Competency Standard (CS)

Machine Shop Practice

Level-2

Light Engineering Sector

Competency Standard Code: CS-LE-MSP-L2-EN-V1

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

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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 – 2 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
NSQF	-	National Skills Qualification Framework
MKS	-	Meter, Kilogram and Second
BNQF	-	Bangladesh National Qualification Framework
OSH	-	Occupational Safety and Health
PPE	-	Personal Protective Equipment
SS	-	Stainless Steel
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	-	4th Industrial Revolution

Approved by

40th Authority Meeting of NSDA

Held on 26 February 2025

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Competency Standards for National Skill Certificate – 2 in
Machine Shop Practice
Course Structure

SL.	Unit Code and Title		UoC Level	Nominal Hours
Generic Units of Competencies				**35**
1.	GU-04-L1-V1	Work in a Team Environment	1	20
2.	GU-02-L2-V1	Carryout Workplace Interaction	2	15
Occupation Specific Units of Competencies				**305**
3.	OU-LE-MSP-01-L2-V1	Grind Cutting Tool	2	80
4.	OU-LE-MSP-02-L2-V1	Perform Lathe Operation	2	120
5.	OU-LE-MSP-03-L2-V1	Perform Surface Grinding	2	35
6.	OU-LE-MSP-04-L2-V1	Perform Boring and Honing Operations	2	70
			Learning Hours	**340**
			Workplace Visit	**20**
			Total Nominal Hours	**360**

Units & Elements at a Glance:

Generic Units of Competencies (35 hours)

Code	Unit of Competency	Elements of Competency	Duration (Hours)
GU-04-L1-V1	Work in a Team Environment	1. Define team role and scope. 2. Identify individual role and responsibility 3. Participate in team discussions 4. Work as a team member	20
GU-02-L2-V1	Carryout Workplace Interaction	1. Interpret workplace communication and etiquette 2. Read and understand workplace documents 3. Participate in workplace meetings and discussions 4. Practice professional ethics at workplace	15
Total Hours			**35**

Occupation Specific Units of Competencies (305 Hours)

Code	Unit of Competency	Elements of Competency	Hours
OU-LE-MSP-01-L2-V1	Grind Cutting Tool	1. Prepare for Work 2. Select wheels and accessories 3. Perform cutting tool grinding operations 4. 4.Clean and maintain Workplace.	80
OU-LE-MSP-02-L2-V1	Perform Lathe Operation	1. Prepare for work 2. Setup workpiece 3. Perform lathe operations 4. Clean and store tools and equipment.	120
OU-LE-MSP-03-L2-V1	Operate Surface Grinding Machine	1. Prepare for work 2. Select and set up surface grinding machine 3. Perform surface grinding operations 4. Clean & store tools and equipment.	35

OU-LE-MSP-04-L2-V1	Perform Boring and Honing Operations	1. Prepare for work 2. Setup workpiece and cutting tools for boring operation 3. Perform boring operations 4. Setup honing tools for honing operation 5. Perform honing operations 6. Clean and store tools and equipment.	70

Generic Units of Competencies

Unit Code and Title	GU-04-L1-V1: Work in a Team Environment
Unit Descriptor	This unit covers the knowledge, skills and attitudes (KSA) required in working in a team environment. It includes defining team role and scope, identifying individual role and responsibility. Participating in team discussions and working as a team member.
Nominal Hours	**20 Hours**
Elements of Competency	**Performance Criteria** **Bold & Underlined** terms are elaborated in the Range of Variables
1. Define team role and scope.	1.1. Role and objectives of the team are defined. 1.2. Team structure, responsibilities and reporting relations are identified from team discussions and other external sources.
2. Identify individual role and responsibility	2.1 Individual roles and responsibilities of **team members** are identified. 2.2 Reporting relationships among team members are defined and clarified. 2.3 Reporting relationships external to the team are defined and clarified.
3. Participate in team discussions	3.1 Ideas related to team plans are contributed. 3.2 Recommendations for improving team work are put forward.
4. Work as a team member	4.1. Effective forms of communication are used to interact with team members. 4.2. Communication channels are followed. 4.3. OHS practices are followed.
Range of Variables	
Variables	**Range** (may include but not limited to):
1. Sources of information	1.1 Standard Operating Procedures 1.2 Job Description 1.3 Operations Manual 1.4 Organizational Structure
2. Team Members	1.1 Coach/mentor 1.2 Supervisor/Manager 1.3 Peers/Colleagues 1.4 Employee representative
3. Workplace context	3.1 National Laws and Statutes 3.2 Standard Operating Procedures 3.3 Workplace Rules and Regulations
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 demonstrated knowledge in working in a team environment.

