NATIONAL COMPETENCY STANDARDS
FOR
DOMESTIC WIRING TECHNICIAN
(CERTIFICATE 2)

TVET QUALITY COUNCIL
BHUTAN QUALIFICATIONS AND PROFESSIONALS
CERTIFICATION AUTHORITY
THIMPHU, BHUTAN: MAY 2024

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FOREWORD

The TVET Quality Council, BQPCA is pleased to present the National Competency Standards (NCS) for DOMESTIC WIRING TECHNICAN, BQF Certificate 2, which is developed in consultation with the field experts and trainers. The main objective of developing National Competency Standards is to set up a well-defined nationally recognized TVET Qualifications that will help in setting a benchmark for the TVET Qualifications in our country aligned to the international best practices.

The standards are developed to ensure that the TVET trainees possess the desired Skills, Knowledge and Attitude required by the industries. In order to ensure the relevancy of the competencies, the standards are developed in close consultation and partnership with industry experts and trainers from training institutes.

A training system based on National Competency Standards shall ensure that the training is relevant to the needs of the labour market. As a result, future TVET trainees will be better skilled to meet the needs and expectations of industries and employers. Such a positive impact on the employability of TVET graduates will enhance the reputation of the TVET system and make it attractive to the youths.

While acknowledging the existing level of cooperation and collaboration, the Council earnestly requests employers and training providers to extend the fullest support and cooperation in development and implementation of the National Competency Standards. The ultimate objective is to build a competent and productive national workforce that will contribute to the socio-economic development of our country.

We gratefully acknowledge the valuable contributions made by experts from industries and trainers during the consultation and validation processes of the NCS development. We further look forward to improved industry engagement and active participation of trainers in the development of a quality-assured demand driven TVET system.

Director
BQPCA

ACKNOWLEDGEMENT

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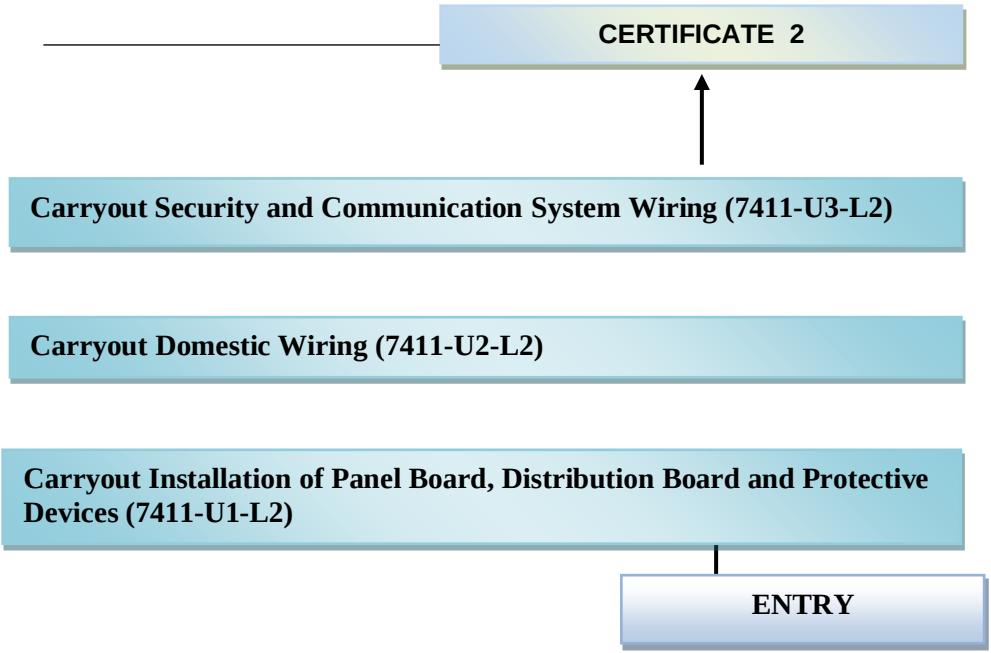
PACKAGING OF QUALIFICATIONS



