Competency Standard (CS)

Machine Shop Practice

Level-1

Light Engineering Sector

Competency Standard Code: CS-LE-MSP-L1-EN-V1

National Skills Development Authority
Chief Advisor's Office
Government of the People's Republic of Bangladesh

Copyright

National Skills Development Authority
Chief Advisor's Office
Level: 10-11, Biniyog Bhaban,
E-6 / B, Agargaon, Sher-E-Bangla Nagar Dhaka-1207, Bangladesh.
Email: ec@nsda.gov.bd
Website: www.nsda.gov.bd.
National Skills Portal: http:\\skillsportal.gov.bd

This Competency Standard for **Machine Shop Practice** is a document for the development of curricula, teaching and learning materials, and assessment tools. It also serves as the document for providing training consistent with the requirements of industry in order to meet the qualification of individuals who graduated through the established standard via competency-based assessment for a relevant job.

This document has been developed by NSDA in association with **Light Engineering Sector**, industry representatives, academia, related specialist, trainer and related employee.
Public and private institutions may use the information contained in this standard for activities benefitting Bangladesh.

Introduction

The NSDA aims to enhance an individual's employability by certifying completeness with skills. NSDA works to expand the skilling capacity of identified public and private training providers qualitatively and quantitatively. It also aims to establish and operationalize a responsive skills ecosystem and delivery mechanism through a combination of well-defined set of mechanisms and necessary technical supports.

Key priority economic growth sectors identified by the government have been targeted by NSDA to improve current job skills along with existing workforce to ensure required skills to industry standards. Training providers are encouraged and supported to work with industry to address identified skills and knowledge to enable industry growth and increased employment through the provision of market responsive inclusive skills training program. "**Machine Shop Practice**" is selected as one of the priority occupations of **Light Engineering** Sector. This standard is developed to adopt a demand driven approach to training with effective inputs from Industry Skills Councils (ISC's), employer associations and employers.

Generally, a competency standard informs curriculum, learning materials, assessment and certification of trainees enrolled in Skills training. Trainees who successfully pass the assessment will receive a qualification in the National Skills Qualification Framework (BNQF) under Bangladesh National Qualification Framework and will be listed on the NSDA's online portal.
This competency standard is developed to improve skills and knowledge in accordance with the job roles, duties and tasks of the occupation and ensure that the required skills and knowledge are aligned to industry requirements. A series of stakeholder consultations, workshops were held to develop this document.

The document also details the format, sequencing, wording and layout of the Competency Standard for an occupation which is comprised of Units of Competence and its corresponding Elements.

Overview

A **Competency Standard** is a written specification of the knowledge, skills and attitudes required for the performance of an occupation, trade or job corresponding to the industry standard of performance required in the workplace.
The purpose of a competency standards is to:

- provide a consistent and reliable set of components for training, recognising and assessing people's skills, and may also have optional support materials
- enable industry recognised qualifications to be awarded through direct assessment of workplace competencies
- encourage the development and delivery of flexible training which suits individual and industry requirements
- encourage learning and assessment in a work-related environment which leads to verifiable workplace outcomes

Competency standards are developed by a working group comprised of representative from NSDA, Key Institutions, ISC, and industry experts to identify the competencies required of an occupation in **Light Engineering Sector**.

Competency standards describe the skills, knowledge and attitude needed to perform effectively in the workplace. CS acknowledge that people can achieve technical and vocational competency in many ways by emphasizing what the learner can do, not how or where they learned to do it.
With competency standards, training and assessment may be conducted at the workplace or at training institute or any combination of these.
Competency standards consist of a number of units of competency. A unit of competency describes a distinct work activity that would normally be undertaken by one person in accordance with industry standards.

Units of competency are documented in a standard format that comprises of:

- unit title
- nominal duration
- unit code
- unit descriptor
- elements and performance criteria
- variables and range statement
- curricular content guide
- assessment evidence guide

Together, all the parts of a unit of competency:

- describe a work activity
- guide the assessor to determine whether the candidate is competent or not yet competent

The ensuing sections of this document comprise of a description of the relevant occupation, trade or job with all the key components of a unit of competency, including:

- a chart with an overview of all Units of Competency for the relevant occupation, trade or job including the Unit Codes and the Unit of Competency titles and corresponding Elements
- the Competency Standard that includes the Unit of Competency, Unit Descriptor, Elements and Performance Criteria, Range of Variables, Curricular Content Guide and Assessment Evidence Guide.

Competency Standards for National Skill Certificate – 1 in Machine Shop Practice in Light Engineering Sector

Level Descriptors of Skills Sector, BNQF Level 1-6

Level & Job classification	Knowledge Domain	Skills Domain	Responsibility Domain
6-Mid-Level Manager/ Sub Assistant Engineer	Comprehensive actual and theoretical knowledge within a specific work or study area with an awareness of the validity and limits of that knowledge, able to analyze, compare, relate and evaluate.	Specialised and wider range of cognitive and practical skills required to provide leadership in the development of creative solutions to defined problems. Communicate professional issues and solutions to the team and to external partners/users.	Work under broad guidance and self-motivation to execute strategic and operational plan/s. Lead lower-level management. Diagnose and resolve problems within and among work groups.
5-Supervisor	Broad knowledge of the underlying, concepts, principles, and processes in a specific work or study area, able to scrutinize and break information into parts by identifying motives or causes.	Broad range of cognitive and practical skills required to generate solutions to specific problems in one or more work or study areas. Communicate practice-related problems and possible solutions to external partners.	Work under guidance of management and self-direction to resolve specific issues. Lead and take responsibility for the work and actions of group/team members. Bridge between management.
4-Highly Skilled Worker	Broader knowledge of the underlying, concepts, principles, and processes in a specific work or study area, able to solve problems to new situations by comparing and applying acquired knowledge.	A range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying the full range of methods, tools, materials and information. Communicate using technical terminology and IT technology with partners and users as per workplace requirements.	Work under minimal supervision in specific contexts in response to workplace requirements. Resolve technical issues in response to workplace requirements and lead/guide a team/ group.
3-Skilled Worker	Moderately broad knowledge in a specific work or study area, able to perceive ideas and abstract from drawing and design according to workplace requirements.	Basic cognitive and practical skills required to use relevant information in order to carry out tasks and to solve routine problems using simple rules and tools. Communicate with his team and limited external partners upholding the values, nature and culture of the workplace	Work or study under supervision with considerable autonomy. Participate in teams and responsible for group coordination.
2-Semi Skilled Worker	Basic understanding of underpinning knowledge in a specific work or study area, able to interpret and apply common occupational terms and instructions.	Skills required to carry out simple tasks, communicate with his team in the workplace presenting and discussing results of his work with required clarity.	Work or study under supervision in a structured context with limited scope of manipulation
1 –Basic Skilled Worker	Elementary understanding of ability to interpret the underpinning knowledge in a specific study area, able to interpret common occupational terms and instructions.	Specific Basic skills required to carry out simple tasks. Interpret occupational terms and present the results of own work within guided work environment/ under supervision.	Work under direct supervision in a structured context with limited range of responsibilities.

