



**NATIONAL COMPETENCY STANDARDS
(NCS)**

**AUTOMOTIVE ELECTRICAL
TECHNICIAN**

CERTIFICATE 2 & 3

AUTOMOBILE SECTOR

**TECHNICAL & VOCATIONAL EDUCATION AND
TRAINING QUALITY COUNCIL**

**BHUTAN QUALIFICATIONS AND PROFESSIONALS
CERTIFICATION AUTHORITY**

THIMPHU, BHUTAN

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FOREWORD

The TVET Quality Council, BQPCA, is pleased to present the National Competency Standards (NCS) for Automotive Electrical Technician Certificate 2 &3, developed in collaboration with industry experts and trainers. These standards establish a nationally recognized qualification aligned with international best practices, setting a benchmark for TVET qualifications in Bhutan.

The NCS ensures that trainees acquire the necessary skills, knowledge, and attitude required by industries. Developed through close consultation with experts, it enhances the relevance of training to labor market needs, equipping graduates to meet industry expectations and improving their employability. A strong and responsive TVET system will also make vocational education more attractive to youth.

The Council acknowledges the valuable contributions of industry experts and trainers in the development of these standards. We urge employers and training providers to continue their support in implementing the NCS, fostering a skilled and productive workforce that contributes to national socio-economic development. Moving forward, we look forward to enhanced industry engagement and collaborative efforts in building a quality-assured, demand-driven TVET system.