Unit Title	Element of Competence
1. Carryout Installation of Panel Board, Distribution Board and Protective Devices	1.1 Perform Installation of Protective Devices for Single Phase 1.2 Perform Installation of Protective Devices for Three Phase 1.3 Perform Installation of Earthing and Lightning Arrester
2. Carryout Domestic Wiring	2.1 Perform Lighting and Power Circuit Wiring 2.2 Install Electrical Fittings and Fixtures 2.3 Perform Repair and Maintenance of Electrical Fittings
3. Carryout Security and Communication System Wiring	3.1 Perform Installation and Maintenance of CCTV System 3.2 Perform Installation and Maintenance of Alarm System 3.3 Perform Installation and maintenance of Communication Cables 3.4 Perform Installation, Operation and Maintenance of Audio-Visual System

UNIT TITLE	**Carry out Installation of Panel Board, Distribution Board and Protective Devices**
DESCRIPTOR	This unit covers the competencies required to install panel board, distribution board, and protective devices for single and three phase followed by installation of earthing and lightning arrester following standard procedures
CODE	**7411-U1-L2**
CREDIT	**10**
ELEMENTS OF COMPETENCE	**PERFORMANCE CRITERIA**
1. Perform Installation of Protective Devices for Single Phase	1.1 Use required ***Personal Protective Equipment*** as per the job requirement following standard procedure 1.2 Use ***tools and equipment*** as per the job requirement following standard procedure 1.3 Interpret the drawings as per the job requirement 1.4 Use ***materials*** as per the job requirement following standard procedure 1.5 Prepare estimate and cost of materials as per the client requirement following standard procedure

	1.6 Install distribution board as per the drawing and specifications following standard procedure 1.7 Install Miniature Circuit Breaker(MCB) as per the drawing and specification following standard procedure 1.8 Install Residual Current Circuit Breaker (RCCB) as per the job requirement following standard procedure 1.9 Install Earth Leakage Circuit Breaker(ELCB) as per the job requirement following standard procedure 1.10 Draw/lay cables as per the specification following standard procedure 1.11 Conduct cable jointing and termination as per the job requirement following standard procedure 1.12 Install single phase energy meter following standard procedure 1.13 Conduct meter reading as per the job requirement following standard procedure
2. Perform Installation of Protective Devices for Three Phase	2.1 Use required ***Personal Protective Equipment*** as per the job requirement following standard procedure

	2.2 Use ***tools and equipment*** as per the job requirement following standard procedure 2.3 Interpret the drawings as per the job requirement 2.4 Use ***materials*** as per the job requirement following standard procedure 2.5 Prepare estimation and costing of materials as per the client requirement following standard procedure 2.6 Install panel board as per the drawing and specifications following standard procedure 2.7 Install distribution board as per the drawing and specifications following standard procedure 2.8 Install Miniature Circuit Breaker (MCB) as per the drawing and specification following standard procedure 2.9 Install Residual Current Circuit Breaker (RCCB) as per the job requirement following standard procedure 2.10 Install Earth Leakage Circuit Breaker (ELCB) as per the job requirement following standard procedure

	2.11 Install Molded Case Circuit Breaker (MCCB) as per the drawing and specification following standard procedure 2.12 Install Bus-bar as per the drawing and specifications following standard procedure 2.13 Draw/lay cables as per the specification following standard procedure 2.14 Conduct cable jointing and termination as per the job requirement following standard procedure 2.15 Install three phase energy meter following standard procedure 2.16 Conduct meter reading as per the job requirement following standard procedure
3. Perform Installation of Earthing and Lightning Arrester	3.1 Use required ***Personal Protective Equipment*** as per the job requirement following standard procedure 3.2 Use ***tools and equipment*** as per the job requirement following standard procedure 3.3 Interpret the drawings as per the job requirement 3.4 Use ***materials*** as per the job requirement following standard procedure

	3.5 Prepare estimate and cost of materials as per the client requirement following standard procedure 3.6 Install ***earthing*** following standard procedure 3.7 Install building lightning arrester following standard procedure 3.8 Conduct test following the standard procedure

