



**NATIONAL COMPETENCY STANDARDS
FOR
SEED PRODUCTION TECHNICIAN
(NC2)**

**Department of Occupational Standards
Ministry of Labour and Human Resources
Thimphu, Bhutan:
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FOREWORD

The Department of Occupational Standards of the Ministry of Labour and Human Resources proudly presents National Competency Standards (NCS) for Seed Production Technician as part of TVET reform initiative for improving the quality of Vocational Education and Training System in Bhutan. 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 Competency Standards is to set up a well defined nationally recognized Vocational Qualification and Certification system that will help set a benchmark for the Technical Vocational Education and Training (VET) System in our country aligned to international best practices.

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

A vocational education and training system based on National Competency Standards 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.

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

I gratefully acknowledge the valuable contributions made by experts from industries during the consultation, verification and validation processes of the

standards. I look forward to improved engagement and active participation of the industry and employers in the development of a quality assured demand driven TVET system in the near future.

Director
Department of Occupational Standards
Ministry of Labour and Human Resources

ACKNOWLEDGEMENT

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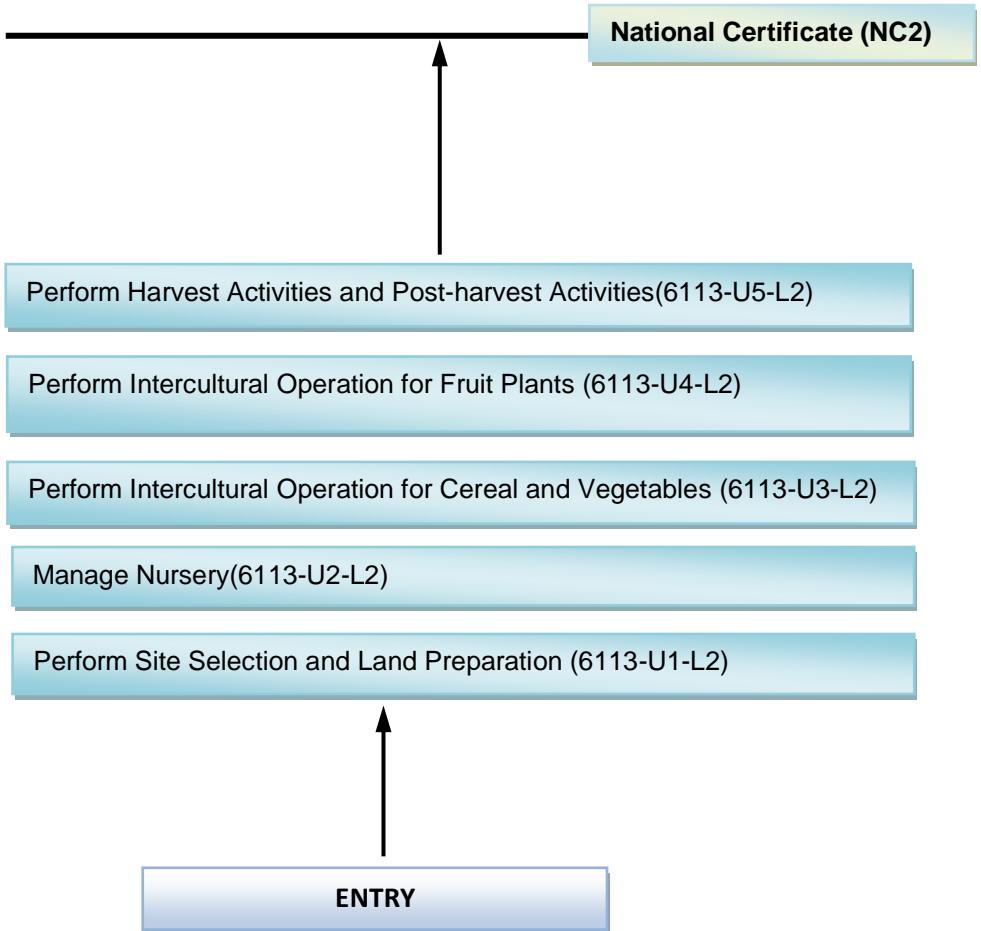
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PACKAGING OF QUALIFICATIONS



