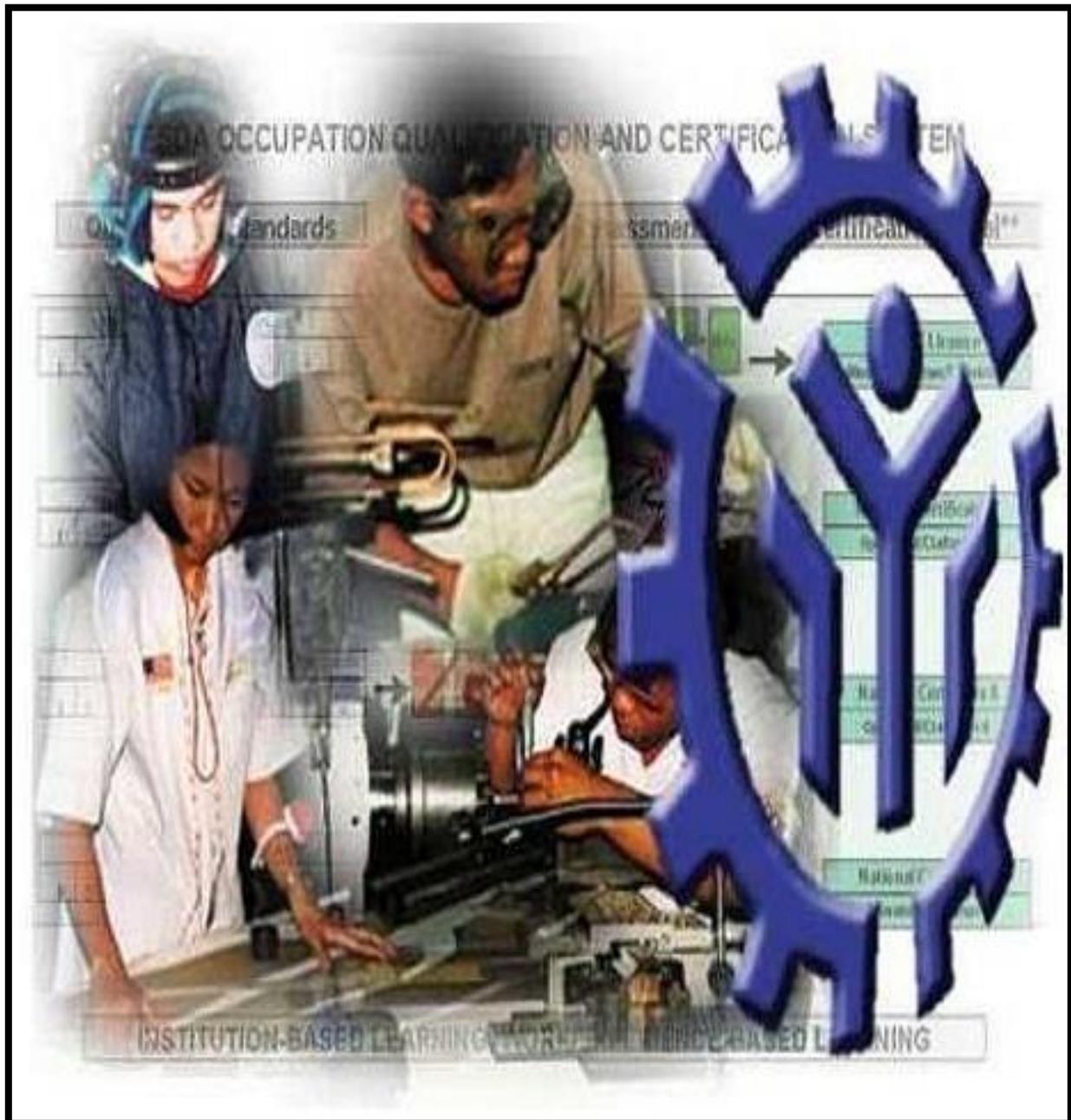


TRAINING REGULATIONS

MACHINING NC I



METALS AND ENGINEERING SECTOR

TECHNICAL EDUCATION AND SKILLS DEVELOPMENT AUTHORITY

East Service Road, South Luzon Expressway (SLEX), Taguig City, Metro Manila

*Technical Education and Skills Development Act of 1994
(Republic Act No. 7796)*

Section 22, "Establishment and Administration of the National Trade Skills Standards" of the RA 7796 known as the TESDA Act mandates TESDA to establish national occupational skill standards. The Authority shall develop and implement a certification and accreditation program in which private industry group and trade associations are accredited to conduct approved trade tests, and the local government units to promote such trade testing activities in their respective areas in accordance with the guidelines to be set by the Authority.

The Training Regulations (TR) serves as basis for:

1. Development of curriculum and assessment tools
2. Registration and delivery of training programs; and
3. Establishment of competency assessment and certification arrangements.

Each TR has four sections:

- Section 1 **Definition of Qualification** - describes the qualification and defines the competencies that comprise the qualification.
- Section 2 **The Competency Standards** format was revised to include the Required Knowledge and Required Skills per element. These fields explicitly state the required knowledge and skills for competent performance of a unit of competency in an informed and effective manner. These also emphasize the application of knowledge and skills to situations where understanding is converted into a workplace outcome.
- Section 3 **Training Arrangements** – contain the information and requirements which serve as bases for training providers in designing and delivering competency-based curriculum for the qualification. The revisions to Section 3 entail identifying the Learning Activities leading to achievement of the identified Learning Outcome.
- Section 4 **Assessment and Certification Arrangements** - describe the policies governing assessment and certification procedures for the qualification.