RANGE STATEMENT	
Personal Protective Equipment (PPE) may include but not limited to:	
• Safety glove • Safety helmet • Safety boot • Fire extinguisher • Uniform	• Safety goggle • Ear muff • Respiratory mask • Safety belt
Tools and equipment may include but not limited to:	
• Pliers • Screw driver set • Wire striper • Neon tester • Wrench Set • Multimeter • Clamp-on Meter/Tongue Tester • Cable Cutter • Measuring Tape • Spirit Level	• Crimping tools • Drilling machine • Electrician knife • Hack saw • Hammer • Wall Chaser • Earth Tester • IR Tester • Allen Key

Materials for single phase and three phase wiring may include but not limited to:	
• Insulation Tape • UG Cable • HDP Pipe • PVC Casing Caping • Energy Meter	• PVC insulated Copper Wire • Service Cable • PVC Conduit Pipe • Temper Pin • Wooden Screw
Materials for Earthing and lightning arrester may include but not limited to:	
• Earth Plate • GI Pipe • HDP Pipe • Earth Wire • Cement • Copper Strip • Nuts and Bolts • Pipe Earthing Set	• Charcoal • Salt • Clay Soil • Mesh Funnel • Prong • GEE Slab • Chemical Earthing Set
Tools and equipment for earthing and lightning arrester may include but not limited to	
• Pliers • Screw driver set • Wrench Set • Multimeter • Measuring Tape • Spirit Level • Clamp-on Meter/Tongue Tester • Cable Cutter • Crimping tools • Drilling machine • Test Lamp	• Electrician knife • Hack saw • Hammer • Earth Tester • IR Tester • Spade • Crow Bar • Pick axe • Ladder • Wheel Barrow • Shovel
Earthing may include but not limited to:	

• Plate Earthing • Slab Earthing • Spike Earthing	• Pipe Earthing • Chemical Earthing
Critical Aspects	
• Use required personal protective equipment as per the job requirement following standard procedure • Interpret the drawings as per the job requirement • Perform installation of protective devices as per the job requirement following standard procedure	

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
• Ethics and Integrity • OHS rules and regulations • Basic First Aid • Types of Earthing and its functions • Electrical drawing and manufacturer specifications, technical sketches, symbols and wiring diagram • Types of domestic wiring methods, circuits and their applications • Types of electrical wires, cables and their rating • Types of electrical fittings and accessories • Types of control and protective devices and accessories • Types of conduits / pipe, casing and capping	• Team Work • Communication • Problem Solving • Interpersonal Relationship • Creativity • Time Management

• Tools and measuring instruments • Method of joining and termination of wires and cables • Related trade theory • Estimation and Costing • Testing procedure in electrical circuits. • Bhutan schedule of rates (BSR) • Load distribution • Internal House Wiring Regulation of Electricity Regulatory Authority • Safety Code and Safety Management • 5S Pillars	

UNIT TITLE	Carryout Domestic Wiring
DESCRIPTOR	This unit covers the competencies required to perform lighting and power circuit wiring and install electrical fittings and fixtures following standard procedures
CODE	7411-U2-L2
CREDIT	15
ELEMENTS OF COMPETENCE	**PERFORMANCE CRITERIA**
1. Perform Lighting and Power Circuit Wiring	1.1 Use required ***Personal Protective Equipment*** as per the job requirement following standard procedure 1.2 Use ***tools and equipment*** as per the job requirement 1.3 Interpret electrical drawings as per the job requirement 1.4 Prepare estimate and cost of materials as per the electrical drawings following standard procedure 1.5 Lay conduit/casing capping as per the electrical drawing following standard procedure 1.6 Install concealed wiring as per the job requirement following standard procedure

	1.7 Draw/lay wires as per the specification following standard procedure
2. Perform Install-ation of Electrical Fittings and Fixtures	2.1 Select and use required ***Personal Protective Equipment*** as per the job requirement following standard procedure 2.2 Lay conduit/casing capping as per the electrical drawing following standard procedure 2.3 Fix the ***electrical fittings*** as per the standard procedure 2.4 Connect the fittings as per the drawing following standard procedure 2.5 Test the circuit for functionality following standard procedure
3. Perform Repair and Maintenance of Electrical Fittings	3.1 Use PPE as per the job requirement following standard procedure 3.2 Use tools and equipment as per the job requirement following standard procedure 3.3 Diagnose the faults in electrical fittings following standard procedure 3.4 Conduct preventive maintenance the electrical fittings as per the job requirement following standard procedure