Director
BQPCA

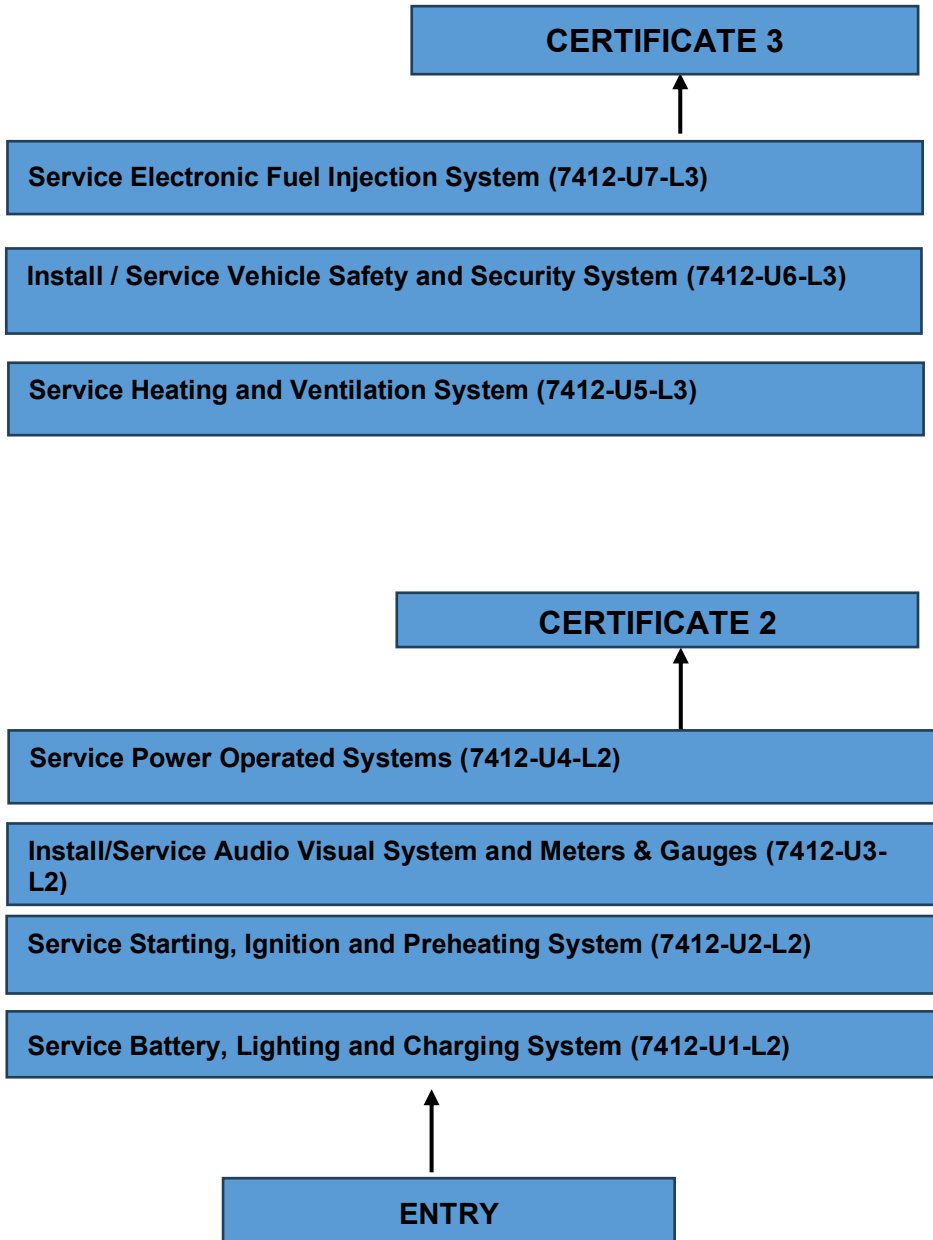
ACKNOWLEDGEMENT

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Experts involved in the revision of the NCS			
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2	Tara Bir Monger	Auto-electrician	Zimdra
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5	Chenco Dhendup	Auto-electrician	Brother Workshop
6	Ngawang Yeshi	Auto-electrician	STCBL

PACKAGING OF QUALIFICATIONS



The NCS for Automotive Electrical Technician shall contain the following 7 units of which four units are packaged under Certificate 2 and remaining three units under certificate 3:

Unit Title	Element of Competence
CERTIFICATE 2	
1. Service Battery, Lighting and Charging System	1.1 Service Battery 1.2 Service Lighting System 1.3 Service Charging System
2. Service Starting, Ignition and Preheating System	2.1 Service Starting System 2.2 Service Ignition System 2.3 Service Preheating System
3. Install/Service Audio Visual System and Meters & Gauges	3.1 Install/ Service Audio System 3.2 Install/ Service Video System 3.3 Service Meters and Gauges
4. Service Power Operated Systems	3.1 Service Electronic Power Steering System 3.2 Service Wiper and Washer System 3.3 Service Power Mirror System 3.4 Service Power Window System 3.5 Service Power Car Seat 3.6 Service sunroof 3.7 Power Siren and Horn
CERTIFICATE 3	
5. Service Heating and Ventilation System	5.1 Service Electrical Components of Heating System 5.2 Service Components of Ventilation System 5.3 Service Electrical Components of MAC System

6. Install / Service Vehicle Safety and Security System	6.1 Install/Service Components of Central Locking 6.2 System and Burglar Alarm 6.3 Service Supplemental Restraint System (SRS) 6.4 Service Engine Immobilizer System 3.8 Service Antilock Braking System (ABS)
7. Service Electronic Fuel Injection System	7.1 Service Electronic Fuel (Petrol) Injection System 7.2 Service Common Rail Direct (Diesel) Injection (CRDI) System 7.3 Service Electrical Components of Emission Control System

UNIT TITLE	Service Battery, Lighting and Charging System
DESCRIPTOR	This unit covers the competencies required to service battery, lighting system and charging system under general supervision
CODE	7412-U1-L2
ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA (The measurable standards used to prove the element was achieved.
1. Service Battery	1.1 Use PPE and workshop safety equipment following standard procedures 1.2 Select and use tools, materials and equipment following standard procedures 1.3 Diagnose battery faults following the standard procedures 1.4 Replace the battery following the standard procedures 1.5 Perform servicing of the battery following the standard procedures 1.6 Repair battery pole following standard procedures 1.7 Perform jump start following standard procedures 1.8 Perform battery charging following standard procedures

	1.9 Replace battery sensors following the standard procedures
2. Service Lighting System	2.1 Use PPE and workshop safety equipment following standard procedures 2.2 Select and use tools, materials and equipment following standard procedures 2.3 Diagnose the faults of lighting system following standard procedures 2.4 Replace the bulb as per the job requirement following standard procedures 2.5 Replace fuses/smart junction box as per the job requirement following standard procedure 2.6 Replace switches as per the job requirement following standard procedure 2.7 Replace the relays or flashers as per the job requirement following standard procedure 2.8 Repair the wires, terminals and connectors as per the job requirement following standard procedure 2.9 Replace wire harness as per the job requirement following standard procedure 2.10 Adjust headlight as per the job requirement following standard procedure 2.11 Install automatic headlight sensors following the standard procedures

3. Service Charging System	3.1 Use PPE and workshop safety equipment following standard procedures 3.2 Select and use tools, materials and equipment following standard procedures 3.3 Diagnose the faults of charging system following standard procedure 3.4 Repair the alternator as per the job requirement following standard procedures. 3.5 Replace alternator as per the job requirement following standard procedures 3.6 Test the charging system
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RANGE STATEMENT	
Equipment may include but not limited to conducting:	
• Battery charger • Paraffin blower/brazing torch	• Hydrometer
Tools may include but not limited to:	
• Hand tools set • Multimeter • Battery carrier • Test lamp	• Hydrometer • Copper brush • Jumper cable
Servicing of battery may include but not limited to:	
• Pole cleaning • Body cleaning	• Topping up distilled water
<i>Critical Aspects</i>	