List of Abbreviations

CS	-	Competency Standard
ISC	-	Industry Skills Council
FPS	-	Foot, Pound and Second
LEISC	-	Light Engineering Industry Skills Councils
NSDA	-	National Skills Development Authority
MKS	-	Meter, Kilogram and Second
BNQF	-	Bangladesh National Qualification Framework
OSH	-	Occupational Safety and Health
PPE	-	Personal Protective Equipment
SCVC	-	Standards and Curriculum Validation Committee
STP	-	Skills Training Provider
SOP	-	Standard Operating Procedure
UoC	-	Unit of Competency
CNC	-	Computer & Numeric Control
MSP	-	Machine Shop Practice
4 iR	-	4^{th} Industrial Revolution

Approved by

41st Authority Meeting of NSDA

Held on 25.03.2025

Table of Contents

Competency Standards for National Skill Certificate – 1 in
Machine Shop Practice
Course Structure

SL.	Unit Code and Title		UoC Level	Nominal Hours
Generic Units of Competencies				**40**
1	GU-04-L1-V1	Perform Computations Using Basic Mathematical Concepts	1	15
2	GU-02-L1-V1	Apply Occupational Safety and Health (OSH) Procedure in the Workplace	1	15
3	GU-06-L1-V1	Practice House Keeping Procedure	1	10
Sector Specific Units of Competencies				**50**
4	SU-LE-01-L1-V1	Interpret Technical Drawing	1	20
5	SU-LE-02-L1-V1	Use Measuring and Checking Tools and Instruments	1	30
Occupation Specific Units of Competencies				**250**
6	OU-LE-MSP-01-L1-V1	Use Hand Tools and Power Tools	1	30
7	OU-LE-MSP-02-L1-V1	Perform Bench Work	1	70
8	OU-LE-MSP-03-L1-V1	Perform Lathe Operations	1	100
9	OU-LE-MSP-04-L1-V1	Perform Shaping Operation	1	50
			Learning Hours	**340**
			Workplace Visit	**20**
			Total Nominal Hours	**360**

Units & Elements at a Glance:

Generic Units of Competencies (40 hours)

Code	Unit of Competency	Elements of Competency	Duration (Hours)
GU-04-L1-V1	Perform Computations Using Basic Mathematical Concepts	1. Identify calculation requirements in the workplace 2. Select appropriate mathematical methods for the calculation. 3. Use tool/instrument to perform calculations	15
GU-02-L1-V1	Apply Occupational Safety and Health (OSH) Procedure in the Workplace	1. Identify OSH policies and procedures. 2. Follow OSH procedure 3. Report hazards and risks. 4. Respond to emergencies 5. Maintain personal well-being	15
GU-06-L1-V1	Practice House Keeping Procedure	1. Sort and remove unnecessary items 2. Arrange items 3. Maintain work area, tools and equipment 4. Follow standardized work process and procedure 5. Perform work spontaneously	10
Total Hours			**40**

Sector Specific Units of Competencies (50 Hours)

Code	Unit of Competency	Elements of Competency	Duration (Hours)
SU-LE-01-L1-V1	Interpret Technical Drawings and Manuals	1. Follow OSH practices 2. Select technical drawing 3. Interpret drawing 4. Interpret and apply information in manuals /specification	20
SU-LE-02-L1-V1	Use Measuring and Checking Tools and Instruments	1. Prepare for work 2. Select the job to be measured and checked 3. Select measuring and checking tools and instruments 4. Take and check measurements 5. Record and communicate	30

		Measurements 6. Clean and store measuring and checking instruments	
Total Hours			**50**

Occupation Specific Units of Competencies (250 Hours)

Code	Unit of Competency	Elements of Competency	Hours
OU-LE-MSP-01-L1-V1	Use Hand Tools and Power Tools	1. Prepare for work 2. Use Manual tools 3. Use power tools 4. Maintain cleanliness and store hand tools and power tools	30
OU-LE-MSP-02-L1-V1	Perform Bench Work	1. Prepare for bench work 2. Accomplish Cutting, and filing 3. Perform drilling operation 4. Cut threads 5. Maintain cleanliness and store hand and power tools.	70
OU-LE-MSP-03-L1-V1	Perform Basic Lathe Operations	1. Prepare for work 2. Setup workpiece 3. Perform turning operation 4. Clean and store tools and equipment	100
OU-LE-MSP-04-L1-V1	Perform Shaping Operation	1. Prepare for work 2. Setup workpiece 3. Carry out shaping operations 4. Clean and store tools and equipment	50
Total Hours			**250**

Generic Units of Competencies

Unit Code and Title	**GU-01-L1-V1: Perform Computations Using Basic Mathematical Concepts**
Unit Descriptor	This unit of competency requires the knowledge, skills and attitude to perform computations using basic mathematical concepts in the workplace. It specifically includes the tasks of identifying calculation requirements in the workplace, selecting appropriate mathematical method/concept for the calculation and using appropriate instruments tools to perform calculation.
Nominal Hours	**15 Hours**
Elements of Competency	**Performance Criteria** **Bold & Underlined** terms are elaborated in the Range of Variables Training Components
1. Identify calculation requirements in the workplace	1.1 Job requirements are identified 1.2 **Measurements** are selected in accordance with job requirement 1.3 Calculation requirements are identified from **workplace information**
2. Select appropriate mathematical methods for the calculation.	2.1 Mathematical methods are identified 2.2 **Appropriate method** is selected to carry out the calculation r equirements 2.3 Tolerance and clearance limits are identified and adjusted according to the job requirements
3. Use tool/instrument to perform calculations	3.1 Work instructions are confirmed and applied to the job in hand 3.2 Materials to be measured are identified as per job specification 3.3 Appropriate **tool/ instrument** is selected based on materials to be measured
Range of Variables	
Variable	**Range** (may include but not limited to)
1. Measurements	1.1 Length 1.2 Width 1.3 Weight 1.4 Tolerance
2. workplace information	2.1 Job Order 2.2 Design 2.3 Working drawing 2.4 Verbal instructions 2.5 Written Instruction
3. Appropriate method	3.1 Addition 3.2 Subtraction 3.3 Division

	3.4 Multiplication 3.5 Conversion 3.6 Percentage and ratio calculation
4. Tool/ Instrument	4.1 Calculator 4.2 Scale 4.3 Measuring tape 4.4 Marker
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent and recent and meet the requirements of the current version of the Unit of Competency.	
1. Critical Aspects of Competency	Assessment required evidence that the candidate: 1.1 Identified calculation requirements from workplace information 1.2 Selected appropriate method to carry out the calculation requirements 1.3 Selected measurements 1.4 Selected appropriate methods 1.5 Used tool/instrument 1.6 Added numbers 1.7 Subtracted numbers 1.8 Multiplied numbers. 1.9 Divided numbers. 1.10 Completed calculations using appropriate tools/instruments
2. Underpinning Knowledge	2.1. Numerical concept 2.2. Basic mathematical methods such as addition, subtraction, multiplication and division and percentage. 2.3. Mathematical language, symbols and terminology. 2.4. Measuring units
3. Underpinning Skills	3.1 Interpret numerical concept 3.2 Interpret mathematical methods such as addition, subtraction, multiplication and division and percentage. 3.3 Interpret mathematical language, symbols and terminology. 3.4 Interpret measuring units
4. Underpinning Attitudes	4.1. Commitment to occupational health and safety 4.2. Environmental concerns 4.3. Eagerness to learn 4.4. Tidiness and timeliness 4.5. Respect for rights of peers and seniors in workplace 4.6. Communication with peers and seniors in workplace
5. Resource Implications	5.1. Work place Procedure 5.2. Materials relevant to the proposed activity 5.3. All tools, equipment, material and documentation required. 5.4. Relevant specifications or work instructions

6. Methods of Assessment	6.1. Written Test 6.2. Demonstration 6.3. Oral Questioning 6.4. Portfolio
7. Context of assessment	7.1 Competency assessment must be done in a training center or in an actual or simulated work place after Completion of the training module; 7.2 Assessment should be done by NSDA certified assessor.