	3.5 Select materials as per the job requirement following standard procedure 3.6 Repair/replace the faulty components of the electrical appliances 3.7 Test the electrical fitting following standard procedures

RANGE STATEMENT	
Personal Protective Equipment may include but not limited to:	
• Safety glove • Safety helmet • Safety boot • Uniform • Reflector Jacket	• Safety goggle • Ear muff • Respiratory mask • Safety belt
Tools and Equipment may include but not limited to:	
• Pliers • Screw driver set • Wire striper • Insulation tape • Crimping tools • IR Tester/ multi-meter • Allen Key	• Drilling Machine • Electrician Knife • Hack saw • Hammer • Neon tester • Measuring tap • Spirit Level
Electrical fittings may include but not limited to:	
• Bulb Holder • Ceiling fitting • Wall bracket lamp	• Ceiling fan • Exhaust fan • 6ASocket

• Switches • Modular box • Smart Switch • Call Bell • SS Combined Socket • Fluorescent Tube • Ceiling Rose	• 16A socket • Fan Regulator • Bell Switch • LED Lamp • Square Box • Motion Sensor
Critical Aspects	
• Use required personal protective equipment as per the job requirement following standard procedure • Interpret electrical drawings as per the job requirement • Prepare estimate of materials and costing as per the electrical drawings • Lay conduit/casing capping as per the electrical drawing following standard procedure	

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
• Ethics and Integrity • OHS rules and regulations • Basic First Aid • Electrical drawing and manufacturer specifications, technical sketches, symbols and wiring diagram • Types of domestic wiring methods, circuits and their applications • Types of electrical wires, cables and their rating • Types of electrical fittings and accessories • Types of control and protective devices and accessories • Types of conduits / pipe, casing and capping • Tools and measuring instruments • Method of joining and termination of wires and cables • Related trade theory • Estimation and costing • Testing procedure in electrical circuits • Emerging technology in house wiring • Bhutan schedule of rates (BSR) • Load distribution • Internal House Wiring Regulation of Electricity Regulatory Authority • Safety Code and Safety Management • 5S Pillars	• Team Work • Communication • Problem Solving • Interpersonal Relationship • Creativity • Time Management

UNIT TITLE	Carryout Security and Communication System Wiring
DESCRIPTOR	This unit covers the competencies required to install CCTV system, alarm system communication cables and install audio-visual system following standard procedures
CODE	7411-U3-L2
CREDIT	15
ELEMENTS OF COMPETENCE	**PERFORMANCE CRITERIA**
1. Perform Installation and Maintenance of CCTV System	1.1 Use required ***Personal Protective Equipment*** as per the job requirement following standard procedure 1.2 Use ***tools and equipment*** as per the job requirement 1.3 Interpret CCTV wiring drawings as per the job requirement 1.4 Prepare estimate and cost of materials as per the drawings 1.5 Perform installation of DVR CCTV system as per the job requirement following standard procedure 1.6 Perform installation of NVR CCTV system as per the job requirement following standard procedure

	1.7 Perform periodic maintenance and update of CCTV System as per the job requirement following standard procedure 1.8 Test the CCTV system for functionality following standard procedure
2. Perform Installation and Maintenance of Alarm System	2.1 Use required ***Personal Protective Equipment*** as per the job requirement following standard procedure 2.2 Use ***tools and equipment*** as per the job requirement 2.3 Interpret drawings as per the job requirement 2.4 Prepare estimate and cost of materials as per the drawings 2.5 Install ***alarm system*** as per the job requirement following standard procedures 2.6 Install alarm control panel as per the job requirement following standard procedure 2.7 Diagnose the faults in the alarm system components following standard procedure 2.8 Repair/Replace faulty alarm components as per the requirement 2.9 Conduct preventive maintenance of alarm system following standard procedure

