedule of work is monitored to ensure work is
	4. completed in an agreed time, to a quality standard and with a minimum of waste
	5. Unplanned events or conditions occurred are responded to accordingly
	6. On-going checks of quality of work are undertaken in accordance with instructions and requirements.
 |
| Complete work | * 1. Final checks are made to ensure that work conforms with instructions and to requirements
	2. Tools, equipment and any surplus resources and materials are checked/monitored in accordance with established procedures.
 |

***Unit 2 Prepare Bus & Under-floor ducts for Electrical Installation***

***Core***

***Range of Variables***

|  |  |
| --- | --- |
| **VARIABLES** | **RANGE** |
| Ducts | * 1. Bus
	2. Under-floor
 |
| Tools & equipment | * 1. Hand Tools
* Pliers
* Screwdrivers
* Wrenches
* Wire splicers
* Knives
* Face shield
* Pipe threader/bender
* Hacksaw
* Manual/Hydraulic puncher
* Lubricants
* Spare parts
	1. Hand Tools
* Electric hand drill
* Tapping/Threading equipment
* Soldering tools
* Jack hammer
	1. Instruments
* Multi tester
* Clamp ammeter
* Insulation tester
* Earth leakage tester
* Ground resistance tester
 |
| Personal Protective Equipment (PPE) | Including but not limited to:* 1. Working gloves
	2. Safety shoes
	3. Hard hat
	4. Safety goggles
 |

***Unit 2 Prepare Bus & Under-floor ducts for Electrical Installation***

***Core***

***Evidence Guide***

|  |  |
| --- | --- |
| **ASPECTS OF COMPETENCY** | **EVIDENCE REQUIREMENTS** |
| Critical Aspects of Competency | Assessment requires evidence that the candidate has:-* 1. Planned and made technical drawings to determine job requirements
	2. Selected appropriate tools, equipment and materials for performing rough-in activities
	3. Selected and used correct personnel protective equipment
	4. Demonstrated correct procedures for performing rough-in activities such as installing bus ducts and under-floor ducts and raceways
	5. Followed safety procedures
	6. Made final checks to ensure work completion and conforms with the working plan.
 |
| Underpinning knowledge | * 1. Bus ducts
* Uses, specifications & fixing methods
	1. Under-floor ducts
* Uses and specifications
	1. Safe working routines
	2. Lao Electrical Code (PEC) requirements v
 |
| Underpinning skills | * 1. Interpreting plan and details
	2. Preparing materials
	3. Proper use of hand tools
	4. Fixing methods for bus bars
	5. Splicing
	6. Dressing of wires
	7. Terminating wires.
 |
| Resource Implications | The following resources should be provided:-* 1. Workplace location
	2. Tools and equipment appropriate to building wiring electrical installation including
	3. Materials relevant to the proposed activity
	4. Drawings and specifications relevant to the task m
 |
| Methods of assessment | Competency can be assessed through:-* 1. Direct observation
	2. Questioning
	3. Portfolio

*Evidence provided for competency determination will be Valid, Sufficient & Current.* |
| Context of assessment | * 1. Competency may be assessed in the work place or in an accredited centre.
	2. Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines.
 |

###### Install electric lighting systems, auxiliary outlets & lighting fixtures

|  |  |
| --- | --- |
| **Unit Code** | 741.7411.123.003.01 |
| **Unit Descriptor** | *This Core Unit covers the Skills Knowledge & Attitudes required when selecting & installing lighting systems, auxiliary outlets and lighting fixtures.* |