Accreditation Requirements

Training Providers must be accredited by National Skills Development Authority (NSDA), the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of qualification under BNQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.

Unit Code and Title	**GU-02-L1-V1: Apply Occupational Safety and Health (OSH) Procedure in the Workplace**
Unit Descriptor	This unit covers the knowledge, skills and attitudes (KSA) required in applying occupational safety and health (OSH) procedures in the workplace. It specifically includes identifying OSH policies and procedures, following OSH procedure, reporting to emergencies, and maintaining personal well-being.
Nominal Hours	**15 Hours**
Elements of Competency	**Performance Criteria** **Bold & Underlined** terms are elaborated in the Range of Variables
1. Identify OSH policies and procedures.	1.1. **OSH policies** and **safe operating procedures** are accessed and stated; 1.2. **Safety signs and symbols** are identified and followed; 1.3. Emergency response, evacuation procedures and other contingency measures are determined according to workplace requirements.
2. Follow OSH procedure	2.1 **Personal protective equipment (PPE)** is selected and collected as required; 2.2 Personal protective equipment (PPE) is correctly used in accordance with organization OHS procedures and practices; 2.3 A clear and tidy workplace is maintained as per workplace standard; 2.4 PPE is maintained to keep them operational and compliant with OHS regulations.
3. Report hazards and risks.	3.1 **Hazards** and risks are identified, assessed and controlled; 3.2 Incidents arising from hazards and risks are reported to designated authority.
4. Respond to emergencies	4.1 Alarms and warning devices are responded; 4.2 Workplace **emergency procedures** are followed; 4.3 **Contingency measures** during workplace accidents, fire and other emergencies are recognized and followed in accordance with organization procedures; 4.4 Frist aid procedures is applied during emergency situations.
5. Maintain personal well-being	5.1 OHS policies and procedures are adhered to; 5.2 OHS awareness programs are participated in as per workplace guidelines and procedures; 5.3 Corrective actions are implemented to correct unsafe condition in the workplace; 5.4 **"Fit to work" records** are updated and maintained according to workplace requirements.
Range of Variables	
Variables	**Range** (may include but not limited to):

1. OSH Policies	1.1. Bangladesh standards for OHS 1.2. Fire Safety Rules and Regulations 1.3. Code of Practice 1.4. Industry Guidelines
2. Safe Operating Procedures	2.1 Orientation on emergency exits, fire extinguishers, fire escape, etc. 2.2 Emergency procedures 2.3 First Aid procedures 2.4 Tagging procedures 2.5 Use of PPE 2.6 Safety procedures for hazardous substances
3. Safety Signs and symbols	3.1 Direction signs (exit, emergency exit, etc.) 3.2 First aid signs 3.3 Danger Tags 3.4 Hazard signs 3.5 Safety tags 3.6 Warning signs
4. Personal Protective Equipment (PPE)	4.1 Gas Mask 4.2 Gloves 4.3 Safety boots 4.4 Face mask 4.5 Overalls 4.6 Goggles and safety glasses 4.7 Sun block 4.8 Chemical/Gas detectors
5. Hazards	5.1 Chemical hazards 5.2 Biological hazards 5.3 Physical Hazards 5.4 Mechanical and Electrical Hazard 5.5 Mental hazard 5.6 Ergonomic hazard
6. Emergency Procedures	6.1 Fire fighting 6.2 Earthquake 6.3 Medical and first aid 6.4 evacuation`
7. Contingency measures	7.1 Evacuation 7.2 Isolation 7.3 Decontamination
8. “Fit to Work” records	8.1 Medical Certificate every year 8.2 Accident reports, if any 8.3 Eye vision certificate

Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency	
1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 stated OSH policies and safe operating procedures. 1.2 followed safety signs and symbols. 1.3 used personal protective equipment (PPE). 1.4 maintained workplace clear and tidy. 1.5 assessed and controlled hazards. 1.6 followed emergency procedures. 1.7 followed contingency measures. 1.8 implemented corrective actions.
2. Underpinning knowledge	2.1 Define OSH 2.2 OHS Workplace Policies and Procedures 2.3 Work Safety Procedures 2.4 Emergency Procedures 2.5 Hazard control procedure 2.6 Different types of Hazards 2.7 PPE and there uses 2.8 Personal Hygiene Practices 2.9 OHS Awareness
3. Underpinning skills	3.1 Accessing OSH policies 3.2 Handling of PPE 3.3 Handling cleaning tools and equipment 3.4 Writing report 3.5 Responding to emergency procedures
4. Required attitude	4.1 Commitment to occupational health and safety 4.2 Sincere and honest to duties 4.3 Promptness in carrying out activities 4.4 Environmental concerns 4.5 Eagerness to learn 4.6 Tidiness and timeliness 4.7 Respect of peers and seniors in workplace 4.8 Communicate with peers and seniors in workplace
5. Resource implications	5.1 Workplace 5.2 Equipment and outfits appropriate in applying safety measures 5.3 Tools, materials and documentation required 5.4 OSH Policies and Procedures
6. Methods of assessment	Assessment methods may include but not limited to: 6.1 written test 6.2 demonstration 6.3 oral questioning 6.4 portfolio

7. Context of assessment	7.1 Competency assessment must be done in a training center or in an actual or simulated workplace after completion of the training module. 7.2 Assessment should be done by a NSDA certified/nominated assessor.

Accreditation Requirements

Training Providers must be accredited by National Skills Development Authority (NSDA), the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award qualification under BNQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.

Unit Code and Title	GU-06-L1-V1: Practice House Keeping Procedure
Unit Descriptor	This unit covers the knowledge, skills and attitude required to Practice housekeeping procedure. It specifically includes sorting and removing unnecessary items, arranging items, maintaining work area, tools and equipment, following standardized work process and procedure and performing work spontaneously.
Nominal Hours	**10 Hours**
Elements of Competency	**Performance Criteria** **Bold underlined** terms are elaborated in the Range of Variables
1. Sort and remove unnecessary items	1.1 Reusable, recyclable materials are sorted in accordance with company/office procedures; 1.2 **Unnecessary items** are removed and disposed of in accordance with company or office procedures.
2. Arrange items	2.1 Items are arranged in accordance with company/office housekeeping procedures; 2.2 Work area is arranged according to job requirements; 2.3 Activities are prioritized based on instructions; 2.4 Items are provided with clear and visible **identification marks** based on procedure; 2.5 Safety equipment and evacuation passages are kept clear and accessible based on instructions.
3. Maintain work area, tools and equipment	3.1 Cleanliness and orderliness of work area is maintained in accordance with company/office procedures; 3.2 Tools and equipment are cleaned in accordance with manufacturer's instructions/manual; 3.3 **Minor repairs** are performed on tools and equipment in accordance with manufacturer's instruction/manual; 3.4 Defective tools and equipment are reported to immediate supervisor.
4. Follow standardized work process and procedure	4.1 Materials for common use are maintained in designated area based on procedures; 4.2 Work is performed according to standard work procedures. Abnormal incidents are reported to immediate supervisor.
5. Perform work spontaneously	5.1 Work is performed as per instruction; 5.2 Company and office **decorum** are followed and complied with 5.3 Work is performed in accordance with OSH requirements.
Range of Variables	