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TRAINING REGULATIONS FOR MACHINING NC I

SECTION 1 MACHINING NC I QUALIFICATION

The Machining NC I Qualification consists of competencies that a person must achieve to perform basic set up and operate a variety of machine tools to perform precision machining operations.

Specifically, this Training Regulations in Machining covers turning, milling, precision grinding, bench work, shape workpiece, and perform basic welding.

The Units of Competency comprising this qualification include the following:

Code No.	BASIC COMPETENCIES
400311101	Receive and respond to workplace communication
400311102	Work with others
400311103	Solve/address routine problems
400311104	Enhance self-management skills
400311105	Support innovation
400311106	Access and maintain information
400311107	Follow occupational safety and health policies and procedures
400311108	Apply environmental work standards
400311109	Adopt entrepreneurial mindset in the workplace
Code No.	COMMON COMPETENCIES
MEE722201	Apply safety practices
MEE722202	Interpret working drawings and sketches
MEE722203	Select and cut workshop materials
MEE722204	Perform shop computations (Basic)
MEE722205	Measure workpiece (Basic)
MEE722206	Perform routine housekeeping
MEE722211	Perform preventive and corrective maintenance
Code No.	CORE COMPETENCIES
MEE722311	Perform bench work (Basic)
MEE722312	Turn workpiece
MEE722313	Mill workpiece
MEE722314	Grind workpiece
MEE722315	Shape workpiece
MEE722316	Repair workpiece

A person who has achieved this qualification is competent to be:

- Machinist
- Machinist helper
- Bench worker/fitter
- Lathe machine operator
- Milling machine operator
- Grinding machine operator
- Shaper machine operator

SECTION 2 COMPETENCY STANDARDS

This section gives the details of the contents of the basic, common and core units of competency required in **MACHINING NC I**.

BASIC COMPETENCIES

UNIT OF COMPETENCY : **RECEIVE AND RESPOND TO WORKPLACE COMMUNICATION**

UNIT CODE : **400311101**

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to receive, respond and act on verbal and written communication.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Follow routine spoken messages	1.1 Required information is gathered by listening attentively and correctly interpreting or understanding information/ instructions 1.2 Instructions/ information are recorded in accordance with workplace requirements 1.3 Instructions are acted upon immediately in accordance with information received 1.4 Clarification is sought from workplace supervisor on all occasions when any instruction/ information is not clear	1.1 Organizational policies/ guidelines in regard to processing internal/external information 1.2 Ethical work practices in handling communications 1.3 Overview of the Communication process 1.4 Effective note-taking and questioning techniques	1.1 Conciseness in receiving and clarifying messages/ information/ communication 1.2 Accuracy in recording messages/ information 1.3 Basic communication skills 1.4 Active-listening Skills 1.5 Note-taking skills 1.6 Clarifying and probing questions (questioning skills)
2. Perform workplace duties following written notices	2.1 <i>Written notices</i> and instructions are read and	2.1 Organizational guidelines in regard to	2.1 Conciseness in receiving and clarifying

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	<p>interpreted correctly in accordance with <i>organizational guidelines.</i></p> <p>2.2 Routine written instructions are followed in sequence.</p> <p>2.3 Feedback is given to workplace supervisor based on the instructions/ information received.</p>	<p>processing internal/ external information</p> <p>2.2 Ethical work practices in handling communications</p> <p>2.3 Overview of the Communication process</p> <p>2.4 Effective questioning techniques (clarifying and probing)</p>	<p>messages/ information/ communication</p> <p>2.2 Accuracy in recording messages/ information</p> <p>2.3 Clarifying and probing questions (Questioning Skills)</p> <p>2.4 Skills in reading and recording and labeling data</p> <p>2.5 Skills in locating information</p>

RANGE OF VARIABLES

VARIABLE	RANGE
1. Written notices and instructions	May include but not limited to: 1.1 Written work instructions 1.2 Internal memos/memorandum 1.3 Business letters 1.4 External communications 1.5 Electronic mail 1.6 Briefing notes 1.7 General correspondence 1.8 Marketing materials 1.9 Guidelines/Circulars
2. Organizational guidelines	May include but not limited to: 2.1 Information documentation procedures 2.2 Company guidelines and procedures 2.3 Standard Operating Procedure (SOPs) 2.4 Organization manuals 2.5 Departmental Policies and Procedures Manual 2.6 Service manual

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Demonstrated knowledge and understanding of organizational procedures in handling verbal and written communications 1.2 Received and acted on verbal messages and instructions correctly and efficiently 1.3 Demonstrated ability in recording instructions/information 1.4 Utilized effective clarifying and probing techniques where necessary
2. Resource Implications	The following resources should be provided: 2.1 Pens 2.2 Note pads 2.3 Computer (if applicable)
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Demonstration on communication skills (e. g., role-playing) 3.3 Oral questioning/Interview 3.3 Written Test
4. Context for Assessment	4.1 Competency may be assessed individually in the actual workplace or in a simulated environment in TESDA-accredited institutions