	1.2 satisfied the requirements mentioned in the Performance Criteria and Range of Variables
2. Underpinning knowledge	2.1 Team Structure, Role and Responsibility 2.2 Individual Members' Roles and Responsibilities 2.3 Communication Flow and Reporting Structures 2.4 Team Planning 2.5 Interpersonal Communication Skills 2.6 Team Meeting Procedures 2.7 OHS Practices
3. Underpinning skills	3.1 Identifying the role and responsibility of the team 3.2 Identifying roles and responsibilities of individual members 3.3 Participating in team discussions 3.4 Working as a team member
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 Pens 5.2 Telephone 5.3 Computer 5.4 Writing materials 5.5 Online communication
6. Methods of assessment	Methods of assessment may include but not limited to**:** 6.1. Workplace observation 6.2. Demonstration 6.3. Oral questioning 6.4. Written test 6.5. 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-03-L2-V1: Carryout Workplace Interaction
Unit Descriptor	This unit covers the knowledge, skills and attitude required to carry out workplace interaction. It specifically includes interpreting workplace communication and etiquette, reading and understanding workplace documents, participating in workplace meetings and discussions and practicing professional ethics at workplace.
Nominal Hours	**15 Hours**
Elements of Competency	**Performance Criteria** **Bold & Underlined** terms are elaborated in the Range of Variables
1. Interpret workplace communication and etiquette	1.1 Workplace code of conducts are interpreted as per organizational guidelines; 1.2 Appropriate lines of communication are maintained with supervisors and colleagues; 1.3 Workplace interactions are conducted in a **courteous manner** to gather and convey information; 1.4 Questions about routine **workplace procedures and matters** are asked and responded as required.
2. Read and understand workplace documents	2.1 Workplace documents are interpreted as per standard; 2.2 Assistance is taken to aid comprehension when required from peers / supervisors; 2.3 Visual information / symbols / signage's are understood and followed; *2.4* Specific and relevant information are accessed from **appropriate sources;** 2.5 Appropriate medium is used to transfer information and ideas.
3. Participate in workplace meetings and discussions	3.1 Team meetings are attended on time and meeting procedures and etiquette are followed; 3.2 Own opinions are expressed and others opinions are listened without interruption; 3.3 Inputs are provided consistent with meeting purpose and meeting outcomes are implemented.
4. Practice professional ethics at workplace	4.1 Responsibilities as a team member are demonstrated and kept promises and commitments made to others; 4.2 Tasks are performed in accordance with workplace procedures 4.3 Confidentiality is respected and maintained; 4.4 Situations and actions considered inappropriate or which present a conflict of interest are avoided
.Range of Variables	

Variable	**Range** (may include but not limited to):
1. Courteous manner	1.1 Effective questioning 1.2 Active listening 1.3 Speaking skills
2. Workplace procedures and matters	2.1 Notes 2.2 Agenda 2.3 Simple reports 2.3.1 Progress report 2.3.2 Incident report 2.4 Job sheets 2.5 Operational manuals 2.6 Brochures and promotional material 2.7 Visual and graphic materials 2.8 Standards 2.9 OSH information 2.10 Signs
3. Appropriate sources	3.1 HR Department 3.2 Managers 3.3 Supervisors
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	1.1 Maintained workplace communication and etiquette 1.2 Followed workplace instructions and symbols 1.3 Followed team meeting and etiquette
2. Underpinning knowledge	2.1 Workplace communication and etiquette 2.2 Workplace documents, signs and symbols 2.3 Meeting procedure and etiquette
3. Underpinning skills	3.1 Maintaining workplace communication and etiquette 3.2 Following workplace instructions and symbols 3.3 Following team meeting and etiquette
4. Underpinning attitude	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	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: 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.	