Variable	**Range** (may include but not limited to):
1. Unnecessary items	1.1 Non-recyclable materials 1.2 Pictures, posters and other materials not related to work activity 1.3 Unserviceable tools and equipment 1.4 Waste materials
2. Identification marks	2.1 Colour coding 2.2 Labels 2.3 Tags
3. Minor repairs	3.1 Application of lubricants 3.2 Replacement of parts 3.3 Sharpening of tools 3.4 Tightening of nuts, bolts and screws
4. Decorum	4.1 Behaviour 4.2 Company/office rules and regulations 4.3 Company/office uniform
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency.	
1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 sorted and removes unnecessary items 1.2 arranged items 1.3 maintained work area, tools and equipment 1.4 followed standardized work process and procedures 1.5 performed work spontaneously
2. Underpinning knowledge	2.1 Environmental requirements relative to work safety 2.2 Principles of 5S 2.3 Reading skills required to interpret instructions 2.4 Work process and procedures 2.5 Work-related documentation requirements
3. Underpinning skills	3.1 Arranging items 3.2 Maintaining work area, tools and equipment 3.3 Following standardizing work process
4. Underpinning attitude	1.1 Commitment to occupational health and safety 1.2 Promptness in carrying out activities 1.3 Sincere and honest to duties 1.4 Environmental concerns 1.5 Eagerness to learn 1.6 Tidiness and timeliness 1.7 Respect for rights of peers and seniors in workplace 1.8 Communication with peers and seniors in workplace

2. Resource implications	The following resources must be provided: 5.1 Work place Procedure 5.2 Materials relevant to the proposed activity 5.3 All tools, equipment, material and documentation required. 5.4 Relevant specifications or work instructions
6. Methods of assessment	Methods of assessment may include but not limited to: 3.1 written test 3.2 demonstration 3.3 oral questioning 3.4 portfolio
4. Context of assessment	7.1 Competency assessment must be done in a training centre or in an actual or simulated work place after Completion of the training module; 7.2 Assessment should be done by NSDA certified assessor
Accreditation Requirements Training Providers must be accredited by National Skills Development Authority (NSDA), the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of qualification under BNQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.	

Sector Specific Units of Competencies

Unit Code and Title	**SU- LE -01-L1-V1: Interpret Technical Drawing and Manuals**
Unit Descriptor	This unit covers the knowledge, skill and attitude required in interpreting technical drawings. It includes following OSH practices, selecting technical drawing and interpreting drawing.
Nominal Hours	**20 Hours**
Elements of Competency	**Performance Criteria** **Bold and Underlined** terms are elaborated in the Range of Variables.
1. Follow OSH practices	1.1 Safe work practices observed as required for the work performed; 1.2 Hazards are identified and controlled; 1.3 Necessary PPE are selected and worn as per work requirement.
2. Select technical drawing	2.1 **Drawing** is selected and checked to ensure that it conforms to the job requirements; 2.2 Drawing is validated.
3. Interpret drawing	3.1 Drawing components, assemblies are identified; 3.2 Dimensions are identified according to job requirement; 3.3 Clearances/tolerances are checked for compliance with work place standards; 3.4 **Instructions** are identified and followed accurately; 3.5 Material specifications are identified; 3.6 Symbols in drawing/s are interpreted.
4. Interpret manuals /specification	5.1 Relevant sections, chapters of specifications/ manuals are determined in relation to the work to be conducted; 5.2 Information and procedure in the manual are interpreted according to job requirements; 5.3 Work steps are correctly identified in accordance with manufacturer's specification; 5.4 Correct sequencing and adjustments are interpreted in accordance with information contained in the manual or specifications; 5.5 Manual or specification is stored in accordance with workplace requirements.
Range of Variables	
Variables	**Range** (may include but not limited to):
1. Drawing	1.1 Technical drawing 1.2 sketch
2. Instructions	2.1 Note 2.2 Instruction 2.3 Special Instruction

	2.4 Precaution
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent and recent and meet the requirements of the current version of the Unit of Competency.	
1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 selected and interpreted technical drawing 1.2 used and followed instruction according to job requirement. 1.3 interpreted and applied information in manuals /specification
2. Underpinning knowledge	2.1 OSH 2.2 Instruction 2.3 Workplace standard 2.4 Sequence of drawing 2.5 Methods of checking 2.6 Manuals and specifications
3. Underpinning skills	3.1 Practicing workplace safety 3.2 Reading / interpreting information on the drawing, following data 3.3 Interpreting manuals 3.4 Keeping records
4. Underpinning attitudes	4.1 Commitment to occupational health and safety 4.2 Promptness in carrying out activities 4.3 Sincere and honest to duties 4.4 Environmental concerns 4.5 Eagerness to learn 4.6 Tidiness and timeliness 4.7 Respect for rights of peers and seniors in workplace 4.8 Communication with peers and seniors in workplace
5. Resource implications	5.1 Tools, equipment and physical facilities 5.2 Drawings, Manuals and Specifications 5.3 Materials, consumable needed to perform activities
6. Methods of assessment	Assessment methods may include but not limited to: 6.1 demonstration 6.2 oral questioning 6.3 written test 6.4 portfolio
7. Context of Assessment	7.1 Competency assessment must be done in a training center or in an actual or simulated workplace after completion of the training module. 7.2 Assessment should be done by an NSDA certified/ nominated assessor

Accreditation Requirements

Training Providers must be accredited by National Skills Development Authority (NSDA), the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of qualification under BNQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.

Unit Code and Title	**SU-LE-02-L1-V1: Use Measuring and Checking Tools and Instruments**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to use measuring and checking tools and instruments. It includes the tasks of preparing for work, selecting the job, selecting measuring and checking tools and instruments, taking and checking measurements, recording measurements, cleaning and storing measuring and checking instruments.
Nominal Hours	**30 Hours**
Elements of Competency	**Performance Criteria** **Bold & Underlined** terms are elaborated in the range of variables
1. Prepare for work	1.1 Safe work practices are observed and **Personal Protective Equipment (PPE)** worn as required for the work performed; 1.2 **Hazards** are identified and risks are minimized and controlled; 1.3 **Measuring and checking tools and instruments** are selected and collected for use.
2. Select the job to be measured and checked	2.1 Jobs to be measured are identified; 2.2 Jobs to be checked are identified; 2.3 **Documents** and specifications are Interpreted.
3. Select measuring and checking tools and instruments	3.1 Measuring and checking instrument is selected accordingto job requirements; 3.2 Tolerance and/or clearance, limits are interpreted from the drawing.
4. Take and check measurements	4.1 Measuring and checking instruments are calibrated to ensure accurate reading/measurement; 4.2 **Routine adjustments** are done as required; 4.3 **Measurements** are taken precisely/accurately as per supplied drawing or manual; 4.4 Measurements are checked against job requirement.
5. Record and communicate Measurements	5.1 Measurements are recorded on form/drawings/sketches as per company procedures; 5.2 Recorded measurements are interpreted andcommunicated to supervisor.
6. Clean and store measuring and checking instruments	6.1 Measuring and checking instruments are cleaned; 6.2 Measuring instruments are stored as per industry procedure.
Range of Variables	
Variable	**Range** (May include but not limited to)
1. Personal Protective Equipment (PPE)	1.1 Safety shoes 1.2 Goggles 1.3 Hand gloves