	2.10 Test the alarm system for functionality following standard procedures
3. Perform Installation and Maintenance of Communication Cables	3.1 Use required ***Personal Protective Equipment*** as per the job requirement following standard procedure 3.2 Use ***tools and equipment*** as per the job requirement 3.3 Interpret drawings as per the job requirement 3.4 Prepare estimate and cost of materials as per the drawings 3.5 Install communication cables as per the job requirement following standard procedures 3.6 Diagnose the faults in the communication cable following standard procedure 3.7 Repair/Replace faulty communication cable as per the job requirement 3.8 Conduct preventive maintenance of communication cable system following standard procedure 3.9 Test the communication cables for functionality following standard procedure
4. Perform Installation, Operation and Maintenance of	4.1 Use required ***Personal Protective Equipment*** as per the job requirement following standard procedure

Audio-Visual System	4.2 Use ***tools and equipment*** as per the job requirement 4.3 Interpret drawings as per the job requirement 4.4 Prepare estimate of materials and costing as per the drawings 4.5 Install Audio-Visual System as per the job requirement following standard procedure 4.6 Operate ***audio-visual system*** as per the requirement following standard procedure 4.7 Diagnose faults in the audio-visual components following standard procedure 4.8 Repair/Replace faulty audio-visual components as per the requirement 4.9 Conduct preventive maintenance of audio-visual system following standard procedure 4.10 Test the Audio-visual system for functionality following standard procedure

RANGE STATEMENT	
Personal Protective Equipment (PPE) may include but not limited to:	
• Safety Glove • Safety Helmet • Safety Boot • Fire Extinguisher • Uniform	• Safety goggle • Ear Muff • Respiratory mask • Safety Belt

Tools and equipment may include but not limited to:	
• Crimping tools • Pliers • Cutter • BNC Tester • PoE • LAN Tester • Splice Machine	• DVR • NVR • PoE • Camera • BNC Cable • Wire Striper • Impact Tool
Alarm System may include but not limited	
• Fire Alarm • Smoke Detector	• Earthquake Alarm • Flood Alarm
Communication cables may include but not limited to:	
• TV • Internet	• Telephone
Audio-visual system may include but not limited to:	
• Projector • Monitor • Speaker • Connecting Jacks • Public Address System	• Amplifier • Mixer • Microphone/ Cordless • Auxiliary Cables
Critical Aspects	
• Use required personal protective equipment as per the job requirement following standard procedure • Perform installation of CCTV, fire alarm and communication cables, audio-visual system as per the job requirement following standard procedures	

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
• Ethics and integrity • Types of LAN cables • Tools and measuring instruments • Method of joining and termination of wires and cables • Related trade theory • Optic fiber technology • Estimation and costing • Bhutan schedule of rates (BSR) • Related rules and regulations regarding CCTV • Types of CCTV • Types of alarm system	• Team Work • Communication • Problem Solving • Interpersonal Relationship • Creativity • Time Management

ANNEXURE

1.1. National Competency Standards (NCS)

The National Competency Standards specify the skill, knowledge and attitudes applied to a particular occupation. Standards also specify the standards or criteria of performance of a competent worker and the various contexts in which work may take place. Standards provide explicit advice to assessors regarding the skill and knowledge to be demonstrated by candidates seeking formal recognition either following training or through work experience.

1.2. Purpose of National Competency Standards

National Competency Standards serve a number of purposes including:

- Providing advice to curriculum developers about the competencies to be included in the curriculum.
- Providing specifications to assessment resource developers about the competencies within an occupation to be demonstrated by candidates.
- Providing advice to industry/employers about job functions, which in turn can be used for the development of job descriptions, performance appraisal systems and work flow analysis.

1.3. Bhutan Qualifications Framework (BQF)

Bhutan Qualifications Framework is an integrated national framework that outlines all types of qualification in Bhutan. As an established and nationally accepted instrument, the BQF has been benchmarked against international practices in terms of standards. The BQF aims to recognize all forms of learning systems, including formal, non-formal, and informal learning. It

acknowledges technological advancements and recognizes contemporary modes of delivery. It covers a broad range of education systems including the TVET education.