OVERVIEW OF NATIONAL COMPETENCY STANDARDS

UNIT TITLE	ELEMENTS OF COMPETENCE
1. Perform Site Selection and Land Preparation	1.1 Perform Site Selection 1.2 Prepare Land 1.3 Manage Soil Fertility
2. Manage Nursery	2.1. Prepare Bed/Poly Pot 2.1. Perform Seed Sowing 2.1. Perform Irrigation and Weeding
3. Perform Intercultural Operation for Cereal and Vegetables	3.1 Perform Irrigation and Weeding 3.2 Perform Transplantation 3.3 Perform Roughing and Thinning 3.4 Perform Pest and Disease Control
4. Perform Intercultural Operation for Fruit Plants	4.1 Perform Irrigation and Weeding 4.2 Perform Transplantation 4.3 Perform Roughing and Thinning 4.4 Manage Mother Plant Block 4.5 Perform Pruning, Budding and Grafting 4.6 Perform Pest and Disease Control
5. Perform Harvest Activities and Post-Harvest Activities	5.1 Perform Harvesting and Seed Extraction 5.2 Perform Post Harvest

UNIT TITLE	Perform Site Selection and Land preparation
DESCRIPTOR	This unit covers competencies required to perform site selection, prepare land and manage fertility for successfully preparing land
CODE	6113-U1-L2
ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA
1. Perform Site Selection	<p>1.1 Check the soil status as per the job requirement following standard procedures</p> <p>1.2 Check the availability of water supply as per the job requirement following standard procedures</p> <p>1.3 Check land aspects and climatic condition as per the job requirement following standard procedures</p>
2. Prepare Land	<p>2.1 Use PPE (safety boots, gloves, mask, safety helmet, field dress) as per the job requirement following standard procedures</p> <p>2.2 Select and use tools and equipment as per the job requirement following standard procedures</p> <p>2.3 Perform soil tillage as per the job requirement following standard procedures</p> <p>2.4 Prepare bed as per the job requirement following standard procedures</p>
3. Manage soil fertility	<p>3.1 Perform soil sampling following standard procedures</p> <p>3.2 Apply manure as per the job requirement following standard procedures</p> <p>3.3 Apply fertilizers as per the job requirement following standard procedures</p> <p>3.4 Perform top dressing as per the job requirement following standard procedures</p>

RANGE STATEMENT	
Tools and equipment may include but not limited to:	
<ul style="list-style-type: none"> • Spade • Pickaxe • Rack • Sickle • Power tiller • Tractor 	<ul style="list-style-type: none"> • Grass Cutter • Axes • Chainsaw • Sprayer
Tillage may include but not limited to:	
<ul style="list-style-type: none"> • Ploughing • Rotavating 	<ul style="list-style-type: none"> • Planking
Manure may include but not limited to:	
<ul style="list-style-type: none"> • FYM • Compost • Bio char 	<ul style="list-style-type: none"> • Ashes • Bokashi
Fertilizers may include but not limited to	
<ul style="list-style-type: none"> • Urea • Suphala 	<ul style="list-style-type: none"> • MoP • Single Super Phospate
Critical Aspects:	
<ul style="list-style-type: none"> • Demonstrate compliance with occupational health and safety regulations applicable to worksite operation • Perform soil tillage as per the job requirement following standard procedures 	

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<ul style="list-style-type: none"> • Ethics and Integrity • Occupational Health and Safety (OHS) Regulations • Climatic Condition • Crop Calendar • Soil types • Isolation Distance 	<ul style="list-style-type: none"> • Team Work • Communication • Problem Solving • Interpersonal Relationship • Creativity • Time Management

UNIT TITLE	Manage Nursery
DESCRIPTOR	This unit covers the competencies required to prepare bed/polypot, sow seeds and carry out irrigation and weeding to successfully manage nursery
CODE	6113-U2-L2
ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA
1. Prepare bed/Poly pot	1.1 Prepare growing media following standard procedures 1.2 Prepare beds (as per the job requirement following standard procedures) 1.3 Perform potting as per job requirement following standard procedures
2. Perform Seed Sowing	2.1 Perform pre-sowing treatment as per the job requirement following standard procedures 2.2 Perform seed sowing as per the job requirement following standard procedures
3. Perform Irrigation and Weeding	3.1 Perform irrigation as per the job requirement following standard procedures 3.2 Perform weeding as per the job requirement following standard procedures