- Demonstrate safe working practices at all times in accordance with OHS regulations.
- Diagnose and the service the faults related to battery, lighting and charging system following standard procedure

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
• Ethics and Integrity • Lighting system • Circuit diagram • Types of bulbs • Measurement and testing procedures • Basic electricity and electronics • Basic auto-electrical engineering drawings • Working principles of charging systems • Working principles of alternator • Construction and Chemical Reaction of battery • Types of battery • Function of battery sensor • Function of automatic headlight sensor • Waste management	• Team Work • Communication • Problem Solving • Interpersonal Relationship • Creativity • Time Management • Innovation

UNIT TITLE	Service Starting, Ignition and Pre-heating System
DESCRIPTOR	This unit covers the competencies required to service the starting system, ignition system and pre-heating system
CODE	7412-U2-L2
ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA
1. Service Starting System	1.1 Use PPE and workshop safety equipment following standard procedures 1.2 Select and use tools, materials and equipment following standard procedures 1.3 Diagnose the faults in the starting system following the standard procedure. 1.4 Repair wire connection as per the job requirement following standard procedure 1.5 Replace push start-stop button system following standard procedures 1.6 Repair/replace self-starter as per the job requirement following standard procedures 1.7 Replace clutch safety switch following standard procedures
Service Ignition System	2.1 Use PPE and workshop safety equipment following standard procedures 2.2 Select and use tools, materials and equipment following standard procedures

	2.3 Diagnose the faults in ignition system following the standard procedure 2.4 Service/replace spark plug as per the job requirement following standard procedure 2.5 Replace high tension cable as per the job requirement following standard procedure. 2.6 Replace ignition coil (conventional) as per the job requirement following standard procedure 2.7 Replace ignition coil pack as per the job requirement following standard procedure 2.8 Service/replace conventional and electronic distributor as per the job requirement following standard procedure 2.9 Set ignition timing as per the job requirement following standard procedure. 2.10 Replace crankshaft position sensor as per the job requirement following standard procedure 2.11 Replace camshaft position sensor as per the job requirement following standard procedure
3. Service Pre-heating System	3.1 Use PPE and workshop safety equipment following standard procedures 3.2 Select and use tools, materials and equipment following standard procedures

	3.3 Diagnose the fault in preheating system following standard procedure 3.4 Replace glow plug as per the job requirement following standard procedure 3.5 Replace glow plug relay as per the job requirement following standard procedure 3.6 Repair wire connection as per the job requirement following standard procedure
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RANGE STATEMENT	
Equipment may include but not limited to:	
• Battery charger • Paraffin blower/brazing torch	• Hydrometer
Tools may include but not limited to:	
• Hand tools set • Multimeter	• Battery carrier • Test lamp
Switches may include but not limited to:	
• Combination switch • Ignition switch • Brake light switch • Reverse gears switch	• Parking light switch • Courtesy light switch • Fog light switch • Dome light switch
<i>Critical Aspects</i>	
• Demonstrate safe working practices at all times in accordance with OHS regulations. • Diagnose and service the faults related to the starting system, ignition and pre-heating system following standard procedures	

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
• Ethics and Integrity • Starting system construction and operation • Circuit diagram of starting system • Principle of starter motor • Function of starter motor components • Inspection and testing procedures • Type of ignition system • Ignition system construction and operation • Pre-heating system construction and operation • Ignition scope patterns • Flemings left hand and right-hand rules • Four stroke cycle operation • Basic electricity and electronics • Functions and operations of CMP and CRK sensors • Function of photo sensor • Working principle of engine • Working principle of pick-up coil • Basic auto-electrical engineering drawing	• Team Work • Communication • Problem Solving • Interpersonal Relationship • Time Management • Innovation

UNIT TITLE	Install and Service Car Infotainment System and Meters Gauges
DESCRIPTOR	This unit covers the competencies required to install/service audio system, install/service video system and service meters and gauges
CODE	7412-U3-L2
ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA
1. Install/ Service stereo System	1.1 Use PPE and workshop safety equipment following standard procedures 1.2 Select and use tools, materials and equipment as per the job requirement 1.3 Diagnose faults in the audio system following the standard procedures 1.4 Repair connections as per the job requirement following standard procedure. 1.5 Install audio unit as per the job requirement following standard procedure 1.6 Replace speakers as per the job requirement following standard procedure. 1.7 Replace/ antenna as per the job requirement following standard procedures 1.8 Install antenna as per the job requirement following standard procedures
Install/ Service Video units	2.1 Use PPE and workshop safety equipment following standard procedures