Occupation Specific Units of Competencies

Unit Code and Title	OU-LE-MSP-01-L2-V1: Grind Cutting Tool
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to grind cutting tool. It includes preparing for work, selecting wheels and accessories and performing cutting tool grinding operations.
Nominal Hours	**80 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; 1.3 Drawings are interpreted to grind tools confirming to the specifications; 1.4 Tool holding devices are selected according to the requirements of the operation.
2. Select wheels and accessories	2.1 Routine maintenance is performed to prepare the machine for required operation; 2.2 **Accessories** are selected as per operations requirements; 2.3 **Grinding wheels** are selected, inspected, dressed according to worksite procedures; 2.4 Machine guards, coolant and dust collection devices are checked according to worksite procedure.
3. Perform cutting tool grinding operations	3.1 **Grinding machine** is adjusted as per job requirement; 3.2 Cutting tool is hold or clamped to avoid damage; 3.3 Coolant is used to reduce heat of tool and prevent damage; 3.4 Grinding operation is performed as per specification mentioned in drawing.
4. Clean and maintain Workplace	4.1 Waste materials are disposed of in accordance with environmental requirements; 4.2 Cleaning of equipment is performed in accordance with work site procedures.

Range of Variables	
Variable	**Range** (may include but not limited to):
1. Safe work practices	1.1 Identify hazards 1.2 Control hazards 1.3 Report to the designated authority regarding hazards and risk 1.4 Response emergency situation 1.5 Use PPE 1.6 Participate in training relevant with OSH

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. Accessories	3.1 Wheel dresser 3.2 Diamond pen 3.3 Centre gauge
4. Grinding wheels	4.1 Silicon carbide wheel 4.2 Aluminum carbide wheel
5. Grinding machine	5.1 Pedestal grinder 5.2 Bench grinder
6. Grinding operation	6.1 Angles to a square shoulder 6.2 Different form of cutting tool ▪ Side cutting tool ▪ Grooving tool ▪ Parting tool ▪ Forming tool ▪ V-thread tool ▪ Boring tool ▪ Drill bit

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 safe work practices 1.2 determined job requirement 1.3 selected wheels and accessories 1.4 performed grinding operations 1.5 checked cutting tools angles.
2. Underpinning knowledge	2.1 Type of grinding wheels. 2.2 Purpose of wheel dressing 2.3 Work holding devices. 2.4 Grinding machine accessories. 2.5 Types of coolant to be used. 2.6 Tool geometry. 2.7 Use of different cutting tools
3. Underpinning skills	3.1 Using measuring instruments. 3.2 Handling of grinding machine. 3.3 Selecting wheel.

	3.4 Dressing grinding wheel 3.5 Applying techniques to grind cutting tools. 3.6 Checking cutting tools angles.
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 5.3 materials relevant to the proposed activity 5.4 drawings and specifications relevant to the task.
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-02-L2-V1: Perform Lathe Operations
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to perform lathe operations. It includes preparing for work, setting up workpiece, performing lathe operations and cleaning and storing tools and equipment.
Nominal Hours	**120 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 quick change gear box as per job required. 2.6 Machine guards and coolant devices are checked according to work requirement.

3. Perform lathe operations	3.1 Cutting speeds, feeds and depth of cut are calculated as per job requirement. 3.2 Machine performance is checked conforming to the work requirement. 3.3 **Coolant** is applied to prevent over heating of workpiece and cutting tool as per manufacturer instruction. 3.4 **Lathe operations** are performed to produce component to specifications in the drawing. 3.5 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 of in accordance with environmental requirements. 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 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 ▪ Grooving tool ▪ Parting tool ▪ Forming tool ▪ V-thread tool ▪ boring tools 5.2 Centre drill 5.3 Drill bits 5.4 Reamers
6. Workpiece	6.1 Mild steel 6.2 Medium Carbon steel 6.3 Gun metal 6.4 Bright steel 6.5 Aluminum 6.6 Brass 6.7 Cast iron
7. Tools and equipment	7.1 Outside caliper 7.2 Inside caliper 7.3 Self-centering chuck 7.4 4-jaw chuck 7.5 Drill chuck 7.6 Chuck key 7.7 Box wrench 7.8 Drill chuck key 7.9 Surface gauge 7.10 Dial indicator with magnetic set 7.11 Mallet 7.12 Allen key set 7.13 Assorted open ended wrench 7.14 Adjustable wrench
8. Lathe accessories and attachment	8.1 Face plate 8.2 Steady rest 8.3 Follower rest 8.4 Lathe dog 8.5 Dead center 8.6 Live center/ Revolving center 8.7 Self-centering tool post 8.8 Tool holder 8.9 Grinding attachment
9. Coolant	9.1 Cutting fluid 9.2 Kerosine for aluminum