1.4 Implementation of TVET Qualifications

*** RPL = Recognition of Prior Learning**

1.5 TVET Qualifications Levels

TVET Qualifications has six levels as per the BQF. The six levels are:

Applied Degree: Level 6
Advanced Diploma: Level 5
Diploma: Level 4
Certificate 3
Certificate 2
Certificate 1

1.6. Level Descriptors

The TVET Qualification levels are set based on the level descriptors, as defined in the BQF. The detail of the qualification level descriptor is as follow:

Certificate 1

Skills	Knowledge:	Application
● Applying operational literacy, numeracy skills required to carry out simple tasks ● Applying simple solutions to solve simple and straightforward everyday issues ● Communicating using everyday expressions and simple phrases	● Foundational, every day and general: ● Basic operational knowledge and skill ● Utilization of basic available information ● Known solutions to familiar problems ● Little generation of new ideas	● Highly structured tasks with close support and supervision ● Minimal discretion and judgement ● Readiness to work together and share knowledge with others

Certificate level 2

Skills	Knowledge	Application
● Applying standard processes relevant to carry out known tasks ● Applying a set of known solutions to solve simple and straightforward issues ● Using simple and direct exchange of information on familiar and routine matters	● Basic, factual and conceptual ● Some relevant theoretical knowledge ● Interpretation of available information ● Discretion and judgments	● Structured and stable tasks ● General support and supervision that require some discretion and judgement

	• A range of known responses to familiar problems	• Collaborati on with others to achieve goals

Certificate 3

Skills	**Knowledge:**	**Application:**
• Applying a range of standard processes to known but varied tasks • Selecting and applying a range of solutions to familiar and unfamiliar problems	• Theoretical with some technical and operational processes: • A broad knowledge base which incorporates some theoretical concepts • Analytical interpretation of information • Informed judgment • A range of sometimes innovative responses to concrete but often unfamiliar problems	• Stable tasks with some aspects of change • General guidance and supervision that require discretion and judgement • Adapting to own behaviours to work with others

Diploma

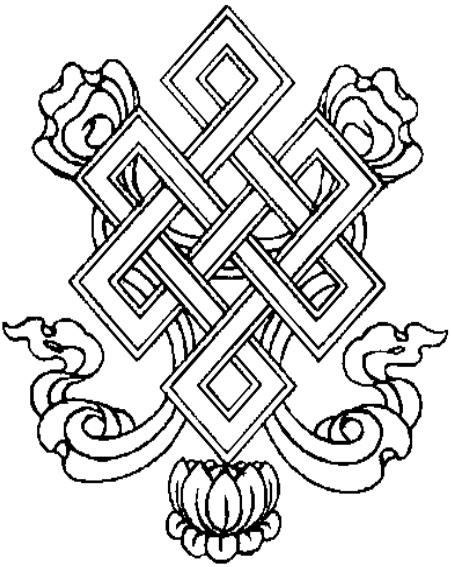
Skills:	Knowledge	Application
• Selecting and applying a range of standard processes relevant to varied and sometimes unpredictable tasks • Selecting and applying a range of solutions involving formulation of solutions to resolve complex issues • Demonstrating a high level of proficiency in English and Dzongkha	• Broad theoretical, technical and operational • Specialist knowledge with depth in more than one area • Analysis reformatting and evaluation of a wide range of information • Formulation of appropriate responses to resolve both concrete and abstract problems	• Stable tasks with predictable changes • Broad guidance with some selfdirection that require sound judgement • Taking some responsibilit y for planning and coordinatio n with others

1.6 CODING USED FOR NATIONAL COMPETENCY STANDARDS

The coding and classification system developed in Bhutan is logical, easy to use, and also aligned with international best practices. The Bhutanese coding and classification system is based on the International Standard Classification of Occupations, 2008 (ISCO-08) developed by the International Labour Organisation (ILO).The coding of the National competency standards forms the basis of the identification code for the Vocational Education and Training Management Information System (VET – MIS) both in terms of economic sector identification and that of the individual standard.

1.7. Coding the individual national competency standards

Coding the individual skills standard has a multiple purpose:

- to identify the level,
- to identify to which module the standard belongs,
- to identify in which order the standard is clustered within that module.

A job can include a number of competencies described in the national competency standards.
However, in
order to follow a logical order, only national competency standards related to each other and following a logical sequence in terms of training delivery, from the simple to the complex, are clustered into a module. Some standards are so complex that they need to stand alone.
Implementation and operational procedures for National Competency Standards (NCS).