	2.2 Diagnose faults in the video system as per the job requirement following standard procedure 2.3 Repair connections as per the job requirement following standard procedure. 2.4 Install video units as per the job requirement following standard procedure 2.5 Install rear view camera as per the job requirement following standard procedure. 2.6 Set Global Positioning System (GPS) as per the job requirement following standard procedure
3. Service Meters and Gauges	3.1 Use PPE and workshop safety equipment following standard procedures 3.2 Diagnose faults of meters and gauges following standard procedures 3.3 Repair/replace instrument cluster assembly as per the job requirement following standard procedures 3.4 Replace fuel gauge sender unit as per the job requirement following standard procedure 3.5 Replace speedometer cable as per the job requirement following standard procedure 3.6 Replace engine temperature switch as per the job requirement following standard procedures

	3.7 Replace engine oil pressure switch as per the job requirement following standard procedure 3.8 Replace warning lamps as per the job requirement following standard procedure
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RANGE STATEMENT	
Tools may include but not limited to:	
• Pliers • Screw driver set • Mini socket set • Test-lamp • Special Service tools	• Wire stripper • Jumper cables • Crimping pliers • Soldering iron
Equipment may include but not limited to:	
• Jump Starter • Multimeter • Diagnostic scanner	• Oscilloscope • Timing light
Materials may include but not limited to	
• Wires • Insulation tape • Wire terminals • Kerosene	• Terminal ends • Soldering lead & flux • Water paper • Grease
Warning lamp may include but not limited to:	
• Oil pressure • Engine temperature	• Battery
Critical Aspects	

- Demonstrate safe working practices at all times in accordance with OHS regulations
- Diagnose and service the faults of the infotainment system, meter and gauges following standard procedure

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
• Ethics and Integrity • Wiring diagram of infotainment system • Circuit diagram of meter and gauges • Global Positioning System • Function of cluster assembly • Function and operation of gauges • Function of fuel sender unit • Function and operation of engine temperature switch • Function and operation of oil pressure switch	• Team Work • Communication • Problem Solving • Interpersonal Relationship • Coordination • Time Management • Innovation

UNIT TITLE	Service Power Operated System
DESCRIPTOR	This unit covers the competencies required to service electric power steering system, wiper & washer system, power mirror system and power window system under supervision
CODE	7412-U4-L2
ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA
1. Service Electronic Power Steering System	1.1 Use PPE and workshop safety equipment following standard procedures 1.2 Select and use tools, equipment and materials and equipment as per the job requirement 1.3 Diagnose faults in electric power steering system following standard procedures 1.4 Replace EPS motor as per the job requirement following standard procedure. 1.5 Replace EPS ECU as per the job requirement following standard procedures 1.6 Replace vehicle speed sensor as per the job requirement following standard procedures 1.7 Replace spiral cable following as per

	standard procedures 1.8 Replace torque sensor and steering angle sensor as per the job requirement following standard procedures
2. Service Wiper and Washer System	2.1 Use PPE and workshop safety equipment following standard procedures 2.2 Diagnose faults of the wiper and washer system following standard procedures. 2.3 Replace wiper switch as per the job requirement following standard procedure. 2.4 Repair/Replace washer motor as per the job requirement following standard procedure 2.5 Repair/Replace wiper motor and relay as per the job requirement following standard procedure 2.6 Replace wiper arms and linkages system as per the job requirement following standard procedure 2.7 Replace rain sensor following standard procedure
3. Service Power Mirror System	3.1 Use PPE and workshop safety equipment following standard procedures 3.2 Diagnose faults in power mirror system following standard procedure

	3.3 Replace power-mirror assembly as per the job requirement following standard procedure 3.4 Replace power mirror switch as per the job requirement following standard procedure. 3.5 Replace/repair wire harness as per the job requirement following standard procedure
4. Service Power Window System	4.1 Use PPE and workshop safety equipment following standard procedures 4.2 Diagnose faults in power window system following standard procedure 4.3 Service power window motor as per the job requirement following standard procedure 4.4 Service power window switch as per the job requirement following standard procedure 4.5 Service power window regulator as per the job requirement following standard procedure 4.6 Replace Body Control Module (BCM) following standard procedure
5. Service sunroof system	5.1 Use PPE and workshop safety equipment following standard procedures 5.2 Diagnose faults in sunroof system following standard procedures 5.3 Service sunroof motor as per the job requirement following standard procedures