UNIT OF COMPETENCY : WORK WITH OTHERS

UNIT CODE : 400311102

UNIT DESCRIPTOR : This unit covers the skills, knowledge and attitudes required in working as member of a team, interacting with co-members and performing one's role in the team.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Develop effective workplace relationships	1.1 <i>Duties and responsibilities</i> are done in a positive manner to promote cooperation and good relationship. 1.2 Assistance is sought from <i>workgroup</i> when difficulties arise and addressed through discussions. 1.3 <i>Feedback</i> provided by others in the team is encouraged, acknowledged and acted upon 1.4 Differences in personal values and beliefs are respected and acknowledged during interaction.	1.1 One's role, duties and responsibilities in the workplace 1.2 Acknowledging/ receiving and giving feedback 1.3 Valuing respect and empathy in the workplace 1.4 Workplace communication protocols 1.5 Teamwork 1.6 Collaboration and teambuilding within the enterprise	1.1 Communication skills – oral and written (e. g., requesting advice, receiving feedback) 1.2 Ability to relate to/interact with people from a range of social and cultural backgrounds
2. Contribute to work group activities	2.1 <i>Support is provided to team members</i> to ensure workgroup goals are met. 2.2 Constructive contributions to workgroup goals and tasks are made according to <i>organizational requirements</i> . 2.3 Information relevant to work is shared with team members to ensure designated goals are met.	2.1 Importance of creative collaboration, social perceptiveness and problem sensitivity in the workplace 2.2 Organizational Requirements 2.3 importance of initiative and dedication in group process 2.4 Office and workplace technologies and automation (hardware, software systems)	2.1 Communication skills – oral and written (e. g., requesting advice, receiving feedback) 2.2 Organizing work priorities and arrangements 2.3 Team player skills 2.4 Technology skills including the ability to select and use technology appropriate to a task

RANGE OF VARIABLES

VARIABLE	RANGE
1. Duties and responsibilities	May include but not limited to: 1.1 Job description and employment arrangements 1.2 Organization's policy relevant to work role 1.3 Organizational structures 1.4 Supervision and accountability requirements including OHS 1.5 Enterprise code of conduct
2. Work group	May include but not limited to: 2.1 Supervisor or manager 2.2 Peers/work colleagues and clients 2.3 Other members of the organization
3. Feedback	May include but not limited to: 3.1 Formal/Informal performance appraisal 3.2 Obtaining feedback from supervisors and colleagues and clients 3.3 Personal, reflective behavior strategies 3.4 Routine organizational methods for monitoring service delivery
4. Providing support to team members	May include but not limited to: 4.1 Explaining/clarifying 4.2 Helping colleagues 4.3 Providing encouragement 4.4 Providing feedback to another team member 4.5 Undertaking extra tasks if necessary
5. Organizational requirements	May include but not limited to: 5.1 Goals, objectives, plans, system and processes 5.2 Legal and organization policy/guidelines 5.3 OHS policies, procedures and programs 5.4 Ethical standards 5.5 Defined resources parameters 5.6 Quality and continuous improvement processes and standards

EVIDENCE GUIDE

<p>1. Critical aspects of competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Provided support to team members to ensure goals are met 1.2 Acted on feedback from clients and colleagues 1.3 Demonstrated quality/active participation in team meetings and activities
<p>2. Resource Implications</p>	<p>The following resources should be provided:</p> <ul style="list-style-type: none"> 2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place 2.2 Materials relevant to the proposed activity or task
<p>3. Methods of Assessment</p>	<p>Competency in this unit may be assessed through:</p> <ul style="list-style-type: none"> 3.1 Written Test 3.2 Role play 3.3 Interview/Oral questioning 3.4 Structured and unstructured activity
<p>4. Context for Assessment</p>	<ul style="list-style-type: none"> 4.1 Competency assessment may occur in workplace or any appropriately simulated environment 4.2 Assessment shall be observed while task are being undertaken whether individually or in group

UNIT OF COMPETENCY : SOLVE/ADDRESS ROUTINE PROBLEMS

UNIT CODE : 400311103

UNIT DESCRIPTOR : This unit of covers the knowledge, skills and attitudes required to solve problems in the workplace including the application of problem solving techniques and to determine and resolve the root cause of routine problems.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify the problem	1.1 Desired operating/output parameters and expected quality of products/services are identified. 1.2 The nature of the problem by observation on routines are defined. 1.3 Problems are stated and specified clearly.	1.1 Competence includes mastery of knowledge and understanding of the process, normal operating parameters, and product quality to recognize non-standard situations 1.2 Competence to include the ability to apply and explain fundamental causes of problems routine problems and to determine the corrective actions. 1.3 Relevant equipment and operational processes 1.4 Enterprise goals, targets and measures 1.5 Enterprise quality OHS and environmental requirement 1.6 Enterprise information systems and data collation 1.7 Industry codes and standards	1.1 Using range of formal problem-solving techniques (e.g., planning, attention, simultaneous and successive processing of information). 1.2 Identifying and clarifying the nature of the problem.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Assess fundamental causes of the problem	2.1 Problem-solving tool appropriate to the problem and the context is selected 2.2 Possible causes based on experience and the use of problem-solving tools/ basic analytical techniques are identified 2.3 Possible fundamental causes of problems are specified.	2.1 Competence includes a thorough knowledge and understanding of the process, normal operating parameters, and product quality to recognize non-standard situations 2.2 Competence to include the ability to apply and explain fundamental causes of problems routine problems and to determine the corrective actions. 2.3 Relevant equipment and operational processes 2.4 Enterprise goals, targets and measures 2.5 Enterprise quality OHS and environmental requirement 2.6 Enterprise information systems and data collation 2.7 Industry codes and standards	2.1 Using range of formal problem-solving techniques (e.g., planning, attention, simultaneous and successive processing of information). 2.2 Identifying extent and causes of procedural problems.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Determine corrective action	3.1 All possible options are considered for resolution of the routine problem. 3.2 Corrective actions are determined to resolve the problem and possible future causes 3.3 Action plans are developed identifying measurable objectives, resource needs and timelines in accordance with safety and operating procedures	3.1 Competence includes a thorough knowledge and understanding of the process, normal operating parameters, and product quality to recognize non-standard situations 3.2 Competence to include the ability to apply and explain, sufficient for the identification of fundamental cause, determining the corrective action and provision of recommendations 3.3 Relevant equipment and operational processes 3.4 Enterprise goals, targets and measures 3.5 Enterprise quality OHS and environmental requirement 3.6 Principles of decision making strategies and techniques 3.7 Enterprise information systems and data collation 3.8 Industry codes and standards	3.1 Using range of formal problem-solving techniques. 3.2 Identifying and clarifying the nature of the problem. 3.3 Devising and applying the best possible solution to a problem. 3.4 Evaluating the solution
4. Communicate action plans and recommendations to routine problems	4.1 Report on recommendations are prepared. 4.2 Recommendations are presented to appropriate person.	4.1 Competence includes a thorough knowledge and understanding of the process, normal operating	4.1 Using range of formal problem solving techniques 4.2 Identifying and clarifying the nature of the