	1.4 Safety helmet with color code 1.5 Overall apron/Boiler suit 1.6 Safety Mask 1.7 Ear plug
2. Hazards	2.1 Physical hazard 2.2 Chemical hazard 2.3 Electrical and mechanical hazard 2.4 Biological hazard 2.5 Ergonomic hazard
3. Measuring and checking tools and instruments	3.1 **Measuring tools** ▪ Measuring tape ▪ Slide/Vernier Calipers ▪ Steel Rules ▪ Micrometer ▪ Protector ▪ Combination square set ▪ Vernier Hight gauge ▪ Depth gauge ▪ Dial indicator 3.2 **Checking tools** ▪ inside calipers ▪ outside calipers ▪ Filler gauge ▪ Thread gauge ▪ Divider ▪ Plug gauge ▪ Snap gauge ▪ Ring gauge
4. Documents	4.1 Drawings 4.2 Sketches 4.3 technical manuals 4.4 specifications 4.5 written instructions
5. Routine adjustment	5.1 Calibration 5.2 Simple zeroing 5.3 Scale adjustment 5.4 Reference adjustment
6. Measurements	6.1 Measuring length 6.2 Thread pitch 6.3 Angle 6.4 Diameter 6.5 Clearances 6.6 Time

Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet the requirements of the current version of the Unit of Competency.	
1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 followed OSH practices 1.2 identified the proper graduated measuring instrument 1.3 took measurement 1.4 recorded measurement 1.5 interpreted written instruction.
2. Underpinning knowledge	2.1 Relevant OSH. 2.2 Principles of using different measuring instruments. 2.3 Workplace standard. 2.4 Sequence of using the instruments. 2.5 Maintaining rules of instruments. 2.6 Methods of checking for instruments 2.7 Methods of taking measurement 2.8 Calibration of instruments
3. Underpinning skill	3.1 Practicing workplace safety 3.2 Using PPE 3.3 Using of instruments 3.4 interpreting and following data sheet, instruction and manuals, technical drawing 3.5 Performing measurement 3.6 Checking for conformance to specification 3.7 Keeping record and report 3.8 Calibration of instruments
4. Underpinning attitudes	4.1 Commitment to occupational health and safety 4.2 Promptness in carrying out activities 4.3 Sincere and honest to duties 4.4 Environmental concerns 4.5 Eagerness to learn 4.6 Tidiness and timeliness 4.7 Respect for rights of peers and seniors in workplace 4.8 Communication with peers and seniors in workplace
5. Resource implications	5.1 Adequate workplaces 5.2 Materials for proposed activities 5.3 Measuring and checking tools appropriate to propose activities 5.4 Information and documentation 5.5 Drawings, Manual, Codes, Standards and reference materials
6. Methods of assessment	Assessment methods may include but not limited to: 6.1 demonstration

	6.2 oral questioning 6.3 written test 6.4 portfolio
7. Context of assessment	7.1 Competency assessment must be done in a training center or in an actual or simulated work place after Completion of the training module; 7.2 Assessment should be done by NSDA certified assessor.
Accreditation Requirements Training Providers must be accredited by National Skills Development Authority (NSDA), the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of qualification under BNQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.	

Occupation Specific Units of Competencies

Unit Code and Title	OU-LE-MSP-01-L1-V1: Use Hand Tools and Power Tools
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to use hand and power tools. It includes the tasks of preparing for work, using hand tools, using power tools, maintaining cleanliness and storing hand tools and power tools
Nominal Hours	**30 Hours**
Elements of Competency	**Performance Criteria** **Bold & Underlined** terms are elaborated in the Range of Variables
1. Prepare for work	1.1 **Personal Protective Equipment (PPE)** is collected and worn as per work requirement; 1.2 Occupational Safety and Health (OSH) is followed; 1.3 Appropriate **hand tools** are identified and collected as per requirement; 1.4 **Power tools** are identified and collected conforming to task requirements.
2. Use hand tools	2.1 **Applications** of tools and equipment are defined; 2.2 Proper hand-eye coordination is applied in the use of hand tools; 2.3 Unsafe or faulty tools are identified and marked for repair or reject; 2.4 Proper Gripping of tools is followed as per instruction.
3. Use power tools	3.1 Power tools are used for a specific **sequence of operations** to produce desired outcomes conforming to job specifications; 3.2 All safety requirements are compiled before, during and after use; 3.3 Unsafe or faulty tools are identified and marked for repair / reject before, during and after use according to current procedures; 3.4 **Operational maintenance** of tools is undertaken according to standard procedures.
4. Maintain cleanliness and store hand tools and power tools	4.1 Workplace is cleaned as per standard procedure; 4.2 Waste materials are disposed conforming to the environmental compliances; 4.3 Hand and power tools are cleaned and stored safe place as per instruction manuals.
Range of Variables	
Variables	**Range** (may include but not limited to):

1. Personal Protective Equipment (PPE)	1.1 Safety shoes 1.2 Goggles 1.3 Hand gloves 1.4 Apron 1.5 Helmet
2. Hand tools	2.1 Different types of hammers 2.2 Different type of wrenches 2.3 Different types of files 2.4 Different types of chisels 2.5 Screwdriver set 2.6 Hacksaw 2.7 Different types of punch 2.8 Scriber 2.9 Different types pliers 2.10 Sniper 2.11 Wire Brush 2.12 Scraper 2.13 Jigs and fixtures 2.14 C clamp (clamp) 2.15 Spanner 2.16 Allen key set 2.17 Ratchet 2.18 Spirit levels 2.19 Tri-square 2.20 Hand Scissor 2.21 Wooden hammer / Malate 2.22 Plastic hammer 2.23 Grip vice 2.24 Tap and die set
3. Application	3.1 Adjusting 3.2 Aligning 3.3 Clamping 3.4 Cleaning 3.5 Finishing 3.6 Lubricating 3.7 Tightening
4. Power tools	4.1 Portable/Hand Grinders 4.2 Portable/Hand drill 4.3 Pedestal drills 4.4 Pedestal grinders 4.5 Bench grinders 4.6 Power saws 4.7 powered screw driver

5. Sequence of Operation	5.1 Clamping 5.2 Alignment 5.3 Adjustment 5.4 Completion of operation
6. Clamping	6.1 Jigs and fixtures 6.2 Clamps 6.3 Grip vice 6.4 Bench/Table Vices
7. Operational maintenance	7.1 Hand sharpening 7.2 Cleaning 7.3 Lubricating 7.4 Tightening 7.5 Simple tools repair and adjustments
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency.	
1. Critical aspects of competency	Assessment required evidences that the candidate: 1.1 followed proper using procedure of manual tools 1.2 maintained safety precaution for using hand & power tools 1.3 maintained operation procedure of power tools 1.4 maintained sequence of operation of hand tools and power tools 1.5 used power tools as per workplace requirement. 1.6 determined proper sequence of operations in using tools 1.7 undertook operational maintenance
2. Underpinning knowledge	2.1 Classification of tools. 2.2 Types of hand and power tools 2.3 Safely use of hand tools and power tools. 2.4 Working principles of hands & power tools: ➢ punches ➢ chisels ➢ wrenches ➢ pliers ➢ hand drill ➢ disc grinder ➢ pedestal drill ➢ powered screw driver 2.5 Preventive maintenance of hand and power tools 2.6 Methods of using hand and power tools 2.7 Storage procedures 2.8 Care of tools and equipment 2.9 Operational maintenance

	2.10 Sequence of operation.
3. Underpinning skills	2.1 Identifying tools. 2.2 Practicing OSH 2.3 Using hand and power tools safely. 2.4 Performing preventive maintenance. 2.5 Performing cleaning and storing tools and equipment.
4. Underpinning attitudes	4.1 Commitment to occupational health and safety 4.2 Environmental concerns 4.3 Eagerness to learn 4.4 Tidiness and timeliness 4.5 Respect for rights of peers and seniors in workplace
5. Resource implications	5.1 Adequate workplaces 5.2 Materials for proposed activities 5.3 Hand tools and power tools appropriate to propose activities 5.4 Information and documentation 5.5 Manual, Codes, Standards and reference materials
6. Methods of assessment	6.1 Demonstration 6.2 Oral questioning 6.3 Written test 6.4 Portfolio
7. Context of assessment	7.1 Competency assessment must be done in a training center or in an actual or simulated work place after Completion of the training module; 7.2 Assessment should be done by NSDA certified assessor.
Accreditation Requirements Training Providers must be accredited by National Skills Development Authority (NSDA), the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of qualification under BNQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.	