RANGE STATEMENT	
Bed may include but not limited to:	
<ul style="list-style-type: none"> • Ridged • Raised 	<ul style="list-style-type: none"> • Sunken
Pre-Sowing treatment may include but not limited to:	
<ul style="list-style-type: none"> • Soaking • Scarification 	<ul style="list-style-type: none"> • Stratification

Irrigation may include but not limited to	
<ul style="list-style-type: none"> • Broadcasting • Line Sowing 	<ul style="list-style-type: none"> • Dibbling
Critical Aspects:	
<ul style="list-style-type: none"> • Demonstrate compliance with occupational health and safety regulations applicable to worksite operation. • Prepare growing media following standard procedures • Perform seed sowing as per the job requirement following standard procedures 	

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<ul style="list-style-type: none"> • Ethics and Integrity • OHS • Seed Depth • Proportion of Growing Media • Irrigation Techniques • Relevant Rules, Regulation and Guidelines • Direct Seeded and Transplanted Crops 	<ul style="list-style-type: none"> • Team Work • Communication • Problem Solving • Interpersonal Relationship • Creativity • Time Management

UNIT TITLE	Carry out Inter-cultural Operation for Cereal and Vegetable Seeds
DESCRIPTOR	This unit covers the competencies required to carry out irrigation, transplantation, roughing, thinning, and control pest and diseases to successfully carry out intercultural operation for cereal and vegetable seeds
CODE	6113-U3-L2
ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA
1. Perform Irrigation and Weeding	<p>1.1 Use tools and equipment as per the job requirement following standard procedures</p> <p>1.2 Perform irrigation as per the job requirement following standard procedures</p> <p>1.3 Perform weeding as per the job requirement following standard procedures</p> <p>1.4 Perform mulching as per the job requirement following standard procedures</p>
2. Perform Transplantation	<p>2.1. Prepare land for transplantation as per the job requirement following standard procedures</p> <p>2.2. Perform hardening of seedlings as per the job requirement following standard procedures</p> <p>2.3. Perform transplantation of seedlings as per the job requirement following standard procedures</p>
3. Perform Roughing and Thinning	<p>3.1 Perform roughing as per the job requirement following standard procedures</p> <p>3.2 Perform thinning as per the job requirement following standard procedures</p>
4. Perform Pest and Disease Control	<p>4.1 Identify pest and disease as per the job requirement following standard procedures</p> <p>4.2 Apply Integrated Pest Management techniques to</p>

	control pest and diseases as per the job requirement following standard procedures
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RANGE STATEMENT	
Tools and Equipment may include but not limited to:	
<ul style="list-style-type: none"> • Spade • Hoe • Sickle 	<ul style="list-style-type: none"> • Watering can • Pipe
Irrigation may include but not limited to:	
<ul style="list-style-type: none"> • Drip • Flooding 	<ul style="list-style-type: none"> • Sprinkling
Mulching may include but not limited to:	
<ul style="list-style-type: none"> • Plastic • Straw • Saw dust 	<ul style="list-style-type: none"> • Husk • Leaf litter
Rouging may include but not limited to:	
<ul style="list-style-type: none"> • Off-types • Volunteer Plants 	<ul style="list-style-type: none"> • Diseased • Other Variety
Critical Aspects:	
<ul style="list-style-type: none"> • Demonstrate compliance with occupational health and safety regulations applicable to worksite operation • Perform irrigation as per the job requirement following standard procedures • Perform rouging as per the job requirement following standard procedures 	

