



**NATIONAL COMPETENCY STANDARDS
FOR
DOMESTIC WIRING TECHNICIAN
(NC2)**

**Department of Occupational Standards
Ministry of Labour and Human Resources
Thimphu, Bhutan.
(August 2019)**

First Publication 2010

First Revision 2012

Second Revision 2016

Third revision 2019

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FOREWORD

The Department of Occupational Standards of the Ministry of Labour and Human Resources is pleased to present the revised National Competency Standards (NCSs) for Domestic Wiring Technician. The standards represent the fruits of hard work and invaluable experiences gained by the department since its establishment in the latter half of 2003. The main aim of developing NCS is to set up a well-defined nationally recognized Vocational Qualification System that will help set a benchmark for the Technical Vocational Education and Training (TVET) System in our country aligned to international best practices.

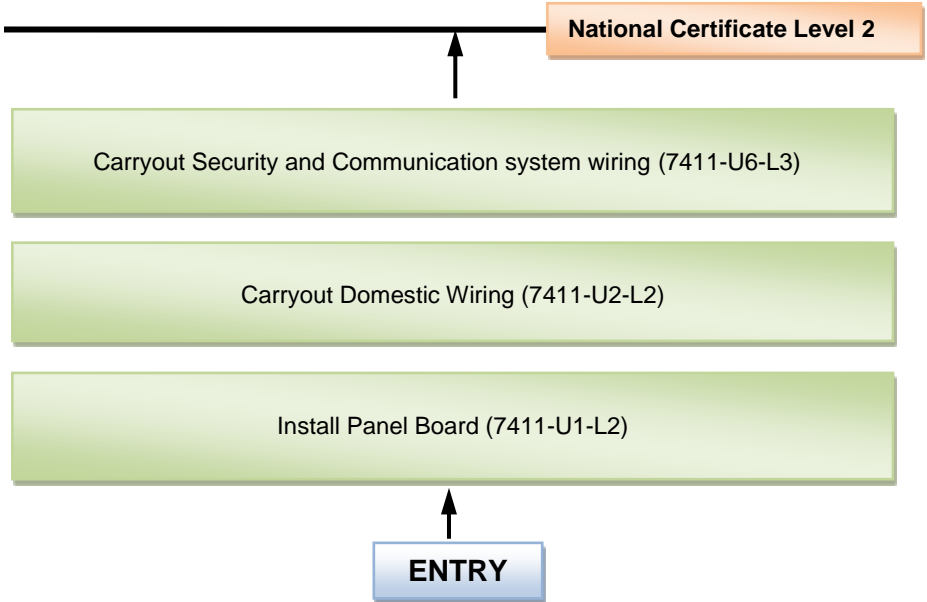
NCS is one of the base pillars in the Bhutan Vocational Qualification Framework (BVQF) and is the first step in its implementation. The NCS are developed and revised to ensure that employees or vocational graduates possess and acquire the desired competencies required by industries and employers. In order to ensure this close match in supply and demand of competencies, NCS have been developed and revised in close consultation and partnership with industry experts and validated by the Technical Advisory Committees of the concerned economic sectors.

A vocational education and training system based on NCS shall ensure that delivered training is of a high quality and relevant to the needs of the labour market. As a result, future TVET graduates will be better equipped to meet the need and expectations of industries and employers. This positive impact on the employability of TVET graduates will enhance the reputation of vocational education and training and make it attractive to school leavers.

I gratefully acknowledge collaboration and the valuable contributions made by experts from industries during the consultation and validation processes of the standards. I look forward for continued engagement and participation of the industry and employers in the development of a quality assured demand driven TVET system and to build competent and productive national workforce that will contribute to the continued socio-economic progress of our country.

Director
Department of Occupational Standards
Ministry of Labour and Human Resources

PACKAGING OF QUALIFICATIONS



NATIONAL COMPETENCY STANDARDS FOR ELECTRICIAN

Validation date : 29/08/2019

Endorsement date : 10/12/2019

Date of Review : 29/08/2022 (Max. 3 years).

Technical Advisory Committee (TAC) members for the Power Sector involved in the validation of NCS:

1. Sonam Tshering (**TAC Chairman**), Engineer, Health Infrastructure Development Division, Department of Medical Services, Ministry of Health, Thimphu.
2. Chador Phuntsho, Manager, Bhutan Power Corporation Limited, Phuentsholing.
3. Mon Prasad Gurung, Deputy Chief Engineer, Penden Cement Authority Limited, Gomtu.
4. Passang Sherpa, Deputy Chief Engineer, Bhutan Carbide and Chemical Limited, Pasakha.
5. Rabilal Ghalley, Manager, Bhutan Ferro Alloy Limited, Pasakha.
6. Nirmal Thapa, Senior Supervisor, Bhutan Board Product Limited, Tala.
7. Damber Thapa, Head of Department (Electrical), Khuruthang Institute of Electrical Engineering (KIEE), Punakha.
8. Karma Dorji, Senior Programme Officer, Training and Professional Services Division, Department of Human Resources, MoLHR, Thimphu.
9. Karma Loday (**TAC Member Secretary**), Chief Programme Officer, Standards and Qualification Division, Department of Occupational Standards, MoLHR, Thimphu.