Unit Code and Title	**OU- LE-MSP -02-L1-V1: Perform Bench Work**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to perform bench work. It includes the tasks o preparing for bench works, accomplishing cutting and filing, performing drilling operation, cutting threads and maintaining cleanliness and storing hand and power tools.
Nominal Hours	**70 Hours**
Elements of Competency	**Performance Criteria** **Bold &Underlined** terms are elaborated in the Range of Variables
1. Prepare for bench work	1.1 Safe work practices observed and **Personal Protective Equipment (PPE)** is used; 1.2 **Tools and equipment** are selected as per job requirement; 1.3 **Materials** for **bench work operations** are selected according to the job requirement; 1.4 Work place and equipment are cleaned for work as per workplace standard.
2. Accomplish Cutting, and filing	2.1 Layout is performed and marked for cutting and filing in accordance with drawing; 2.2 Workpiece are clamped in **work holding devices** to avoid damage and accidents; 2.3 Workpieces are cut and filed as specified in the drawing; 2.4 Any broken or dull hacksaw blades are replaced according to requirements; 2.5 Measurement of workpiece is checked according to standard work procedures and drawing.
3. Perform drilling operation	3.1 Layout is performed and marked for drilling in accordance with drawing; 3.2 Machine is set as appropriate to the work requirement; 3.3 **Drilling** holes are performed according to recommended sequence.
4. Cut threads	4.1 Tap and die are selected in accordance with job requirement; 4.2 Workpiece is held with support as required; 4.3 **Thread** is cut to fit gauge or mating screw given in the drawing; 4.4 Internal thread is cut in accordance with the recommended tapping sequence; 4.5 External thread is cut in accordance with the recommended sequence of die operation.

5. Maintain cleanliness and store hand and power tools.	5.1 Hand and power tools are cleaned as per instruction manual; 5.2 Workplace is cleaned in accordance with environmental requirement; 5.3 Tools and equipment are stored safely in appropriate location according to standard workshop procedures.
Range of Variables	
Variable	**Range** (may include but not limited to):
1. Personal Protective Equipment (PPE)	1.1 Apron 1.2 Mask 1.3 Helmet 1.4 Hand gloves 1.5 Goggles / eye shields 1.6 Safety shoes
2. Tools and equipment	2.1 Hand drill 2.2 Bench / pedestal Drill 2.3 Pedestal grinder 2.4 Surface plate 2.5 Centre punch, scriber 2.6 Hammer 2.7 Hacksaw 2.8 Different types of cold chisel 2.9 Different types of files 2.10 Hand shears 2.11 drill bits 2.12 Tri –square 2.13 Inspection and measuring tools ▪ Vernier caliper ▪ digital vernier caliper, ▪ micrometer, ▪ straight edge, ▪ Plug gauge ▪ Ring gauge ▪ Screw gauge, ▪ Radius gauge ▪ Filler gauge ▪ height gauges, ▪ combination set, ▪ bevel protector 2.14 Tap and Die set
3. Materials	3.1 MS, Aluminum 3.2 Brass/Bronze 3.3 different grade of cutting fluid

4. Bench work operations	4.1 Layout and marking 4.2 Cutting 4.3 Filing 4.4 Drilling 4.5 Threading use Tap and Die
5. Work holding devices	5.1 Different types of Clamps 5.2 Different types of Vices
6. Drilling	6.1 Hand drilling 6.2 Pedestal drilling
7. Thread	7.1 External thread (BSW, Metric) 7.2 Internal thread (BSW, Metric)
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency.	
1. Critical aspects of competency	Assessment required evidences that the candidate: 1.1 followed Occupational Safety and Health (OSH) as per work place requirement 1.2 laid-out and marked workpiece / according to the dimension 1.3 clamped workpiece 1.4 cut, chipped and filed workpiece 1.5 drilled holes 1.6 cut threads
2. Underpinning knowledge	2.1 Principles of using measuring tools 2.2 Care and safety use of tools and equipment. 2.3 RPM, Feed and depth of cut. 2.4 Cutting fluid. 2.5 Lubricants. 2.6 Tap and drill size. 2.7 Lay out. 2.8 Basic knowledge of materials
3. Underpinning skills	3.1 Handling tools and equipment. 3.2 Using hand and power tools 3.3 Using measuring instruments. 3.4 Operating drill machine 3.5 Using tap and dies
4. Underpinning attitudes	4.1 Commitment to occupational health and safety 4.2 Promptness in carrying out activities 4.3 Sincere and honest to duties 4.4 Environmental concerns 4.5 Eagerness to learn 4.6 Tidiness and timeliness

	4.7 Respect for rights of peers and seniors in workplace 4.8 Communication with peers and seniors in workplace
5. Resource implications	5.1 Adequate workplaces 5.2 Materials for proposed activities 5.3 Tools and equipment appropriate to propose activities 5.4 Information and documentation 5.5 Manual, Codes, Standards and reference materials
6. Methods of assessment	Assessment methods may include but not limited to: 6.1 demonstration 6.2 oral questioning 6.3 written test 6.4 portfolio
7. Context of assessment	7.1 Competency assessment must be done in a training center or in an actual or simulated work place after Completion of the training module; 7.1 Assessment should be done by NSDA certified assessor.

Accreditation Requirements

Training Providers must be accredited by National Skills Development Authority (NSDA), the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of qualification under BNQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.

Unit Code and Title	**OU-LE-MSP-03-L1-V1: Perform Basic Lathe Operations**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to perform basic lathe operations. It includes preparing for work, setting up workpiece, performing turning operations and cleaning and storing tools and equipment.
Nominal Hours	**100 Hours**
Elements of Competency	**Performance Criteria** **Bold & Underlined** terms are elaborated in the Range of Variables
1. Prepare for work	1.1 **Safe work practices** are observed; 1.2 **Personal Protective Equipment (PPE)** is collected and worn as per job requirement; 1.3 **Routine maintenance** is performed to prepare the machine for required operation as per manufacturer's instruction; 1.4 **Drawings** are interpreted to produce component to specifications; 1.5 Sequence of operation is determined to produce component to specifications; 1.6 **Cutting tools** are selected according to the requirements of the operation.
2. Setup workpiece	2.1 **Workpiece** is clamped on chuck to required level of accuracy using **tools and equipment**; 2.2 **Workpiece** is centered to required level of accuracy using tools and equipment in accordance with worksite procedures; 2.3 **Cutting tool** is set in accordance with the requirement of the operation; 2.4 **Lathe accessories** are used as appropriate to the requirements of the operation. 2.5 Setting up spindle speed as per job requirement 2.6 Machine guards and coolant devices are checked according to work requirement.