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	4.3 Recommendations are followed-up, if required.	parameters, and product quality to recognize non-standard situations 4.2 Competence to include the ability to apply and explain, sufficient for the identification of fundamental cause, determining the corrective action and provision of recommendations 4.3 Relevant equipment and operational processes 4.4 Enterprise goals, targets and measures 4.5 Enterprise quality, OHS and environmental requirement 4.6 Principles of decision making strategies and techniques 4.7 Enterprise information systems and data collation 4.8 Industry codes and standards	problem 4.3 Devising the best possible solution to a routine problem 4.4 Evaluating the solution 4.5 Developing action plans to resolving and managing routine problems

RANGE OF VARIABLES

VARIABLE	RANGE
1. Problem	May include but not limited to: 1.1 Routine/non – routine processes and quality problems 1.2 Equipment selection, availability and failure 1.3 Teamwork and work allocation problem 1.4 Safety and emergency situations and incidents
2. Basic analytical techniques	May include but not limited to: 2.1 Brainstorming 2.2 Case Analysis 2.3 Cause and effect diagrams 2.4 Pareto analysis 2.5 SWOT analysis 2.6 Gant chart, Pert CPM and graphs 2.7 Scattergram
3. Action plans	May include but not limited to: 3.1 Priority requirements 3.2 Measurable objectives 3.3 Resource requirements 3.4 Timelines 3.5 Co-ordination and feedback requirements 3.6 Safety requirements 3.7 Risk assessment 3.8 Environmental requirements
4. Appropriate person	May include but not limited to: 4.1 Supervisor or manager 4.2 Peers/work colleagues 4.3 Other members of the organization

EVIDENCE GUIDE

<p>1. Critical aspects of Competency</p>	<p>Assessment requires evidence that the candidate:</p> <ol style="list-style-type: none"> 1.1 Identified the problem. 1.2 Determined the fundamental causes of the problem. 1.3 Determined the correct / preventive action. 1.4 Developed action plans in managing routine problems. <p>These aspects may be best assessed using project-based learning mode of assessment and case formulation.</p>
<p>2. Resource Implications</p>	<p>2.1 Assessment will require access to a workplace over an extended period, or a suitable method of gathering evidence of operating ability over a range of situations.</p>
<p>3. Methods of Assessment</p>	<p>Competency in this unit may be assessed through:</p> <ol style="list-style-type: none"> 3.1 Case Formulation 3.2 Life Narrative Inquiry (Interview) 3.3 Standardized test <p>The unit will be assessed in a holistic manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations, which will include disruptions to normal, smooth operation. Simulation may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual workplace and will include walk through of the relevant competency components.</p> <p>These assessment activities should include a range of problems, including new, unusual and improbable situations that may have happened.</p>
<p>4. Context for Assessment</p>	<p>4.1 Competency may be assessed individually in the actual workplace or simulation environment in TESDA accredited institutions.</p>

UNIT OF COMPETENCY : ENHANCE SELF-MANAGEMENT SKILLS

UNIT CODE : 400311104

UNIT DESCRIPTOR : This unit covers the knowledge, skills, and attitudes in applying the ability to regulate actions, make good decisions, and show appropriate behavior based on self-awareness.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Set personal and career goals	1.1 The difference between personal and career goals are described. 1.2 Clear and concise personal and career goals are developed. 1.3 Characteristics of motivational goals according to Locke & Latham are identified.	1.1 Definition of personal goals and career goals 1.2 SMART Model for goal setting 1.3 Five principle of goal setting according to Locke & Latham (Clarity, Challenge, Commitment, Feedback, and Task complexity)	1.1 Setting of personal and career goals 1.2 Defining, creating, and mapping personal and career goals using SMART Model for goal setting 1.3 Applying goal setting principles to personal and career goals
2. Recognize emotions	2.1 Influence that people, situations and events have on emotions are described. 2.2 Importance of responding with appropriate emotions are explained. 2.3 Influences on and consequences of emotional responses in a social and work-related contexts are examined.	2.1 Common positive and negative emotions manifested in the workplace 2.2 Professional and non-professional behaviors in the workplace 2.3 Triggers and implications of positive and negative emotions in the workplace	2.1 Identifying sensitively the positive and negative emotions in the workplace 2.2 Responding with appropriate emotions in the workplace 2.3 Identifying possible consequences of inappropriate emotional responses in a social and work-related context
3. Describe oneself as a learner	3.1 Factors and strategies that assist learning are identified and described. 3.2 Preferred learning styles according to VAK Learning Style Model and Kolb's	3.1 Kolb's Theory of Learning Styles (Converger, Diverger, Assimilator, Accommodator) 3.2 VAK Learning Style Model (Visual, Auditory,	3.1 Identifying factors and strategies that assist learning 3.2 Applying learning styles to positively influence school/work