Subject experts involved during the consultation workshop:

1. Tow Tshering, BPC, Phuntsholing
2. Keshab Phuyel, BCCL, Phuntsholing
3. Tshewang Penjor, CST, Phuntsholing
4. Kinley Wangdi, CST, Phuntsholing
5. Pema Lhamo, CST, Phuntsholing
6. Karma Wangzom, CST, Phuntsholing
7. Padam Sighn Mongar, Gedu, ESD, Phuntsholing
8. Jamyang Yonten, NNPC, Phuntsholing
9. Dirga Bdr. Monger, Phuntsholing
10. Tshe Wangchuk, Phuntsholing
11. Sonam Tshomo, Instructor, TTI-Khuruthang

Facilitators:

1. Karma Loday, Chief Program Officer, Department of Occupational Standards (DOS), MoLHR, Thimphu
2. Chogay Lhendup, Programme Officer (Facilitator), Department of Occupational Standards (DOS), MoLHR, Thimphu.

OVERVIEW OF COMPETENCY STANDARDS FOR DOMESTIC WIRING TECHNICIAN

UNIT TITLE	ELEMENTS OF COMPETENCE
Install Panel Board	<ol style="list-style-type: none"><li data-bbox="396 300 941 363">1. Install protective devices for single phase<li data-bbox="396 376 941 408">2. Install protective devices for three phase<li data-bbox="396 421 941 453">3. Install Earthing and lightening arrester
Carryout Domestic wiring	<ol style="list-style-type: none"><li data-bbox="396 491 941 523">1. Perform lighting and power circuit wiring<li data-bbox="396 536 941 568">2. Install electrical fittings and fixtures
Carryout security and Communication system wiring	<ol style="list-style-type: none"><li data-bbox="396 603 594 635">1. Install CCTV<li data-bbox="396 647 636 679">2. Install fire alarm<li data-bbox="396 692 790 724">3. Install communication cables

UNIT TITLE : Install Panel Board

DESCRIPTOR : This unit covers the competencies required to install protective devices for single and three phase followed by installation of earthing and lightening arrester following standard procedures

CODE : 7411-U1-L2

ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA
1. Install protective devices for single phase	1.1 Select and use required Personal Protective Equipment as per the job requirement following standard procedures. 1.2 Select and use tools and equipment as per the job requirement following standard procedures 1.3 Interpret the drawings as per the job requirement 1.4 Install distribution board as per the drawing and specifications following standard procedures 1.5 Install Miniature Circuit Breaker(MCB) as per the drawing and specification following standard procedures 1.6 Install Residual Current Circuit Breaker (RCCB) as per the job requirement following standard procedures 1.7 Install Earth Leakage Circuit Breaker(ELCB) as per the job requirement following standard procedures
2. Install protective devices for three phase	2.1 Interpret the drawings as per the job requirement 2.2 Install distribution board as per the drawing and specifications following standard procedures

	2.3	Install Miniature Circuit Breaker(MCB) as per the drawing and specification following standard procedures
	2.4	Install Residual Current Circuit Breaker (RCCB) as per the job requirement following standard procedures
	2.5	Install Earth Leakage Circuit Breaker(ELCB) as per the job requirement following standard procedures
	2.6	Install Molded Case Circuit Breaker (MCCB) as per the drawing and specification following standard procedures
	2.7	Install Bus-bar as per the drawing and specifications following standard procedures
3. Install earthing and lightning arrester	3.1	Install plate earthing following standard procedures
	3.2	Install building lightning arrester following standard procedures

RANGE STATEMENT	
Personal protective equipment may include but not limited to:	
<ul style="list-style-type: none"> • Safety glove • Safety helmet • Safety boot • Fire extinguisher • Uniform 	<ul style="list-style-type: none"> • Safety goggle • Ear muff • Respiratory mask • Safety belt
Tools and equipment may include but not limited to:	
<ul style="list-style-type: none"> • Pliers • Screw driver set • Wire stripper • Insulation tape • Neon tester 	<ul style="list-style-type: none"> • Crimping tools • Drilling machine • Electrician knife • Hack saw • Hammer