	5.4 Service sunroof switch as per the job requirement following standard procedure
6. Service horn and siren system	6.1 Use PPE and workshop safety equipment following standard procedures 6.2 Diagnose faults in horn and siren system following standard procedures 6.3 Service horn as per the job requirement following standard procedures 6.4 Service horn switch and relay as per the job requirement following standard procedure 6.5 Service emergency siren following standard procedures

RANGE STATEMENT	
Tools may include but not limited to:	
• Pliers • Screw driver set • Mini socket set • Multimeter	• Crimping pliers • Test-lamp • Wire stripper • Soldering iron
Materials may include but not limited to:	
• Wires • Wire terminals	• Insulation tape • Soldering lead & flux
<i>Critical Aspects</i>	

- Demonstrate safe working practices at all times in accordance with OHS regulations.
- Diagnose and service the faults related to power operated systems following standard procedures.

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
• Ethics and integrity • Operation of power window circuit • Operation of power mirror circuit • Function of BCM • Function and Operation of wiper system • Function and operation of electric power steering system • Functions and operations of Torque sensors • Functions and operations of Vehicle Speed sensors • Functions and operations of steering angle sensors	• Team Work • Communication • Problem Solving • Interpersonal Relationship • Coordination • Time Management • Innovation • Entrepreneurship • Growth oriented

UNIT TITLE	Service Heating and Ventilation System
DESCRIPTOR	This unit covers the competencies required to service electrical components of heating system, components of ventilation system and to components of MAC system under limited supervision
CODE	7412-U5-L3
ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA
1. Service Components of Heating System	1.1 Use PPE and workshop safety equipment following standard procedures 1.2 Select and use tools, materials and equipment as per the job requirement. 1.3 Diagnose faults of heating system components following standard procedures 1.4 Replace control panel assembly as per the job requirement following standard procedures 1.5 Replace blower resistor and motor as per the job requirement following standard procedures 1.6 Replace heater core as per the job requirement following standard procedures 1.7 Replace heater control valve as per the job requirement following standard procedures

2. Service Components of Ventilation System	2.1 Use PPE and workshop safety equipment following standard procedures 2.2 Diagnose faults of ventilation system following standard procedures 2.3 Replace air inlet damper control/blend door actuator as per the job requirement following standard procedures 2.4 Replace air duct as per the job requirement following standard procedures 2.5 Clean cabin filters following standard procedures
3. Service Components of MAC System	3.1 Use PPE and workshop safety equipment following standard procedures 3.2 Diagnose faults of electrical components of MAC systems following standard procedures 3.3 Service condenser cooling fan motor as per the job requirement following standard procedures 3.4 Replace AC temperature sensor following standard procedures 3.5 Replace magnetic compressor clutch as per the job requirement following standard procedures 3.6 Replace AC pressure switches as per the job requirement following standard procedures

	3.7 Recover refrigerant as per the job requirement following standard procedures 3.8 Perform leak test as per the job requirement following standard procedures 3.9 Perform vacuuming as per the job requirement following standard procedures 3.10 Charge refrigerant as per the job requirement following standard procedures 3.11 Check temperature sensor as per the job requirement following standard procedures
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RANGE STATEMENT

Tools may include but not limited to:

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| <ul style="list-style-type: none"> • Pliers • Screw driver set • Mini socket set • Test-lamp • Wrench set | <ul style="list-style-type: none"> • Multimeter • Wire stripper • Crimping pliers • Soldering iron • Socket set |
|--|--|

Materials may include but not limited to:

- | | |
|---|--|
| <ul style="list-style-type: none"> • Wires • Wire terminals | <ul style="list-style-type: none"> • Insulation tape • Soldering lead & flux |
|---|--|

Critical Aspects

- Demonstrate safe working practices at all times in accordance with OHS regulations.
- Diagnose and service the faults related to Heating, ventilation and MAC systems following standard procedures.