Elements & Performance Criteria

|  |  |
| --- | --- |
| **ELEMENTS** | **PERFORMANCE CRITERIA*****Italicized*** terms are elaborated in the Range of Variables |
| 1. Plan & prepare work
 | * 1. Instructions for the preparation of the work activity are communicated and confirmed to ensure clear understanding
	2. ***Tools, equipment and personnel protective equipment (PPE)*** needed to install electrical wiring are identified, checked to ensure the work is done as intended and are safe to use in accordance with established procedures
	3. ***Materials*** needed for work are obtained in accordance with established procedures
	4. Materials needed to do the work are estimated according to job requirements.
 |
| 1. Install lighting fixtures
 | * 1. ***Safety procedures*** are followed
	2. ***Correct procedures*** for installation of lighting fixtures are performed in line with job requirements
	3. Schedule of work is followed to ensure work is completed in an agreed time, to a quality standard and with a minimum waste
	4. Further instructions are sought from a supervisor if unplanned events or conditions occur
	5. On-going checks of quality of work are
	6. Undertaken in accordance with instructions and requirements
 |
| 1. Notify & record work completion
 | * 1. Final checks are made to ensure that work conforms with instructions and requirements
	2. Supervisor is notified upon completion of work
	3. Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage in accordance with established procedures
	4. Waste materials and hazardous substances are disposal of in accordance with environmental rules and procedures
 |

***Unit 5 Install electric lighting systems, auxiliary outlets & lighting fixtures***

Range of Variables

|  |  |
| --- | --- |
| **VARIABLES** | **RANGE** |
| 1. Tools & equipment
 | * 1. Electric hand tools
	2. Hand tools including;-
* Pliers
* Screwdrivers
* Wrenches
* Splicers
* Knives
	1. Materials including Wiring, Cabling
 |
| 1. PPE
 | * 1. Working gloves
	2. Safety shoes
	3. Hard hat
 |
| 1. Light & fixtures
 | * 1. Flood lights/spotlights
	2. Track lights
	3. High/Low bay sodium vapor lamps,Halogen lamps
	4. Perimeter lighting
 |
| 1. Safety procedures
 | * 1. OHS, SOP
	2. Lao Electric Code (LEC)
 |
| 1. Installation of lighting fixtures
 | * 1. Floodlights/Spotlights
* Horizontally aligned against wall
* No gap between ceiling and lighting fixture base
* Wiring at junction box cut to requirement as required
* Floodlights/spotlights securely mounted
	1. Track Lights
* Wiring at junction box cut to requirement as required
* Track light mounted securely
	1. High/Low Bay Sodium Vapor Lamps
* Wiring at junction box cut to requirement as required
* High/Low sodium vapor lamps mounted securely
	1. Halogen Lamps
* Wiring at junction box cut to requirement
* Halogen lamps mounted securely
	1. Perimeter Lighting
* Perimeter lighting installed as per plan/shop
	1. Foundation constructed as per plan
* Fixture wired and tested
* Fixture mounted to pole
 |

Evidence Guide

|  |  |
| --- | --- |
| **ASPECTS OF COMPETENCY** | **EVIDENCE REQUIREMENTS** |
| 1. Critical aspects of competency
 | Assessment requires evidence that the candidate has:-* 1. Correctly interpreted work instructions
	2. Selected appropriate tools, equipment and materials for building wiring installation
	3. Selected and used correct PPE
	4. Demonstrated correct procedures for installation of floor outlets and ground fault current interrupting outlets
	5. Followed safety procedures
	6. Cleaned worksite, tools and equipment
	7. Stored surplus materials.
 |
| 1. Underpinning knowledge
 | * 1. Installation procedures for floor outlets and ground fault current interrupting outlets
	2. Use of ground fault current interrupting outlets
	3. Safe work practices
	4. LEC requirements c
 |
| 1. Underpinning skills
 | * 1. Interpreting plan and details
	2. Preparing materials
	3. Proper use of hand tools
	4. Splicing
	5. Dressing of wires
	6. Terminating wires b
 |
| Resource implications | The following should be provided:-* 1. Workplace location
	2. Tools and equipment appropriate for installation of wiring devices
	3. Materials relevant to the proposed activity
	4. Drawings and specifications relevant to the task
 |
| Methods of assessment | Competency can be assessed through:-* 1. Direct observation
	2. Questioning
	3. Portfolio

*Evidence provided for competency determination will be Valid, Sufficient & Current.* |
| Context of assessment | * 1. Competency may be assessed in the work place or in an accredited centre.
	2. Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines.
 |

###### Maintain and repair Electrical appliances

|  |  |
| --- | --- |
| **Unit Code** | 741.7411.123.004.01 |
| **Unit Descriptor** | *This unit of Core Electrical Competencies deals with the knowledge, skills and attitudes when identifying and preparing materials in the repair and maintenance of electric appliances and equipment* |