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	<p>Theory of Learning Styles are identified.</p> <p>3.3 Range of <i>learning strategies</i> appropriate to specific tasks and describe work practices that assist their learning are identified and chosen.</p>	<p>Kinesthetic)</p> <p>3.3 Range of learning strategies appropriate to specific tasks and describe work practices that assist their learning</p>	<p>performance</p> <p>3.3 Using appropriate learning strategies to improve study habits and learning</p>

RANGE OF VARIABLES

VARIABLE	RANGE
1. Personal goals	May include but not limited to: 1.1 Graduate from Tech-Voc training 1.2 Buy a car 1.3 Travel around the world
2. Career goals	May include but not limited to: 2.1 Graduate from Tech-Voc training 2.2 Graduate from college 2.3 Buy a car 2.4 Retire at 50 years old
3. Emotions	Positive emotions may include but not limited to: 3.1 Joy 3.2 Gratitude 3.3 Hope 3.4 Serenity Negative emotions may include but not limited to: 3.5 Anger 3.6 Fear 3.7 Disgust 3.8 Sadness
4. Social and work-related contexts	May include professional behavior such as– 4.1 Committed to developing and improving their skills 4.2 Professionals get the job done 4.3 They keep their word and deliver what they promise. May include non-professional behavior such as– 4.4 They engage in office politics 4.5 Bluffing and misrepresenting their skills 4.6 Blaming a colleague
5. Learning styles	May include but not limited to: 5.1 Visual 5.2 Auditory 5.3 Kinesthetic 5.4 Converger 5.5 Diverger 5.6 Assimilator 5.7 Accommodator
6. Learning strategies	May include but not limited to: 6.1 Explain and describe ideas with many details 6.2 Switch between ideas while studying 6.3 Use specific examples to understand abstract ideas

EVIDENCE GUIDE

<p>1. Critical aspects of Competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Identified the problem. 1.2 Determined the fundamental causes of the problem. 1.3 Determined the correct / preventive action. 1.4 Developed action plans in managing routine problems. <p>These aspects may be best assessed using project-based learning mode of assessment and case formulation.</p>
<p>1. Critical aspects of Competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Developed SMART personal and career goals 1.2 Applied goal setting principles 1.3 Identified sensitively the positive and negative emotions in the workplace 1.4 Responded with appropriate emotions in the workplace 1.5 Identified possible consequences of inappropriate emotional responses in a social and work-related context 1.6 Applied learning styles to positively influence school/work performance 1.7 Developed reflective practice through realization of limitations, likes/ dislikes; through showing of self-confidence
<p>2. Resource Implications</p>	<p>The following resources for should be provided:</p> <ul style="list-style-type: none"> 2.1 Access to workplace and resources
<p>3. Methods of Assessment</p>	<p>Competency in this unit may be assessed through:</p> <ul style="list-style-type: none"> 3.1 Demonstration or simulation with oral questioning (ex. how to recognize emotions) 3.2 Case problems involving workplace diversity issues 3.3 Third-party report
<p>4. Context for Assessment</p>	<ul style="list-style-type: none"> 4.1 Competency assessment may occur in workplace or any appropriately simulated environment

UNIT OF COMPETENCY : SUPPORT INNOVATION

UNIT CODE : 400311105

UNIT DESCRIPTOR : This unit of covers the knowledge, skills and attitudes required to identify, recognize and support innovation.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify the need for innovation in one's area of work	1.1 The value of innovative practices in the workplace is recognized. 1.2 Creativity in innovation in one's scope of work is applied. 1.3 The need for innovation in own scope of work is recognized.	1.1 Clear-cut definition of innovation 1.2 Current practice in own scope of work 1.3 Workplace procedures	1.1 Contributing in brainstorming session 1.2 Examining current practice in one's scope of work 1.3 Identifying issues and concerns of one's scope of work
2. Recognize innovative and creative ideas	2.1 Opportunities within the team are identified to develop innovation. 2.2 Creative ideas of coworkers pertaining to work practices are analyzed. 2.3 Environment conducive for learning and innovating is maintained.	2.1 Support required to generate creative ideas 2.2 Difference between innovation and creativity 2.3 Innovative climate in one's scope of work	2.1 Identifying resources required for creativity and innovation 2.2 Examining potential obstacles to and opportunities for creativity and innovation 2.3 Communicating creative ideas of co-workers
3. Support individuals' access to flexible and innovative ways of working	3.1 Individuals and key people are reinforced to identify innovative ideas to achieve outcomes. 3.2 Sharing of best practices using flexible and innovative ways of working is accomplished. 3.3 Obstacles to progress in implementing flexible and innovative ways of working are recognized.	3.1 The role of employees/workers in the improvement of practices in the organization 3.2 Best practices using flexible and innovative ways of working 3.3 Obstacles in implementing innovation in one's scope of work	3.1 Encouraging co-workers to generate and develop ideas 3.2 Evaluating potential obstacles to and opportunities for creativity and innovation 3.3 Sharing of best practices related to innovation and creativity