10. Lathe operations	10.1 Turning 10.2 Facing 10.3 Outside Thread Cutting 10.4 Grooving 10.5 Parting 10.6 Boring 10.7 Irregular shape facing and turning,
11. Measuring tools	11.1 measuring tape 11.2 Steel rule 11.3 Telescopic gauge 11.4 Vernier calipers / Digital Vernier calipers 11.5 Micrometer (inside, outside, depth) / Digital micrometer 11.6 Centre Gauge 11.7 Radius gauge 11.8 screw pitch 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 RPM (revolution per minute). 2.11 Feed. 2.12 Depth of cut. 2.13 Routine maintenance, SOP 2.14 Workpiece materials 2.15 Use of different coolant

	2.16 Use of different measuring tools 2.17 Thread terminology 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 Performing required operation. 3.9 Using measuring instruments and gauges 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 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-03-L2-V1: Operate Surface Grinding Machine**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to perform surface grinding operation. It includes preparing for work, selecting and setting up surface grinding machine, performing surface grinding operations and cleaning & storing tools and equipment.
Nominal Hours	**35 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 Sequence of operation is determined to produce component to specifications. 1.7 Work holding devices are selected according to the requirements of the operation.
2. Select and set up surface grinding machine	2.1 **Grinding wheels** are selected and dressed as per job requirement. 2.2 **Accessories** selected are appropriate techniques to the job requirement. 2.3 Grinding machine is setup and adjusted in accordance to job requirement. 2.4 Machine guards, coolant and dust extraction devices are checked according to worksite procedure.
3. Perform surface grinding operations	3.1 Workpiece is set up and hold or clamped to required level of accuracy as per specifications. 3.2 Feed and depth of cut are selected according to the job requirement. 3.3 Grinding operations are performed to produce component to specifications as per drawing. 3.4 Workpiece is checked / measured for conformance to specification using measuring

	tools and equipment.
4. Clean & store tools and equipment	4.1 Waste materials are disposed of in accordance with environmental requirements. 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 practices	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. Grinding wheels	3.1 Cylindrical type 3.2 Types of wheel ▪ Rough ▪ semi rough ▪ smooth ▪ dead smooth
4. Accessories	4.1 Magnetic bed 4.2 Vices 4.3 Clamps 4.4 Parallel bars 4.5 Wheel dresser 4.6 Balancing stand with weights
5. Grinding machine	5.1 Horizontal spindle surface grinder
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency.	
	Assessment required evidences that the candidate:

1. Critical aspects of competency	1.1 followed Occupational Safety and Health (OSH) in the workplace 1.2 determined job requirements 1.3 selected wheel and accessories 1.4 interpreted drawing 1.5 performed surface grinding operation 1.6 checked / measured workpiece.
2. Underpinning knowledge	2.1 Coolants and lubricants 2.2 Types and specification of grinding wheel. 2.3 Surface grinding machine parts and their functions. 2.4 Grade numbering of grinding wheel 2.5 Selection criteria of grinding wheels. 2.6 Work holding devices. 2.7 Surface grinding machine accessories, fixtures and attachments.
3. Underpinning skills	3.1 Selecting surface grinding wheel. 3.2 Setting feed and depth of cut. 3.3 Using techniques to performing surface grinding operations. 3.4 Using measuring instruments to check dimension, surface finishing level 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 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-L2-A1: Perform Boring and Honing Operations.**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to perform boring and honing operations. It includes preparing for work, setting up workpiece and cutting tools for boring operation, performing boring operations, setting up honing tools for honing operation, performing honing operations and cleaning and storing tools and equipment.
Nominal Hours	**70 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 followed throughout the work procedure; 1.2 **Personal Protective Equipment (PPE)** is collected and worn as per job requirement; 1.3 **Materials** for boring are selected conforming to the job requirement; 1.4 Performed **routine maintenance** to prepare the machine for required operation; 1.5 Drawings are interpreted to produce component to specifications; 1.6 Sequence of operation is determined to produce component to specifications; 1.7 **Accessories** are selected according to the requirements of the operation.
2. Setup workpiece and cutting tools for boring operation	2.1 Workpiece is setup and clamped to required level of accuracy using **instruments / equipment** according to work site procedures; 2.2 **Cutting tools** for boring are setup in accordance to the job requirement; 2.3 Accessories are used as appropriate to the requirements of the operation.
3. Perform boring operations	3.1 Component of boring and honing machine is set up and adjusted in accordance with the work specification; 3.2 **Boring operations** are carried out conforming to drawing specifications; 3.3 Workpiece is checked and measured using **measuring tools,** equipment and gauges.
4. Setup honing tools for honing operation	4.1 Honing tools are setup in accordance to the job Requirement; 4.2 Accessories are used as appropriate to the

	requirements of the operation.
5. Perform honing operations	5.1 Component of boring and honing machine is set up and adjusted in accordance with the work specification; 5.2 Honing operations are carried out conforming to drawing specifications; 5.3 Workpiece is checked and measured using measuring Tools**,** equipment and gauges.
6. Clean and store tools and equipment	6.1 Waste materials are disposed of in accordance with environmental requirements; 6.2 Cleaning of equipment is performed in accordance with work site procedures; 6.3 Tools and equipment are stored safely in appropriate location according to standard procedures.
Range of Variables	
Variable	**Range** (may include but not limited to):
Safe work practice	2.1
2. Personal Protective Equipment (PPE)	2.2 Apron 2.3 Mask 2.4 Helmet 2.5 Hand gloves 2.6 Goggles / eye shields 2.7 Safety shoes
3. Materials	3.1 Cast Iron 3.2 Cast alloy
4. Routine maintenance	4.1 Cleaning of dust and chips 4.2 Checking and adjust machine guards 4.3 Checking and use coolant and lubricant 4.4 Checking machine performance 4.5 Checking proper ventilation and lighting
5. Accessories	5.1 Dial Indicator 5.2 Vice 5.3 Clamping kit
6. Tools and equipment	6.1 Adjustable Wrench 6.2 Spanner set 6.3 Tool holder

7. Cutting tools	7.1 Boring tool 7.2 Honing tool
8. Measuring tools	8.1 Vernier calipers 8.2 Micrometer 8.3 Telescopic gauge 8.4 Inside caliper 8.5 Optical gauge 8.6 Bore 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 interpreted drawing 1.3 determined job requirements 1.4 selected boring, honing tools and accessories 1.5 performed boring and honing operations 1.6 checked / measured workpiece.
2. Underpinning knowledge	2.1 Functions of different parts of boring and honing machine. 2.2 Work holding devices. 2.3 Accessories, fixtures and attachments of boring and honing machine. 2.4 Cutting speed, feed, depth of cut and RPM. 2.5 Safe use of boring and honing tools 2.6 Procedure to set up workpiece 2.7 Routine maintenance
3. Underpinning skills	3.1 Interpreting drawings. 3.2 Selecting proper coolant and lubricants. 3.3 Selecting and positioning cutting tools and workpiece. 3.4 Calculating and selecting cutting parameters, including speeds, feeds and depth of cut. 3.5 Applying techniques of boring and honing machine operation. 3.6 Using measuring instruments and gauges.

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 drawings and specifications relevant to the task 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.
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

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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-2 in **Machine Shop Practice** is Developed by NSDA on 10 February, 2025.

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Validation of Competency Standard

The Competency Standards for National Skills Certificate Level-2 in **Machine Shop Practice** is Validated by NSDA on 12 February, 2025.

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References:

a. Competency standard of Australia with web address https://www.Training.gov.au
b. Competency standard of Philippine with web address https://www.tesda.gov.ph