Critical Aspects:

- Following occupational health and safety regulations
- Interpretation of relevant technical drawings and specifications
- Selecting and fitting of protective devices and accessories

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<ul style="list-style-type: none">• Ethics and integrity• 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• Tools and measuring instruments• Method of joining and termination of wires and cables• Related trade theory	<ul style="list-style-type: none">• Communication• Team work• Problem solving• Planning• Negotiation skills

<ul style="list-style-type: none">• Estimation and costing• Testing procedure in electrical circuits.• Bhutan schedule of rates (BSR)• Load distribution	
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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

ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA
1. Perform lighting and power circuit wiring	<p>1.1 Select and use required Personal Protective Equipment as per the job requirement following standard procedures.</p> <p>1.2 Select and use tools and equipment as per the job requirement</p> <p>1.3 Interpret electrical drawings as per the job requirement</p> <p>1.4 Prepare estimate of materials and costing as per the electrical drawings</p> <p>1.5 Lay conduit/casing capping as per the electrical drawing following standard procedures</p> <p>1.6 Draw/lay wires as per the specification following standard procedures</p>
2. Install electrical fittings and fixtures	<p>2.1 Fix the electrical fittings as per the standard procedures</p> <p>2.2 Connect the fittings as per the drawing following standard procedures</p> <p>2.3 Test the circuit for functionality as per the standard procedures</p>

RANGE STATEMENT

Personal protective equipment 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 stripper
- Insulation tape
- Crimping tools
- IR Tester/ multi-meter
- Drilling machine
- Electrician knife
- Hack saw
- Hammer
- Neon tester

Electrical fittings may include but not limited to:

- Bulb holder
- Ceiling fitting
- Wall bracket lamp
- Switches
- Modular box
- Ceiling fan
- Exhaust fan
- 6A socket
- 16A socket
- Fan regulator

Critical aspects:

- Following occupational health and safety regulations
- Connect the electrical fittings as per the drawing following standard procedures

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<ul style="list-style-type: none"> • Ethics and integrity • 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 	<ul style="list-style-type: none"> • Communication • Team work • Problem solving • Planning • Negotiation skills

UNIT TITLE : **Carryout security and communication system wiring**

DESCRIPTOR : This unit covers the competencies required to install CCTV, fire alarms and communication cables following standard procedures

CODE : **7411-U3-L2**

ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA
1. Install CCTV	1.1 Select and use required Personal Protective Equipment as per the job requirement following standard procedures. 1.2 Select and use tools and equipment as per the job requirement 1.3 Interpret CCTV wiring drawings as per the job requirement 1.4 Prepare estimate of materials and costing as per the drawings 1.5 Perform installation of CCTV as per the job requirement following standard procedures 1.6 Test the CCTV wiring for functionality following standard procedures
2. Install fire alarm	2.1 Interpret drawings as per the job requirement 2.2 Prepare estimate of materials and costing as per the drawings

	2.3	Perform installation of fire alarm as per the job requirement following standard procedures
	2.4	Test the fire alarm system for functionality following standard procedures
3. Install communication cables	3.1	Interpret drawings as per the job requirement
	3.2	Prepare estimate of materials and costing as per the drawings
	3.3	Perform installation of communication cables as per the job requirement following standard procedures
	3.4	Test the communication cables for functionality following standard procedures

RANGE STATEMENT	
Personal protective equipment may include but not limited to:	
<ul style="list-style-type: none"> • Safety glove • Safety helmet • Safety boot • Fire extinguisher • Uniform 	<ul style="list-style-type: none"> • Safety goggle • Ear muff • Respiratory mask • Safety belt
Tools and equipment may include but not limited to:	
<ul style="list-style-type: none"> • Crimping tools • Pliers • Cutter • BNC tester 	<ul style="list-style-type: none"> • DVR • Camera • BNC Cable
Communication cables may include but not limited to:	
<ul style="list-style-type: none"> • TV 	<ul style="list-style-type: none"> • Telephone

- Internet

Critical aspects:

- Following occupational health and safety regulations
- Perform installation of CCTV, fire alarm and communication cables as per the job requirement following standard procedures

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Communication • Team work • Problem solving • Planning • Negotiation skills

Annexure

National Competency Standards (NCS)