RANGE OF VARIABLES

VARIABLE	RANGE
1. Innovative practices	May include but not : 1.1 Self-directed support 1.2 Community based services 1.3 Working within a collaborative arrangement 1.4 Making scope of work more efficient
2. Innovation	May include: 2.1 New ideas 2.2 Original ideas 2.3 Different ideas 2.4 Methods or tools

EVIDENCE GUIDE

<p>1. Critical aspects of Competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Identified need for innovation in the area of work 1.2 Recognized innovative and creative ideas 1.3 Pursued agreement for flexible and innovative ways of working 1.4 Supported individuals and people to access flexible and innovative ways of working
<p>2. Resource Implications</p>	<p>Specific resources for assessment</p> <ul style="list-style-type: none"> 2.1 Evidence of competent performance should be obtained by observing an individual in an information management role within the workplace or operational or simulated environment.
<p>3. Methods of Assessment</p>	<p>Competency in this unit may be assessed through:</p> <ul style="list-style-type: none"> 3.1 Written Test 3.2 Interview <p>The unit will be assessed in a holistic manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations, which will include disruptions to normal, smooth operation. Simulation may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual workplace and will include walk through of the relevant competency components.</p>
<p>4. Context for Assessment</p>	<ul style="list-style-type: none"> 4.1 Competency may be assessed individually in the actual workplace or simulation environment in TESDA accredited institutions

UNIT OF COMPETENCY : ACCESS AND MAINTAIN INFORMATION

UNIT CODE : 400311106

UNIT DESCRIPTOR : This unit of covers the knowledge, skills and attitudes required to identify, gather, interpret and maintain information.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify and gather needed information	1.1 Required information is identified based on requirements. 1.2 Sources to produce required information are identified and accessed. 1.3 Report information is collected, organized and recorded. 1.4 Organize information is collected in a way that enables easy access and retrieval by other staff.	1.1 Policies, procedures and guidelines relating to information handling in the public and private sector, including confidentiality, privacy, security, freedom of information 1.2 Data collection and management procedures 1.3 Cultural aspects of information and meaning 1.4 Sources of public sector work-related information 1.5 Public/private sector standards	1.1 Handling policies, procedures and guidelines relating to information handling in the public sector, including confidentiality, privacy, security, freedom of information 1.2 Collecting data and managing procedures 1.3 Practicing cultural aspects of information and meaning 1.4 Using public/private sector standards
2. Search for information on the internet or an intranet	2.1 Engine is search to find and select appropriate information. 2.2 Suitable techniques is use to make it easier to find useful information and to pass it on to others. 2.3 Records are use where useful information came from. 2.4 Results are used for searches of useful information. 2.5 Search engine is chosen appropriate for the information	2.1 Find and select appropriate information 2.3 Techniques in finding useful information Records are use where useful information came from 2.3 Search engines for information	2.1 Finding and selecting search engine to find and select appropriate information 2.2 Using suitable techniques to find useful information easier 2.3 Using records 2.4 Carrying out Searches

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	<p>that is needed.</p> <p>2.6 Searches are carry out as per requirements.</p>		
3. Examine information	<p>3.1 Information and its sources are evaluated for relevance and validity to business and/or client requirements.</p> <p>3.2 Information is examined as required to identify key issues.</p> <p>3.3 Detailed evaluation of information is carried out as required using relevant techniques including mathematical calculations.</p>	<p>3.1 Data evaluation procedures</p> <p>3.2 Cultural aspects of information and meaning</p> <p>3.3 Sources of public sector work-related information</p> <p>3.4 Public sector standards</p>	<p>3.1 Evaluating data</p> <p>3.2 Practicing cultural aspects of information and meaning</p> <p>3.3 Using public sector standards</p>
4. Secure information	<p>4.1 Basic file-handling techniques are used for the software</p> <p>4.2 Techniques is used to handle, organize and secure information</p>	<p>4.1 Policies, procedures and guidelines relating to information handling in the public sector, including confidentiality, privacy, security, freedom of information</p> <p>4.2 Basic file-handling techniques</p> <p>4.3 Techniques in handling, organizing and saving files</p> <p>4.4 Electronic and manual filing systems</p>	<p>4.1 Handling policies, procedures and guidelines relating to information handling in the public sector, including confidentiality, privacy, security, freedom of information</p> <p>4.2 Using basic file-handling techniques is used for the software</p> <p>4.3 Using different techniques in handling, organizing and saving files</p> <p>4.4 Using electronic and manual filing systems</p>

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
5. Manage information	<p>5.1 Information and records are maintained to ensure data and system integrity using a range of standard and complex information systems and operations.</p> <p>5.2 Routine data and records are reconciled as required.</p> <p>5.3 Inadequacies in system/s relating to information retrieval are identified and corrected or reported to relevant staff as required.</p>	<p>5.1 Policies, procedures and guidelines relating to information handling in the public sector, including confidentiality, privacy, security, freedom of information</p> <p>5.2 Data collection and management procedures</p> <p>5.3 Organizational information handling and storage procedures</p> <p>5.4 Cultural aspects of information and meaning</p> <p>5.5 Sources of public sector work-related information</p> <p>5.6 Public sector standards</p> <p>5.7 Databases and data storage systems</p>	<p>5.1 Handling policies, procedures and guidelines relating to information handling in the public sector, including confidentiality, privacy, security, freedom of information</p> <p>5.2 Collecting data and managing procedures</p> <p>5.3 Handling organizational information and storage procedures</p> <p>5.4 Practicing cultural aspects of information and meaning</p> <p>5.5 Using public sector standards</p> <p>5.6 Managing databases and data storage systems</p>