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<ul style="list-style-type: none"> • Ethics and Integrity • Occupational Health and Safety (OHS) Regulations • Critical stages for irrigation and 	<ul style="list-style-type: none"> • Team Work • Communication • Problem Solving • Interpersonal Relationship

roughing • Name and varieties of crops	• Creativity • Time Management
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UNIT TITLE	Carry out Inter-cultural Operation for Fruit Plants
DESCRIPTOR	This unit covers the competencies required to perform irrigation, weeding, transplantation, rouging, thinning, pruning, budding, grafting and managing mother plant block in successfully carrying out intercultural operation for fruit plants
CODE	6113-U4-L2
ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA
1. Perform irrigation and weeding	<p>1.1 Use tools and equipment as per the job requirement following standard procedures</p> <p>1.2 Perform irrigation as per the job requirement following standard procedures</p> <p>1.3 Perform weeding as per the job requirement following standard procedures</p> <p>1.4 Perform mulching as per the job requirement following standard procedures</p>
2. Perform Transplantation	<p>2.1. Prepare land for transplantation as per the job requirement following standard procedures</p> <p>2.2. Perform hardening of seedling as per the job requirement following standard procedures</p> <p>2.3. Perform transplantation of seedlings as per the job requirement following standard procedures</p>
3. Perform Rouging and Thinning	<p>3.1 Perform rouging as per the job requirement following standard procedures</p> <p>3.2 Perform thinning as per the job requirement following standard procedures</p>
4. Manage Mother Plant Block	<p>4.1 Use tools and equipment as per the job requirement following standard procedures</p> <p>4.2 Perform pruning of mother plants as per the job requirement following standard procedures</p> <p>4.3 Apply Bordeaux mixture paste as per the job requirement following standard procedures</p>
5. Perform Pruning,	<p>5.1 Use tools and equipment as per the job requirement following standard procedures</p>

Budding and Grafting	<p>5.2 Perform scion selection, collection and storage as per the job requirement following standard procedures</p> <p>5.3 Perform pruning as per the job requirement following standard procedures</p> <p>5.4 Perform budding as per the job requirement following standard procedures</p> <p>5.5 Perform grafting as per the job requirement following standard procedures</p>
6. Perform Pest and Disease Control	<p>6.1 Identify pest and disease as per the job requirement following standard procedures</p> <p>6.2 Apply Integrated Pest Management techniques to control pest and diseases as per the job requirement following standard procedures</p>

RANGE STATEMENT	
Tools and Equipment for irrigation may include but not limited to:	
<ul style="list-style-type: none"> • Spade • Hoe • Sickle 	<ul style="list-style-type: none"> • Watering can • Pipe
Irrigation may include but limited to:	
<ul style="list-style-type: none"> • Drip • Flooding 	<ul style="list-style-type: none"> • Sprinkling
Mulching may include but not limited to	
<ul style="list-style-type: none"> • Plastic • Straw • Saw dust 	<ul style="list-style-type: none"> • Husk • Leaf litter
Roughing may include bit not limited to:	
<ul style="list-style-type: none"> • Off-types • Volunteer Plants 	<ul style="list-style-type: none"> • Diseased • Other Variety
Thinning may include but not limited to:	
<ul style="list-style-type: none"> • Weak Plant 	<ul style="list-style-type: none"> • Densely Planted
Budding may include but not limited to:	
<ul style="list-style-type: none"> • T-budding • Chip Budding 	<ul style="list-style-type: none"> • Patch Budding

Grafting may include but not limited to:	
<ul style="list-style-type: none"> Whip and Tongue grafting 	<ul style="list-style-type: none"> Side Grafting,
Tools and Equipment for Managing Mother Plant Block may include but not limited to:	
<ul style="list-style-type: none"> Secateur Pruning saw 	<ul style="list-style-type: none"> Top Pruner
Tools and Equipment for pruning, budding and grafting may include but not limited to:	
<ul style="list-style-type: none"> Secateur Grafting knife Budding knife 	<ul style="list-style-type: none"> Pruning saw Grafting plastic wax
Critical Aspects:	
<ul style="list-style-type: none"> Demonstrate compliance with occupational health and safety regulations applicable to worksite operation Perform scion selection, collection and storage as per the job requirement following standard procedures Perform grafting as per the job requirement following standard procedures 	

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<ul style="list-style-type: none"> Ethics and Integrity Occupational Health and Safety (OHS) Regulations Critical stages for irrigation, budding and grafting Name and varieties of fruit plants Grafting and budding techniques 	<ul style="list-style-type: none"> Team Work Communication Problem Solving Interpersonal Relationship Creativity Time Management