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
• Ethics and integrity • Circuit diagram of blower motor • Circuit diagram of MAC system • Operation of Heating and ventilation system • Operation of Mobile Air Conditioning (MAC) system • Principle of heat transfer • Function and operation of magnetic compressor clutch • Functions and operation of AC switch • Function of MAC system components	• Team Work • Communication • Problem Solving • Interpersonal Relationship • Coordination • Time Management • Innovation • Entrepreneurship • Growth oriented

UNIT TITLE	Install/Service Vehicle Safety and Security System
DESCRIPTOR	This unit covers the competencies required to service install/service components of central locking system and burglar alarm, service Supplemental Restraint System (SRS), service engine immobilizer system and to service Anti-Lock Braking System (ABS)
CODE	7412-U6-L3
ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA
1. Install/Service Components of Central Locking System and Burglar Alarm	1.1 Use PPE and workshop safety equipment following standard procedures 1.2 Select and use tools, equipment and materials following standard procedures 1.3 Diagnose faults of central locking system following standard procedure 1.4 Install central locking system and burglar alarm as per the job requirement following standard procedures 1.5 Replace actuators as per the manufacturer specifications 1.6 Replace Electronic Control Module (ECM) as per the job requirement following standard procedures 1.7 Replace courtesy door light switch as per the job requirement following standard procedures

2. Service ADAS and monitoring system	2.1 Use PPE and workshop safety equipment following standard procedures 2.2 Diagnose fault in ADAS system using scanning tools/circuit tester 2.3 Install parking sensor unit following standard procedures 2.4 Check ultra-sonic sensor following standard procedures 2.5 Check radar sensor following standard procedures 2.6 Adjust radar sensor following standard procedures 2.7 Check LiDAR sensor following standard procedures 2.8 Install/service TPMS following standard procedures 2.9 Install dash cam following standard procedures 2.10 Replace brake pad wear sensor following standard procedures
3. Service Supplemental Restraint System (SRS)	3.1 Use PPE and workshop safety equipment following standard procedures 3.2 Diagnose fault SRS system using scanning tools 3.3 Replace SRS ECU as per the job requirement following standard procedures

	3.4 Replace air bag inflator as per the manufacturer's instructions following standard procedure 3.5 Replace spiral cable as per the manufacturer's instructions following standard procedure 3.6 Replace airbag impact sensor as per the manufacturer's instructions following standard procedure 3.7 Replace occupant detection sensor as per the manufacturer's instructions following standard procedure 3.8 Replace pre-tensioner seat belt assembly following standard procedures
4. Service Engine Immobilizer System	4.1 Use PPE and workshop safety equipment following standard procedures 4.2 Diagnose fault in engine immobilizer system following standard procedure 4.3 Replace transponder chip as per the manufacturer's instruction following standard procedure 4.4 Perform key programming as per the job requirement following standard procedure 4.5 Replace immobilizer key coil/antenna as per the job requirement following standard procedure

5. Service Antilock Braking System (ABS)	5.1 Use PPE and workshop safety equipment following standard procedures 5.2 Diagnose fault of antilock braking system following standard procedures 5.3 Replace brake pedal switch as per the job requirement following standard procedure 5.4 Replace/service wheel speed sensor as per the job requirement following standard procedures 5.5 Replace brake modulator unit as per the job requirement following standard procedures 5.6 Replace ABS control unit as per the job requirement following standard procedures
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RANGE STATEMENT	
Tools may include but not limited to:	
• Screw driver set • Test-lamp • Mini socket set • Wrench set • Wire stripper	• Pliers • Socket set • Crimping pliers • Allen key set • Soldering iron
Materials may include but not limited to:	
• Wires • Petrol • Insulation tape	• Wire terminals • Soldering lead & flux
Equipment may include but not limited to:	

• Scanner • Intelligent tester	• Multi meter
SRS components may include but not limited to:	
• Airbag inflator • Spiral cable • Airbag impact sensor	• Occupant detection sensor • SRS module
<i>Critical Aspects</i>	
• Demonstrate safe working practices at all times in accordance with OHS regulations. • Diagnose and service the faults of vehicle safety and security system following standard procedure.	

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
• Ethics and integrity • Construction and operation of SRS • Construction and operation of ABS • Construction and operation of engine immobilizer • Function of SRS • Function of ABS • Construction and operation of central locking system • Circuit diagrams of SRS • Circuit diagram of ABS	• Team Work • Communication • Problem Solving • Interpersonal Relationship • Coordination • Time Management • Innovation • Entrepreneurship • Growth oriented

UNIT TITLE	Service Electronic Fuel Injection System
DESCRIPTOR	This unit covers the competencies required to service electronic fuel (petrol) injection system, service Common Rail Direct Injection system (CRDI) and to service electronics components of emission control system
CODE	7412-U7-L3
ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA
1. Service Electronic Fuel (Petrol) Injection System	1.1 Select and use correct PPE 1.2 Select and use tools, materials and equipment as per the job requirement 1.3 Diagnose faults of electronic fuel (petrol) injection system using scan tool following standard procedures 1.4 Replace electric fuel pump motor as per the job requirement following standard procedures 1.5 Replace or clean sensors as per the job requirement following standard procedures 1.6 Replace ECU as per the job requirement following standard procedures 1.7 Repair wire as per the job requirement following standard procedures 1.8 Replace/service injectors as per the job requirement following standard procedures