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

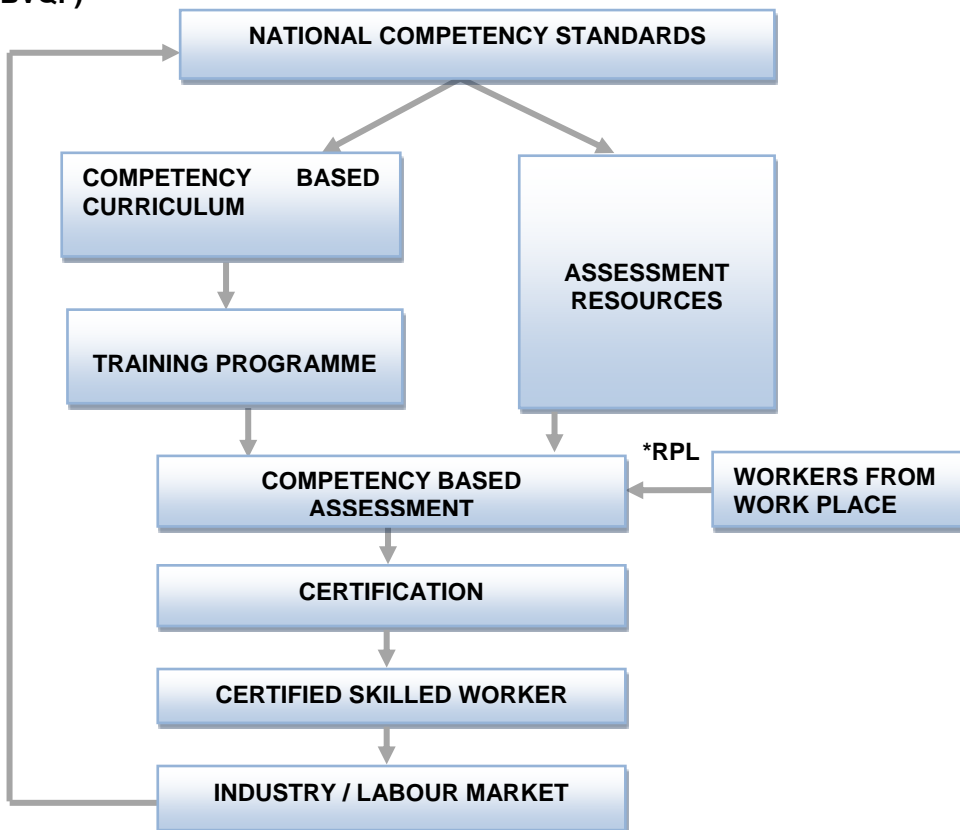
Competency Standards serve a number of purposes including:

- Providing advice to curriculum developers about the skill and knowledge to be included in curriculum.
- Providing specifications to assessment resource developers about the skill, knowledge and attitudes 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 Vocational Qualifications Framework (BVQF)

Bhutan Vocational Qualifications Framework is an agreed system of Assessing, Certifying and Monitoring nationally recognized qualifications for all learning in the VET sector against national standards, in training institutions, in the workplace, in schools or anywhere where learning takes place.

Components of the Bhutan Vocational Qualification Framework (BVQF)



* RPL = Recognition of Prior Learning

BVQF Levels

The Bhutan Vocational Qualifications Framework has three levels classified based on the competency of the skilled workers. The three levels are:

- National Certificate Level 3 (NC 3) -Master Craftsman
- National Certificate Level 2 (NC 2) -Craftsman
- National Certificate Level 1 (NC 1) -Semi Skilled Worker

BVQF Level Descriptors

The qualification levels are decided based on level descriptors. The detail of the qualification level descriptor is as follows:

National Certificate Level 1 (Semi skilled)

Carry out processes that:	Learning demand:	Responsibilities :
<ul style="list-style-type: none">• Are narrow in range.• Are established and familiar.• Offer a clear choice of routine responses.• Involve some prioritizing of tasks from known solutions.	<ul style="list-style-type: none">• Basic operational knowledge and skill.• Utilization of basic available information.• Known solutions to familiar problems.• Little generation of new ideas.	<ul style="list-style-type: none">• In directed activity.• Under general supervision and quality control.• With some responsibility for quantity and quality.• With no responsibility for guiding others.

National Certificate Level 2 (Craftsman)

Carry out processes that:	Learning demand:	Responsibilities :
<ul style="list-style-type: none"> • Require a range of skills. • Offer a significant choice of procedures requiring prioritization. • Are employed within a range of familiar context. 	<ul style="list-style-type: none"> • Some relevant theoretical knowledge. • Interpretation of available information. • Discretion and judgment. • A range of known responses to familiar problems 	<ul style="list-style-type: none"> • In directed activity with some autonomy. • Under general supervision and quality checking. • With significant responsibility for the quantity and quality of output. • With some possible responsibility for the output of others.