3. Perform turning operations	3.1 Machine performance is checked conforming to the work requirement. 3.2 **Coolant and lubricants** are applied to prevent over heating of workpiece and cutting tool as per manufacturer instruction. 3.3 Feed Rate is set as per job requirements 3.4 Depth of Cut is determined and adjusted based on material hardness and machining conditions. 3.5 **Lathe operations** are performed to produce component to specifications in the drawing. 3.6 Workpiece is checked / measured for conformance to specification using appropriate techniques, **measuring tools** and equipment.
4. Clean and store tools and equipment	4.1 Waste materials are disposed in accordance with the work site procedures. 4.2 Cleaning of tools and equipment is performed in accordance with work site procedures. 4.3 Tools and equipment are stored safely in appropriate location according to standard procedures.
Range of Variables	
Variable	**Range** (may include but not limited to):
1. Safe work practice	1.1 Safe use of PPE 1.2 Identify hazards 1.3 Control hazards 1.4 Report to the designated authority regarding hazards 1.5 Response to emergency situations 1.6 Safe use of tools and equipment
2. Personal Protective Equipment (PPE)	2.1 Apron 2.2 Mask 2.3 Helmet 2.4 Goggles / eye shields 2.5 Safety shoes
3. Routine maintenance	3.1 Cleaning of dust and chips 3.2 Checking and adjust machine guards 3.3 Checking and use coolant and lubricant 3.4 Checking machine performance 3.5 Checking proper ventilation and lighting
4. Drawings	4.1 Views and projections 4.2 Drawing symbols 4.3 Dimensions and features 4.4 Limit, Fit and Tolerance

5. Cutting tools	5.1 Tool bits (high speed steel/ carbide tips/ high carbon speed) ▪ Side cutting tool ▪ Parting tool ▪ Knurling 5.2 Counter shank/ Centre drill 5.3 Drill bits
6. Workpiece	6.1 Mild steel 6.2 Cast iron 6.3 Stainless Steel 6.4 Aluminum 6.5 Brass
7. Tools and equipment	7.1 Outside caliper 7.2 Inside caliper 7.3 Self-centering chuck 7.4 Drill chuck 7.5 Chuck key 7.6 Box wrench 7.7 Drill chuck key 7.8 Surface gauge 7.9 Dial indicator with magnetic set 7.10 Mallet 7.11 Allen key set 7.12 Assorted open ended wrench 7.13 Adjustable wrench
8. Lathe accessories and attachment	8.1 Dead center 8.2 Live center/ Revolving center 8.3 Self-centering tool post 8.4 Tool holder
9. Coolant and Lubricant	9.1 Cutting fluid 9.2 Kerosine for aluminum 9.3 Grease 9.4 Lubricating oil
10. Lathe operations	10.1 Turning 10.2 Facing 10.3 Parting 10.4 Drilling 10.5 Knurling 10.6 Taper turning
11. Measuring tools	11.1 Measuring tape 11.2 Steel rule 11.3 Vernier calipers / Digital Vernier calipers 11.4 Centre Gauge 11.5 Radius gauge

Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency.	
1. Critical aspects of competency	Assessment required evidences that the candidate: 1.1 followed Occupational Safety and Health (OSH) in the workplace 1.2 performed routine maintenance to prepare the machine for required operation 1.3 determined job requirements 1.4 setup and clamped the workpiece 1.5 interpreted drawing 1.6 performed lathe operation 1.7 checked / measured workpiece.
2. Underpinning knowledge	2.1 Limit. 2.2 Fit. 2.3 Tolerance. 2.4 Allowance. 2.5 Clearance. 2.6 Fundamentals of work holding and tool holding devices. 2.7 Fundamentals of turning tools and tool geometry. 2.8 Lathe accessories, fixtures and attachments. 2.9 Cutting speed. 2.10 Taper turning procedure 2.11 Taper angle and its calculation 2.12 RPM (revolution per minute). 2.13 Feed. 2.14 Depth of cut. 2.13 Routine maintenance, 2.14 SOP 2.15 Workpiece materials 2.16 Use of different coolant and lubricant 2.17 Use of different measuring tools 2.18 Different gages used for checking turning product
3. Underpinning skills	3.1 Selecting and grinding cutting tools. 3.2 Calculating feed, cutting speed and machine rpm as per job requirement. 3.3 Setting cutting Speed, RPM, Feed rate. 3.4 Selecting and setting proper cutting tools. 3.5 Holding workpieces. 3.6 Sharping cutting tools. 3.7 Holding cutting tools. 3.8 Using measuring instruments and gauges to check dimension.

4. Required attitudes	4.1 Commitment to occupational safety and health. 4.2 Promptness in carrying out activities. 4.3 Sincere and honest to duties. 4.4 Eagerness to learn. 4.5 Tidiness and timeliness. 4.6 Environmental concerns. 4.7 Respect for rights of peers and seniors at workplace. 4.8 Communication with peers and seniors at workplace.
5. Resources implication	The following resources must be provided: 5.1 workplace (actual or simulated) 5.2 tools and equipment appropriate to activities or process 5.3 materials relevant to the proposed activity / task 5.4 equipment and outfits appropriate in applying safety measures 5.5 relevant drawings, manuals, codes, standards and reference material.
6. Methods of assessment	Methods of assessment may include but not limited to: 6.1 written test 6.2 demonstration 6.3 oral questioning 6.4 portfolio.
7. Context of assessment	7.1 Competency assessment must be done in a training center or in an actual or simulated work place after Completion of the training module; 7.2 Assessment should be done by NSDA certified assessor.

Accreditation Requirements

Training Providers must be accredited by National Skills Development Authority (NSDA), the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of qualification under BNQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.

Unit Code and Title	OU-LE-MSP-04-L1-V1: Perform Shaping Operation
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to perform shaping operations. It includes preparing for work, setting up work piece, carrying out shaping operations and cleaning and storing tools and equipment.
Nominal Hours	**50 Hours**
Elements of Competency	**Performance Criteria** **Bold & Underlined** terms are elaborated in the Range of Variables
1. Prepare for work	1.1 **Safe work practices** are observed. 1.2 **Personal Protective Equipment (PPE)** is used. 1.3 Sequencing of operation is determined to produce components to specifications. 1.4 Work holding devices are selected according to job requirements. 1.5 **Cutting tools** are selected, inspected, and mounted according to manufacturer's specification and work procedure. 1.6 Machine guards and coolant devices are checked according to work requirement. 1.7 **Cutting parameters** are determined as per job requirement.
2. Setup workpiece	2.1 Drawings are interpreted to produce components to specifications. 2.2 **Workpiece materials** is setup to required level of accuracy using instrument / equipment / **accessories** according to work procedures. 2.3 Routine maintenance is performed to prepare the machine for required operation.
3. Carry out shaping operations	3.1 Shaping accessories are used appropriate to the requirements of the operations. 3.2 Coolant is applied to prevent over heating of workpiece and cutting tool as per manufacturer instruction. 3.3 **Shaping operations** are performed to produce component to specifications in the working drawing. 3.4 Workpiece is checked for conformance to specifications using appropriate techniques, **measuring tools and equipment.**
4. Clean and store tools and equipment	4.1 Waste materials are disposed in accordance with work site procedures. 4.2 Cleaning of equipment is performed in accordance with work site procedures. 4.3 Tools and equipment are stored safely in appropriate location according to standard procedures.
Range of Variables	
Variable	**Range** (may include but not limited to):