Elements & Performance Criteria

|  |  |
| --- | --- |
| **ELEMENTS** | **PERFORMANCE CRITERIA*****Italicized*** terms are elaborated in the Range of Variables |
| 1. Request materials, tools and equipment
 | * 1. Quantity, usage and ***specifications*** of materials, tools and equipment are verified according to job requirements
	2. Requisition form is properly filled-up according to list of materials, tools and equipment prepared
	3. Requisition forms are approved by immediate superior
 |
| 1. Select electrical appliances and equipment
 | * 1. ***Electrical appliances and equipment*** are identified and selected in line with job specification
	2. Tools are inspected for damage in line with enterprise requirements
	3. ***Damaged tools*** are reported to supervisor and repaired according to manufacturer’s specifications
 |
| 1. Maintain electrical appliances and equipment
 | * 1. Electrical appliances and equipment are lubricated in line with enterprise requirements
	2. Auxiliary parts of power tools/hydraulic tools are inspected and replaced according to manufacturer’s specifications
	3. Electrical appliances and equipment are safety stored in line with enterprise requirements
 |

Range of Variables

|  |  |
| --- | --- |
| **VARIABLES** | **RANGE** |
| 1. Specifications
 | * 1. Brand/Make

- Classification/Type* 1. Rating

- Voltage- Current- Power- Frequency- Temperature- Service factor- Degree of protection- Utilization category- Harmonics- RPM - Pressure* 1. Phase
	2. Pole
	3. Range (Tools must be specific)
	4. Needed accessories
 |
| 1. Electrical appliances and equipment
 | Including but not limited to:* 1. Electrical household appliances
* Electric Iron
* Electric cooker
* Electric fans and blowers
* Washing machines
* Window type Aircondition
* Refrigerators
* Water Dispensers
	1. Electric Equipment / tools
* Power drills
* Portable grinder
* Power saw
* Pipe bender
* Jack hammer
 |
| 1. Damaged tools
 | Including but not limited to:* 1. Faulty plugs and cords of power tools
	2. Damage Switches, Pilot lamps
	3. Damage components, parts
	4. Damaged housing and accessories
	5. Defective bearing, gasket, bushing
	6. Centrifugal switch
	7. Capacitors
	8. Carbon brush
 |
| 1. Specifications
 | * 1. Brand/Make

- Classification/Type* 1. Rating

- Voltage- Current- Power- Frequency- Temperature- Service factor- Degree of protection- Utilization category- Harmonics- RPM - Pressure* 1. Phase
	2. Pole
	3. Range (Tools must be specific)
	4. Needed accessories
 |

Evidence Guide

|  |  |
| --- | --- |
| **ASPECTS OF COMPETENCY** | **EVIDENCE REQUIREMENTS** |
| Critical aspects of Competency | Assessment requires evidence that the candidate has:-* 1. Identified, selected electrical appliances and equipment in line with job specification/requirements
	2. Checked quality and ratings of tools and accessories in line with job requirements
	3. Inspected electrical tools for damages in line with enterprise requirements
	4. Reported and repaired damaged electrical materials and tools to supervisor
	5. Maintained and stored electrical materials, hand tools, electrical appliances and equipment and hydraulic tools in line with manufacturer’s/ supplier's specifications and enterprise requirements
 |
| Underpinning knowledge | * 1. Types of electrical appliances and equipment
	2. Types of electrical appliances and equipment
	3. Common damage to tools
	4. Maintenance procedure for electrical appliances and equipment
 |
| Underpinning skills | * 1. Material & tool preparation
	2. Cleaning and maintaining electrical appliances and equipment.
 |
| Resource implications | The following should be provided;-* 1. Workplace location
	2. Tools appropriate for electrical installation
 |
| Methods of assessment | Competency can be assessed through:-* 1. Direct observation
	2. Questioning
	3. Portfolio

*Evidence provided for competency determination will be Valid, Sufficient & Current* |
| Context of assessment | * 1. Competency may be assessed in the work place or in an accredited centre.