UNIT TITLE	Carry out Harvesting and Post-harvest Activities of Seed Crops
DESCRIPTOR	This unit covers competencies required to perform harvesting, seed extraction and post-harvest activities in successfully carrying out harvesting and post harvesting activities of seed crops
CODE	6113-U5-L2
ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA
1. Perform Harvesting and seed extraction	1.1 Use tools and equipment as per the job requirement following standard procedures 1.2 Perform seed crop harvest as per the job requirement following standard procedures 1.3 Perform drying of seed crops as per the job requirement following standard procedures 1.4 Perform seed extraction as per the job requirement following standard procedures
2. Perform post-harvest	2.1. Perform seed quality test following standard procedures 2.2. Perform seed processing as per the job requirement following standard procedures 2.3. Perform seed packaging and labeling as per the job requirement following standard procedures 2.4. Perform seed storage as per the job requirement following standard procedures 2.5. Perform seed labelling following standard procedures

RANGE STATEMENT
Tools and equipment for harvesting may include but not limited to:
<ul style="list-style-type: none"> • Reaper • Basket

<ul style="list-style-type: none"> • Sickle • Gunny Bags 	<ul style="list-style-type: none"> • Tarpaulin
Seed Quality Test may include but not limited to:	
<ul style="list-style-type: none"> • Seed Sampling • Seed Moisture Testing 	<ul style="list-style-type: none"> • Purity Analysis • Germination Test
Seed processing may include but not limited:	
<ul style="list-style-type: none"> • Drying • Pre-cleaning • Air Screen Cleaning and Grading 	<ul style="list-style-type: none"> • Specific gravity grading, • Seed treatment
Seed Packaging may include but not limited to:	
<ul style="list-style-type: none"> • Bag • Pouch 	<ul style="list-style-type: none"> • HDPE Bag/gunny bag)
Seed Labeling may include but not limited to:	
<ul style="list-style-type: none"> • Name of the Seed • Variety Name • Date of Packaging 	<ul style="list-style-type: none"> • Net Weight • Price • Seed Source
Critical Aspects:	
<ul style="list-style-type: none"> • Demonstrate compliance with occupational health and safety regulations applicable to worksite operation • Perform seed quality test following standard procedures • Perform seed storage as per the job requirement following standard procedures • Perform seed processing as per the job requirement following standard procedures 	

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<ul style="list-style-type: none"> • Ethics and Integrity • Occupational Health and Safety (OHS) Regulations • Maturity Indices • Standard Seed Quality • Techniques of seed testing as per International Seed Testing Association (ISTA) • Seed Storage 	<ul style="list-style-type: none"> • 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

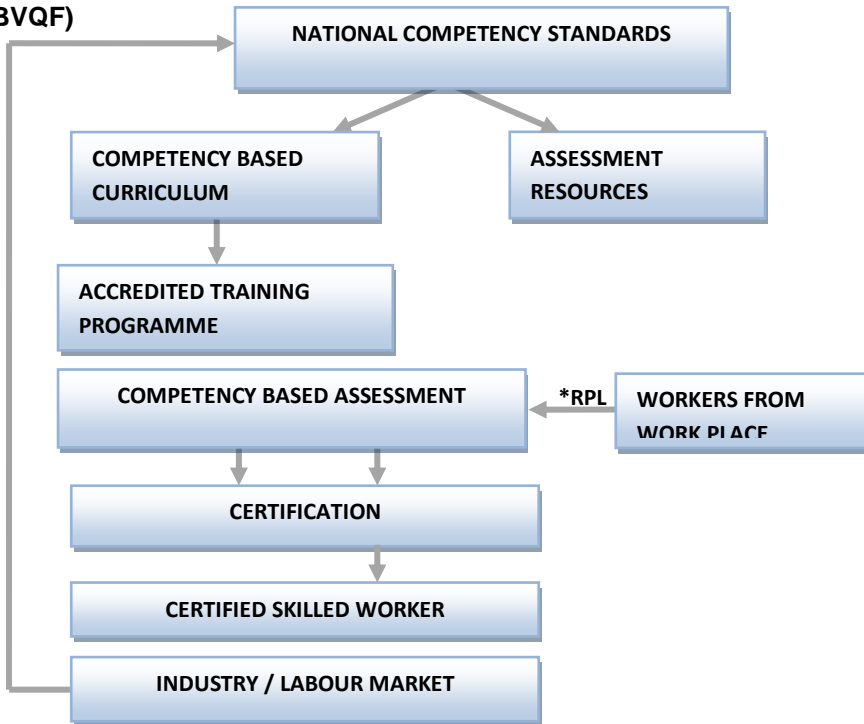
National Competency Standards serve a number of purposes including:

- Providing advice to curriculum developers about the competencies to be included in 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 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 TVET sector against national competency standards, in training institutions, in the workplace, in schools or anywhere where learning takes place.