RANGE OF VARIABLES

VARIABLE	RANGE
1. Information	May include but not limited to: 1.1 Property 1.2 Organizational 1.3 Technical reference
2. Search engine	May include but not limited to: 2.1 Crawler-based search engine 2.1.1 Google 2.1.2 AlltheWeb 2.1.2 AltaVista 2.2 Human-powered directories 2.2.1 Yahoo directory 2.2.2 Open directory 2.2.3 Looksmart
3. Sources	May include but not limited to: 3.1 Other IT systems 3.2 Manually created 3.3 Within own organization 3.4 Outside own organization 3.5 Geographically remote

EVIDENCE GUIDE

<p>1. Critical aspects of Competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Identified and gathered needed information 1.2 Searched for information on the internet or an intranet 1.3 Studied and interpreted information 1.4 Handled files 1.5 Maintained information
<p>2. Resource Implications</p>	<p>Specific resources for assessment</p> <ul style="list-style-type: none"> 2.1 Evidence of competent performance should be obtained by observing an individual in an information management role within the workplace or operational or simulated environment.
<p>3. Methods of Assessment</p>	<p>Competency in this unit may be assessed through:</p> <ul style="list-style-type: none"> 3.1 Written Test 3.2 Interview 3.3 Portfolio <p>The unit will be assessed in a holistic manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations, which will include disruptions to normal, smooth operation. Simulation may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual workplace and will include walk through of the relevant competency components.</p>
<p>4. Context for Assessment</p>	<ul style="list-style-type: none"> 4.1 In all workplace, it may be appropriate to assess this unit concurrently with relevant teamwork or operation units.

UNIT OF COMPETENCY : FOLLOW OCCUPATIONAL SAFETY AND HEALTH POLICIES AND PROCEDURES

UNIT CODE : 400311107

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes to identify relevant occupational safety and health policies and procedures, perform relevant occupational safety and health procedures, and comply with relevant occupational safety and health policies and standards.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify relevant occupational safety and health policies and procedures	1.1 Related <i>occupational safety and health risks and hazards</i> are recognized based on <i>OSH work standards</i> . 1.2 <i>OSH requirements/regulations</i> towards work are determined in accordance to workplace policies and procedures. 1.3 <i>Incident/Emergency procedures</i> relevant to workplace are identified based on relevant OSH work standards.	1.1 Occupational safety and health risks and hazards 1.2 OSH work standards 1.3 Government approved Occupational Safety and Health Policies and regulations 1.4 Terms related to occupational safety and health 1.5 Workplace process and procedures 1.6 Standard emergency plan and procedures	1.1 Observation skills 1.2 Critical thinking skills 1.3 Communication skills

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Perform relevant occupational safety and health procedures	2.1 Safety devices are checked in accordance with workplace OSH work standards. 2.2 OSH Work instructions are followed in accordance with workplace policies and procedures. 2.3 Personal protective equipment, materials, tools, machinery, and equipment are utilized according to OSH work standards.	2.1 OSH Work instructions Personal protective equipment 2.2 Safe handling procedures of tools, equipment and materials 2.3 Standard emergency plan and procedures 2.4 Different OSH control measures 2.5 Standard accident and illness reporting procedures	2.1 Communication skills 2.2 Knowledge management 2.3 Organizing skills 2.4 Observation skills
3. Comply with relevant occupational safety and health policies and standards	3.1 Preventive Control Measures are identified in accordance with OSH work standards. 3.2 OSH requirements are obeyed in accordance with workplace policies and procedures. 3.3 Incident/Emergency procedures are executed based on OSH Procedures.	3.1 OSH Preventive Control Measures 3.2 Principles of 5S 3.3 Environmental requirements relative to industrial wastes disposal 3.4 OSH requirements relative to safe handling and disposal of materials 3.5 Personal hygiene practices	3.1 Communication skills 3.2 Knowledge management 3.3 Organizing skills 3.4 Critical thinking skills 3.5 Observation skills

RANGE OF VARIABLES

VARIABLE	RANGE
1. Occupational Safety and Health Risks and Hazards	May include: <ul style="list-style-type: none"> 1.1 Physical hazards – impact, illumination, pressure, noise, vibration, extreme temperature, radiation 1.2 Biological hazards- bacteria, viruses, plants, parasites, mites, molds, fungi, insects 1.3 Chemical hazards – dusts, fibers, mists, fumes, smoke, gasses, vapors 1.4 Ergonomics 1.5 Psychological factors – over exertion/ excessive force, awkward/static positions, fatigue, direct pressure, varying metabolic cycles 1.6 Physiological factors – monotony, personal relationship, work out cycle 1.7 Safety hazards (unsafe workplace condition) – confined space, excavations, falling objects, gas leaks, electrical, poor storage of materials and waste, spillage, waste and debris 1.8 Unsafe workers’ act (Smoking in off-limited areas, Substance and alcohol abuse at work)
2. OSH Work Standards	May include: <ul style="list-style-type: none"> 2.1 OSHS Rule 1090 Hazardous Materials 2.2 OSHS Rule Gas & Electric Welding and Cutting Operations 2.3 OSHS Rule 1120 Hazardous Work Processes 2.4 OSHS Rule 1150 Materials Handling & Storage 2.5 OSHS Rule 1180 Internal Combustion Engine 2.6 OSHS Rule 1210 Electrical Safety 2.7 OSHS Rule 1420 Logging 2.8 OSHS Rule 1410 Construction Safety 2.9 OSHS Rule 1950 Pesticides & Fertilizers
3. OSH Requirements/ Regulations	May include: <ul style="list-style-type: none"> 3.1 Clean Air Act 3.2 Building code 3.3 National Electrical and Fire Safety Codes 3.4 Waste management statutes and rules 3.5 Permit to Operate 3.6 Philippine Occupational Safety and Health Standards 3.7 Department Order No. 13 (Construction Safety and Health) 3.8 ECC regulations 3.9 Republic Act No. 11058 – An Strengthening Compliance with Occupational Safety and Health
4. Incident and Emergency Procedures	May include: <ul style="list-style-type: none"> 4.1 Chemical spills 4.2 Equipment/vehicle accidents 4.3 Explosion 4.4 Fire Drill 4.5 Gas leak 4.6 Injury to personnel