6.2. Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines. |

# ANNEX

* Lao World of Work
* Lao Electrical Sub Sector Codes
* Competency Map Electrician
* Competency Standards Development Team
* Notes/ References

## LAO World of Work

**General Electrician**

***CARREER PATH***

**Industrial Electrician**

 **MASTER**

**ELECTRICIAN**

**JOB TITLE**

**JOB FUNCTION**

**COMPETENCY**

**STANDARD**

**AWARD**

**LEVEL**

**WORLD OF WORK WORK**

**LAO PDR**

**CONSTRUCTION and INDUSTRY SECTOR**

**SECONDARY SCHOOL**

**SEMI SKILLED**

**WORKER**

**SKILLED**

**WORKER**

**ADVANCED**

**SKILLED**

**WORKER**

**SUPERVISOR**

9

OR

12

SCHOOL YEARS

**I**

**General Electrician**

 **MASTER**

**ELECTRICIAN**

**II**

**III**

**IV**

**General Electrician**

**General Electrician**

**TO WORK**

**WORK EXPERIENCE**

**&**

**ASSESMENT**

OR WITH CERTIFICATE

**I**

**TO WORK**

**WORK EXPERIENCE**

**&**

**ASSESMENT**

OR WITH CERTIFICATE II

&

WORK EXPIRIENCE

**TO WORK**

**WORK EXPERIENCE**

**&**

**CERTIFICATE III**

**T**

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**WORK EXPERIENCE**

**Industrial Electrician**

**TO WORK**

Annex:

## LAO Electrical Sub-Sector Code

**Sub-Sector Code:**

1 - General Electrician

2 - Building Electrician

3 - Ship Electrician

4 - Stage Studio Electrician

5 - Electrician Maintenance and Support

**Competency Unit Standards by Sub-Sector:**

|  |  |
| --- | --- |
| **Unit No** | **Unit Title** |
|  | **Basic** |
| 741.7411.121.001.01 | Lead Workplace Communication  |
| 741.7411.121.002.01 | Lead Small Teams |
| 741.7411.121.003.01 | Work with Others |
| 741.7411.121.004.01 | Demonstrate Positive Work Values |
| 741.7411.121.005.01 | Practice Housekeeping procedures |
|  | **Common** |
| 741.7411.121.001.01 | Prepare Construction Materials and Tools |
| 741.7411.121.002.01 | Observe Procedures, Specifications and Manuals of Instructions |
| 741.7411.121.003.01 | Interpret Technical Drawings and Plans |
| 741.7411.121.004.01 | Use Mathematical Concepts and Techniques |
| 741.7411.121.005.01 | Maintain Tools and Equipment  |
| 741.7411.121.006.01 | Perform Mensuration and Calculation |
| 741.7411.121.007.01 | Apply OHS Requirements in the Construction Industry |
| 741.7411.121.008.01 | Apply Gender and Social Equity Principles and Policies |
|  | **Core** |
| 741.7411.123.001.01 | Perform Maintenance and Troubleshooting Work |
| 741.7411.123.002.01 | Assemble and Install Electric Motor Control Systems |
| 741.7411.123.003.01 | Install electric lighting systems, auxiliary outlets & lighting fixtures |
| 741.7411.123.004.01 | Maintain and Repair Electrical Appliances |
|  |  |