	1.9 Service Idle Air Control (IAC) valve as per the job requirement following standard procedures 1.10 Check Variable Valve Timing (VVT) following standard procedure
2. Service Common Rail Direct Injection (Diesel) System	2.1 Diagnose faults of CRDi system using scan tool following standard procedure 2.2 Replace fuel supply pump as per the job requirement following standard procedures 2.3 Service sensors as per the job requirement following standard procedures 2.4 Repair wire as per the job requirement following standard procedures 2.5 Replace injectors as per the job requirement following standard procedures 2.6 Replace fuel cut off switch as per the job requirement following standard procedures 2.7 Replace common rail pressure control valve as per the job requirement following standard procedures 2.8 Replace fuel metering control valve as per the job requirement following standard procedures
3. Service Electrical Components of Emission Control System	3.1 Diagnose faults of emission control system following standard procedure

	3.2 Replace canister purge solenoid as per the job requirement following standard procedure 3.3 Service vacuum modulator as per the job requirement following standard procedure 3.4 Regenerate Diesel Particulate Filter (DPF) as per the job requirement following standard procedure 3.5 Replace dozing injector, pump and filter following standard procedure 3.6 Replace dozing control units following standard procedure 3.7 Replace AdBlue tank's sensors following standard procedure 3.8 Replace Exhaust Gas Temperature(EGT) sensor and NOx sensor as per the job requirement following standard procedure 3.9 Service EGR valve as per the job requirement following standard procedure 3.10 Regenerate Lean NOx Trap (LNT) as per the job requirement following standard procedure
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RANGE STATEMENT	
Tools may include but not limited to:	
• Pliers	• Soldering iron

• Screw driver set • Mini socket set • Wire stripper • Crimping pliers	• Test-lamp • Wrench set • Socket set • Circuit tester
Materials may include but not limited to:	
• Wires • Insulation tape	• Wire terminals • Soldering lead & flux
Equipment may include but not limited to:	
• Scanner • Refractometer	• Multimeter
<i>Critical Aspects</i>	
• Demonstrate safe working practices at all times in accordance with OHS regulations • Diagnose the faults of electronic fuel injection system and emission control system following standard procedure	

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
• Ethics and integrity • Operation of electronic fuel (petrol) injection system • Operation of CRDi system • Operation of emission control system • Circuit diagram of fuel injection system • Norms of emission	• Team Work • Communication • Problem Solving • Interpersonal Relationship • Coordination • Time Management • Innovation • Entrepreneurship

• Functions and operation of sensors • Advantages of electronic fuel injection system • Function and operation of EGR system • Function and operation of DPF, SCR and LNT system	• Growth oriented
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ANNEXURE

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.

Purpose of National Competency Standards

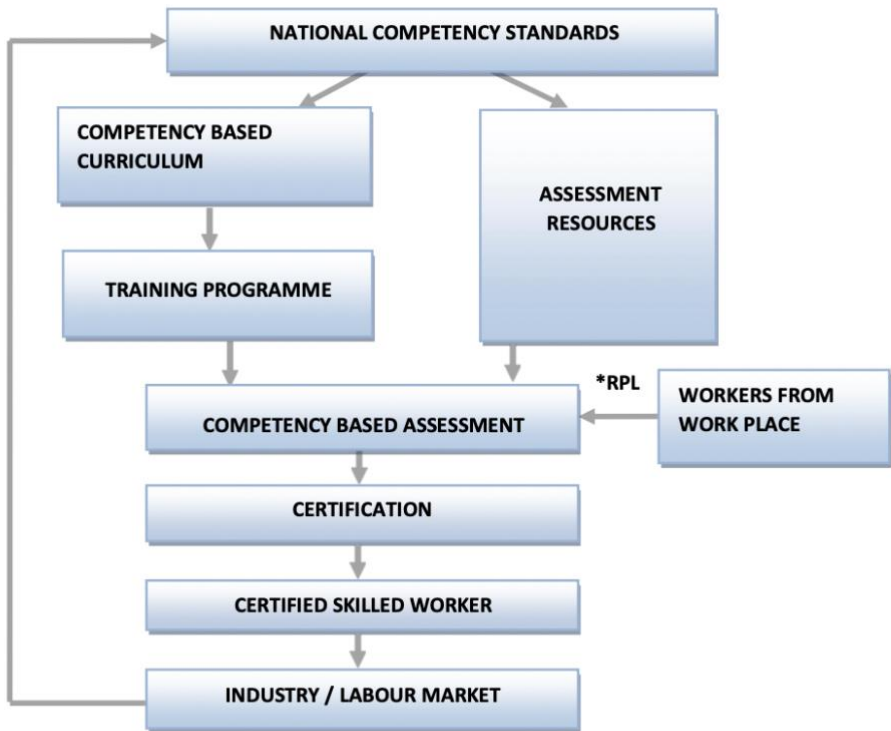
National Competency Standards serve a number of purposes including:

- 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.