1. Safe work practice	1.1 Safe use of PPE 1.2 Identify hazards 1.3 Control hazards 1.4 Report to the designated authority regarding hazards 1.5 Response to emergency situations 1.6 Safe use of tools and equipment
2. Personal Protective Equipment (PPE)	2.1 Apron 2.2 Mask 2.3 Helmet 2.4 Hand gloves 2.5 Goggles / eye shields 2.6 Safety shoes
3. Cutting tools	3.1 Shaping tool 3.2 Parting tools 3.3 "V" tools 3.4 Forming tool
4. Cutting parameters	4.1 Feeds 4.2 Speeds 4.3 Depth of cut 4.4 Length of strock etc.
5. Accessories	5.1 Angle plate 5.2 Dial indicator 5.3 Rotary table 5.4 "C" clamp 5.5 Parallel bar 5.6 "V" Block 5.7 Surface gauge
6. Shaping operations	6.1 Surfacing/Facing 6.2 Key way Slotting
7. Workpiece materials	7.1 MS 7.2 CI
8. Measuring tools and equipment	8.1 measuring tape 8.2 Vernier calipers 8.3 Gauges (Depth, Surface gauge,) 8.4 Vernier height gauge 8.5 **C**ombination set 8.6 Tri Square 8.7 Spirit level 8.8 Outside and inside caliper
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency.	

1. Critical aspects of competency	Assessment required evidences that the candidate: 1.1 followed Occupational Safety and Health (OSH) in the workplace 1.2 performed routine maintenance to prepare machine for required operation 1.3 setup and clamped workpiece 1.4 interpreted drawing 1.5 performed shaping 1.6 checked / measured the workpiece.
2. Underpinning knowledge	2.1 Procedures for setting up tools and workpiece. 2.2 Tool type and geometry to achieve required specifications on different materials. 2.3 Techniques and procedures for machining flat surfaces and slots. 2.4 Name and functions of different parts of shaper 2.5 Changing procedure of stroke length 2.6 Various operation of shaper machine
3. Underpinning skills	3.1 Setting machine as per calculated cutting parameters. 3.2 Grinding cutting tools. 3.3 Setting cutting tools. 3.4 Holding and clamping workpiece. 3.5 Adjusting length of stroke as required. 3.6 Applying techniques for required shaping operations. 3.7 Using precision measurement equipment to check dimension and tolerance.
4. Required attitudes	4.1 Commitment to occupational safety and health. 4.2 Promptness in carrying out activities. 4.3 Sincere and honest to duties. 4.4 Eagerness to learn. 4.5 Tidiness and timeliness. 4.6 Environmental concerns. 4.7 Respect for rights of peers and seniors at workplace. 4.8 Communication with peers and seniors at workplace.
5. Resources implication	The following resources must be provided: 5.1 workplace (actual or simulated) 5.2 materials relevant to proposed activities 5.3 all tools, equipment, material and documentation required 5.4 relevant drawings and specifications or work instructions.
6. Methods of asessment	Methods of assessment may include but not limited to: 6.1 written test 6.2 demonstration 6.3 oral questioning 6.4 portfolio

7. Context of assessment	7.1 Competency assessment must be done in a training center or in an actual or simulated work place after Completion of the training module; 7.2 Assessment should be done by NSDA certified assessor.

Accreditation Requirements

Training Providers must be accredited by National Skills Development Authority (NSDA), the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of qualification under BNQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.

References:

- CS of Bangladesh Technical Education Board (BTEB)
- CS of Technical Education and Skills Development Authority (TESDA), Philippine, https://www.tesda.gov.ph

Development of Competency Standard

The Competency Standards for National Skills Certificate Level-1 in **Machine Shop Practice** is Developed by NSDA on 10 March, 2025.

List of Members of the Development Workshop

Sl. No.	Name and Address	Signature
1.	Md. Siddiqur Rahman Chief instructor (Mech.) Dhaka Polytechnic Institute Mobail:01716059720 Email: siddiqurdpi83@gmail.com	
2.	Biplab Kumar Singha Trainer (MSP) UCEP Jatrabari TVET Institute 49/2, Saddam Market, Matuail Dhaka. Mobile: 019 13 13 29 22 E-mail: biplob.singha@ucepbd.org; biplab1759@gmail.com	
3.	Engr. Mahmudul Hasan Executive Engineer BITAC, Dhaka. Mobile no.01712190666 Email: mhasan0925@gmail.clom	
4.	Palash Kumar Sarker Executive Engineer DEW Ltd, Narayanganj, Dhaka Mobile: 01769719838 Email:palash07me@gmail.com	
5.	Md. Aslam Uddin Lead Trainer Master Craftsmanship BEIOA-Light Engineering Training Institute Mobile-01722250008 Email: inst.mcs3.beioa@gmail.com	
6.	Md. Tasiqul Islam Assistant Technical Officer Machine shop Dep. Of Mechanical Mobile: 01718103311 Emai: mdtasiqulislam32@gmail.com	
7.	Md. Jahid Hossain Proprietor, AHJ Engineering Workshop Power House More, Sopura, Rajshahi Mobile: 01750368988 Email: ntr.jahid96@gmail.com	
8.	Md. Nazrul Islam Competency Standard Expert National Skills Development Authority (NSDA) Mobile: +880 1711 273708 Email: ndewli@yahoo.com	

Validation of Competency Standard

The Competency Standards for National Skills Certificate Level-1 in **Machine Shop Practice** is Validated by NSDA on 12 March, 2025.

List of Members of the Validation Workshop

Sl. No.	Name and Address	Position in the committee	Signature
1	Md. Abdur Razzaque Chairman Light Engineering Sector ISC Mobile: 01819 245588 Email: bcioa2008@gmail.com	Chairman	
2	Professor Dr. A N M Momirul Islam Mukut Department of Mechanical Engineering Dhaka University of Engineering & Technology (DUET) Gazipur Mobile: 01913471401 Email:mukut@duet.ac.bd	Member	
3	Engr. Md. Jahangir Alam. Additional Director, Tool & Technology Institute BITAC, Tejgaon Mobile: 01712755890 Email: engr.Jahangir.alam71@gmail.com	Member	
4	Md. Siddiqur Rahman Chief instructor (Mech.)Dhaka Polytechnic Institute Mobail:01716059720 Email: siddiqurdpi83@gmail.com	Member	
5	Uttam Kumar Das Instructor, MSP, BKTTC, Dhaka Mobile: 01998006001 E-mail: udas.bkttc@gmail.com	Member	
6	Md. Rezwan Munshi Assistant Engineer, BITAC, Dhaka Mobile: 01770926099 Email: mdrezwan203@gmail.com	Member	
7	Md. Anwarul Haque Ansari Director Light Engineering Industry Skills Council, Wari, Dhaka Mobile:01711530619 Email: ahansari007@yahoo.com	Member	
8	Abul Kashem Titu Director Light Engineering Industry Skills Council, Wari, Dhaka Mobile:01711286477 Email:nafiaengineeringbd@gmail.com	Member	
9	Md. Nazrul Islam Competency Standard Expert National Skills Development Authority (NSDA) Mobile: 0 1711 273708; e-mail: ndewli@yahoo.com	Member	