National Certificate Level 3 (Master Craftsman)

Carry out processes that:	Learning demand:	Responsibilities :
<ul style="list-style-type: none"> • Requires a wide range of technical or scholastic skills. • Offer a considerable choice of procedures requiring prioritization to achieve optimum outcomes. • Are employed in a variety of familiar and unfamiliar contexts. 	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • In self-directed activity. • Under broad guidance and evaluation. • With complete responsibility for quantity and quality of output. • With possible responsibility for the output of others.

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 practises. 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).

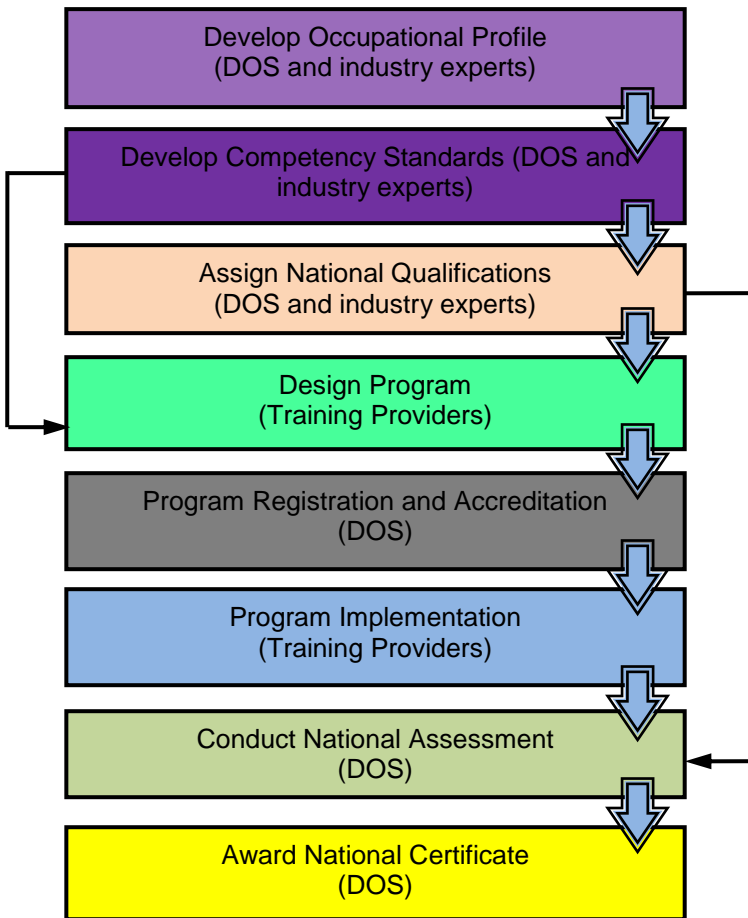
The coding of the National Competency Standards forms the basis of the identification code for the Vocational Education and Training Management Information System (VET – MIS) both in terms of economic sector identification and that of the individual standard.

Coding the individual unitcompetency standard is to identify the level in qualification package to which it belongs.

While packaging, in order to follow a logical order, only 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 qualification packages.

The ILO assigns the code 7411 to the occupation of Domestic Wiring Technician and related trades. Therefore, in the Bhutan context, the occupation Domestic Wiring Technician has been assigned the code 7411 in the National Coding System. The first unit is assigned the code U1, the first Unit of Competency Standard clustered into the first qualification is designated the code 7411-U1. Levels are assigned the code L and follow a logical progression from the National Certificate Level 1 (NC I) to the National Certificate Level 3 (NC III). Therefore the National Certificate Level 2 is assigned the code L2. The complete unit code will be 7411-U1-L2.

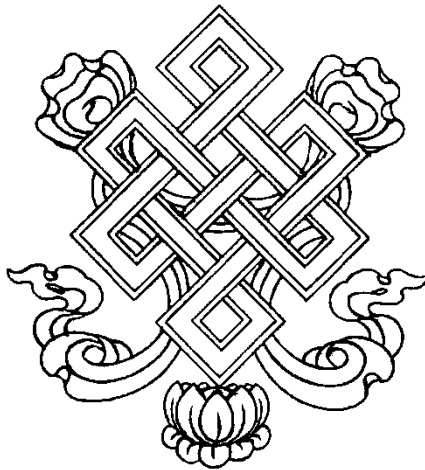
Implementation and operational procedures for National Competency Standard (NCS)



Key:

MoLHR – Ministry of Labour and Human Resources

DOS – Department of Occupational Standards



Department of Occupational Standards
Ministry of Labour & Human Resources
Thongsel Lam, Lower Motithang
P.O. Box 1036, Thimphu.
Tel: 02-331611, Fax: 02-326873
www.molhr.gov.bt