## Competency Map Electrician

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Basic Competencies** | Receive & respond to Workplace communication | Work with others | Demonstrate work values | Practice basic housekeeping procedures | Participate in workplace communication | Work in a team environment | Practice career professionalism |
|  |   |   |   |   |   |   |   |
| **Common Competencies** | Practice OHS procedures | Lead workplace communication | Lead small working teams | Develop & practice negotiation skills | Solve problems related to work activities | Use Mathematical concepts & techniques | Use relevant technologies |
| Use Specialised communication skills | Develop Team & individuals | Apply problem solving techniques in the workplace | Manage project costs & quality  | Collect Analyse & organise information | Plan & organise work | Provide environmental protection |
| Prepare Construction Materials, tools equipment | Observe procedures, specifications & manuals of instructions | Interpret technical drawings & plans | Perform mensurations & calculations | Maintain tools & equipment | Apply OHS in the workplace | Apply gender & social equity principles & policies |
|  |   |   |   |   |   |   |   |
| **Core Competencies** | Prepare electrical materials & tools | Perform roughing-in for basic electrical layout | Install wiring devises for power, lights & auxiliary outlets | Install electrical wiring | Install basic electrical protection systems | Install basic auxiliary outlets & lighting fixtures | Commission low volt electrical systems |
| Perform roughing-in for communication & distribution systems | Install wiring devices for floor & ground fault current interrupting outlets | Install electrical system for lightning & grounding | Install electric lighting on auxiliary outlets & lighting fixtures | Install communication, signalling devices & remote control systems on auxiliary equipment | Commission installed electrical systems | Perform maintenance & trouble shooting work |
| Prepare electrical & hydraulic tools | Prepare Bus & under-floor ducts for electrical installation | Install wiring devices for floor & ground fault current interrupting outlets | Installation of standard electrical protection system for lighting & grounding | Install electric lighting systems, auxiliary outlets & lighting fixtures | Install data measurement & control systems on electrical equipment | Assemble & install electric motor control systems |
| Supervise installation & maintenance on electrical systems & equipment | Commission electrical system/equipment | Programme & install PLC systems |   |   |   |   |

Annex:

## Competency Standard Development Team

***SSTVET Project***

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Name and Surname | Organization/Company | Job Expert |
|  | MR. ROLAND OGUING  | SSTVET Project | International Consultant in Electrical Technology  |
|  | MR. SYSOUK MONGDAVANH | CHAMPASAK TECHNICAL VOCATIONAL COLLEGE (CTVC) | National Consultant in Electrical Technology  |

***Resource Person / Methodologist***

|  |  |  |  |
| --- | --- | --- | --- |
|  | Mr.Bountham SITTHIMANUOTHAM | SSTVET Project  | M&E Specialist |
|  | Ms.Somphalang NGONPHETSY | VEDI | Head of Curriculum Development Section |
|  | Mrs. Angkhasaya SISOUPHANH | TVED, MoES | Deputy of M&E Division |

***Resource Persons / Company & Industry***

|  |  |  |  |
| --- | --- | --- | --- |
|  | Mr. VITHOUNE PHOUMIVONG | ELECTRICITE DU LAO - TRAINING CENTER (EDL - TC) | Electrrical Instructor |
|  | Mr. SOMBATH SOUTHHISOMBATH | ELECTRICITE DU LAO - TRAINING CENTER (EDL - TC | Electrrical Instructor |
|  |  |  |  |

***Resource Persons / Public & Private TVET Institutions***

|  |  |  |  |
| --- | --- | --- | --- |
|  | Mr. BOUNTHAVY SAYYAVONG | TECHNICAL COLLEGE OF VIENTIANE PROVINCE (TCVP) | Teacher – Electrical Department |
|  | Mr. KIKHAM POUNNAVONG | VOCATIONAL EDUCATION DEVELOPMENT INSITUTE (VEDI) | Teacher – Electrical Department |
|  | Mr. LADSAMY THONGPASOM | CHAMPASAK TECHNICAL VOCATIONAL COLLEGE (CTVC) | Teacher – Electrical Department |
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|  | Mr. BOUNNAM SAYKOSY | KHAMMOUANE TECHNICAL VOCATIONAL COLLEGE (KMTVC) | Teacher – Electrical Department |
|  | Mr. MYNA TANHTHAPHENGSAY | KHAMMOUANE TECHNICAL VOCATIONAL COLLEGE (KMTVC) | Head – Electrical Department  |
|  | Mr. BOUNYOU CHANTHAVONG | POLYTECHNIC COLLEGE (PTC) | Teacher – Electrical Department |
|  | Mr. KHAMSONE CHANSY | PAKPASAK TECHNICAL COLLEGE (PSTC) | Head – Electrical Department |
|  | Mr. LAMPHONE SENGSAVANG | POLYTECHNIC COLLEGE (PTC) | Deputy Head – Electrical Department |
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## Notes / References:

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