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.

Implementation of TVET Qualifications



* RPL = Recognition of Prior Learning

TVET Qualifications Levels

TVET Qualifications have seven levels as per the BQF, as follows:

Bhutan Qualifications Framework 2023

Table 2: Qualification Types and Levels Based on Education Sector.

BQF Level	Community Education	School Education	TVET	Higher Education	Monastic Education
8				Doctoral Degree	<i>Khewang</i> མཁས་དབང་།
7			Master's Degree Postgraduate Diploma Postgraduate Certificate	Master's Degree Postgraduate Diploma Postgraduate Certificate	<i>Tsugla Gongma</i> གཞུག་ལག་གོང་མ།
6			Applied Degree	Bachelor's Degree Bachelor's Degree (Honours) Graduate Diploma Graduate Certificate	<i>Tsugla Wogma</i> གཞུག་ལག་འོག་མ།
5			Advanced Diploma	Advanced Diploma	
4			Diploma	Diploma	
3		Bhutan Higher Secondary Education Certificate	Certificate 3		<i>Dringrim Gongma</i> འགྲིང་རིམ་གོང་མ།
2		Bhutan Certificate for Secondary Education	Certificate 2		<i>Dringrim Barma</i> འགྲིང་རིམ་བར་མ།
1	ALC		Certificate 1		

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:

Level	<i>Knowledge</i>	<i>Skills</i>	<i>Values</i>	<i>Application</i>
	<i>Knowledge that is:</i>	<i>Demonstrate skills that involve:</i>	<i>Demonstrate values that involve:</i>	<i>Applied in contexts that involve:</i>
4	Broad theoretical, technical and operational	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	Strong level of awareness of self and others; and an appreciation of belief system, role of social norms, and the importance of relationship building Application of ethical norms and legal rules in decision-making; and comprehending the correlation between values and behavior Commitment to own profession and quality of work	Stable tasks with predictable changes Broad guidance with some self-direction that requires sound judgement Taking some responsibility for planning and coordination with others
3	Theoretical with some technical and operational processes	Applying a range of standard processes to known but varied tasks Selecting and applying a range of solutions to familiar	Sound level of self-awareness and beliefs; and ability to apply social norms and	Stable tasks with some aspects of change General guidance and supervision that require

		and unfamiliar problems Communicating effectively and clearly, both oral and written, in both English and Dzongkha	build relationships Application of a set of ethical norms Commitment to own field of interest and apply self-management of learning and performance	discretion and judgement Adapting to own behaviour to work with others
2	Basic, factual and conceptual	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 Developing basic proficiency in Dzongkha and English	Some level of self-awareness and beliefs, and appreciation of social norms; and significance of relationships Awareness of ethical norms, and openness to different activities Developing own knowledge and skills	Structured and stable tasks General support and Supervision that require some discretion and judgement Collaboration with others to achieve goals
1	Foundational, every day and general	Applying operational literacy, numeracy skills required to carry out simple tasks Applying simple solutions to solve simple and straightforward everyday issues	Basic awareness of self, beliefs, and social norms; and understand the significance of relationships Basic awareness of	Highly structured tasks with close support and supervision Minimal Discretion and judgement

		Communicating using everyday expressions and simple phrases in Dzongkha and English	fundamental ethical norms, basic civil rights, and responsibilities Willingness to understand tasks and motivated to implement them successfully	Readiness to work together and share knowledge with others
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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 Technical & Vocational Education and Training Management Information System (TVET – MIS) both in terms of economic sector identification and that of the individual standard.

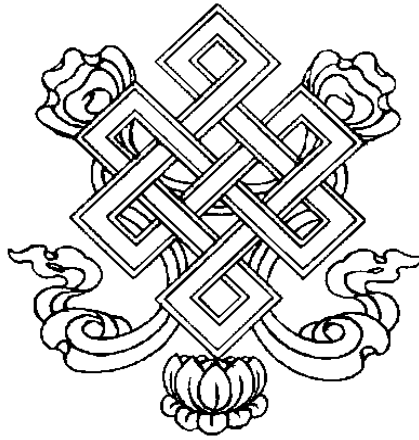
Coding the individual national competency standards

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.



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