1.4 Components of the Bhutan Vocational Qualifications Framework (BVQF)



* RPL = Recognition of Prior Learning

1.5 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 III)
- National Certificate Level 2 (NC II)
- National Certificate Level 1 (NC I)

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

Carry out processes that:	Learning demand:	Responsibilities which are applied:
<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

Carry out processes that:	Learning demand:	Responsibilities which are applied:
<ul style="list-style-type: none"> • Require a range of well-developed 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 judgments. • 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

Carry out processes that:	Learning demand:	Responsibilities which are applied:
<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.

1.6 PURPOSE

This qualification is designed for people interested in a career as a Fashion Designer at the Certificate level. It comprises of two units that cover the essential knowledge and skills required at workplace.

It provides industry specific skills and demands a level of performance that will enable new recruits to the industry to be immediately productive.

1.7 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 national competency standards

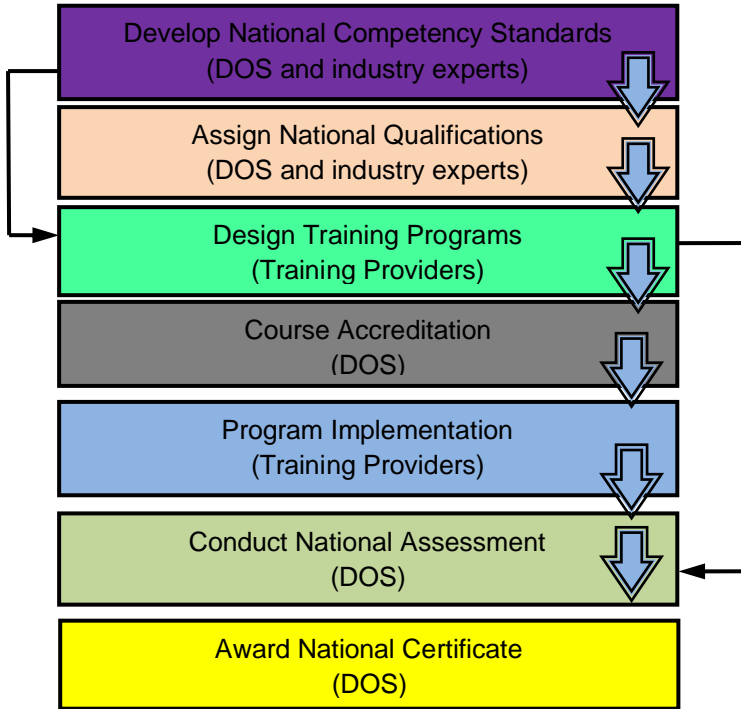
Coding the individual skills standard has a multiple purpose:

- 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)



Key:

MoLHR – Ministry of Labour and Human Resources

DOS – Department of Occupational Standards

1.8 ASSESSMENT GUIDE

Form of assessments

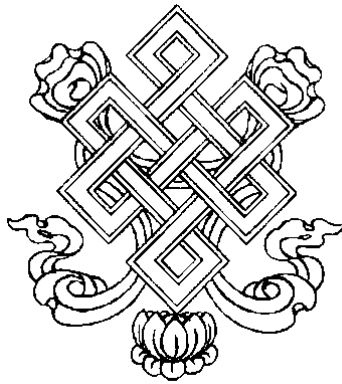
- Continuous assessment together with collected evidence of performance will be used.
- Evidence of the performance shall be based on practical demonstration.
- Knowledge can be assessed through diagrams, in writing or orally (viva-voce).

Assessment context

- Competency may be assessed in the actual work place or in a simulated workplace setting.

Assessment condition

- The candidate shall have access to all required tools, equipments, materials and documents.
- Candidate must complete the assessment in industry accepted time frame.



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