VARIABLE	RANGE
	4.7 Structural collapse 4.8 Earthquake drill 4.9 Toxic and/or flammable vapors emission 4.10 Evacuation 4.11 Isolation 4.12 Basic life support/CPR 4.13 Decontamination 4.14 Calling designed emergency personnel
5. OSH Work Instructions	May include: 5.1 Worker's Participation Policies 5.2 Company Environment Safety and Health Policies 5.3 Continual OSH Improvement Instructions 5.4 Education and Training 5.5 Safety and Health Policy Statements 5.6 Mission and Vision Statements 5.7 Operating Instructions and Policies
6. Personal Protective Equipment	May include: 6.1 Arm/Hand guard, gloves 6.2 Eye protection (goggles, shield) 6.3 Hearing protection (ear muffs, ear plugs) 6.4 Hair Net/cap/bonnet 6.5 Hard hat 6.6 Face protection (mask, shield) 6.7 Apron/Gown/coverall/jump suit 6.8 Anti-static suits 6.9 High-visibility reflective vest
7. Preventive Control Measures	May include: 7.1 Eliminate the hazard (i.e., get rid of the dangerous machine) 7.2 Isolate the hazard (i.e. keep the machine in a closed room and operate it remotely; barricade an unsafe area off) 7.3 Substitute the hazard with a safer alternative (i.e., replace the machine with a safer one) 7.4 Use administrative controls to reduce the risk (i.e. give trainings on how to use equipment safely; OSH-related topics, issue warning signages, rotation/shifting work schedule) 7.5 Use engineering controls to reduce the risk (i.e. use safety guards to machine) 7.6 Use personal protective equipment 7.7 Safety, Health and Work Environment Evaluation 7.8 Periodic and/or special medical examinations of workers

EVIDENCE GUIDE

<p>1. Critical aspects of Competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Recognize related occupational safety and health risks and hazards based on OSH work standards 1.2 Identify incident/emergency procedures relevant to workplace based on relevant OSH work standards 1.3 Follow the OSH work instructions in accordance with workplace policies and procedures 1.4 Utilize personal protective equipment, materials, tools, machinery, and equipment according to OSH work standards 1.5 Obey OSH requirements in accordance with workplace policies and procedures 1.6 Executed incident/ emergency procedures based on OSH Procedures
<p>2. Resource Implications</p>	<p>The following resources should be provided:</p> <ul style="list-style-type: none"> 2.1 Facilities, materials tools and equipment necessary for the activity
<p>3. Methods of Assessment</p>	<p>Competency in this unit may be assessed through:</p> <ul style="list-style-type: none"> 3.1 Observation/Demonstration with oral questioning 3.2 Third party report
<p>4. Context for Assessment</p>	<ul style="list-style-type: none"> 4.1 Competency may be assessed in the work place or in a simulated work place setting

UNIT OF COMPETENCY : APPLY ENVIRONMENTAL WORK STANDARDS

UNIT CODE : 400311108

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitude to identify environmental work hazards, follow environment work procedures and comply with environmental requirements.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify environmental work hazards	1.1 Related environmental hazards are recognized based on environmental work standards . 1.3 Environmental work standards are interpreted in accordance to relevant policies. 1.3 Required resources to minimize effect of environmental hazards are prepared based on relevant environmental work standards.	1.1 Environmental Hazards 1.2 Environmental Work Standards 1.3 Required Resources 1.4 OSH Standards 1.5 Fight against poverty rights 1.6 Environmental Protection 1.7 Respect of Human Rights	1.1 Critical thinking 1.2 Problem solving 1.3 Observation Skills
2. Follow environmental work procedures	2.1 Environmental protection pre-cautionary activities are practiced based on environmental work procedures. 2.2 Work activities are executed in accordance with Environmental Work Procedures . 2.3 Environmental Protection Post-Activities are accomplished based on environmental work procedures.	2.1 Environmental Protection 2.2 Environmental Work Procedures 2.3 Renewable Energies	2.1 Critical thinking 2.2 Problem solving 2.3 Observation Skills
3. Comply with environmental work requirements	3.1 Required resources are utilized in accordance with workplace	3.1 Environmental Work Procedures 3.2 Environmental Laws	3.1 Critical thinking 3.2 Problem solving 3.3 Observation Skills

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	<p>environmental policies.</p> <p>3.2 <i>Environmental hazardous and non-hazardous materials</i> are stored in accordance with <i>environmental regulations</i>.</p> <p>3.3 Hazardous and Non-hazardous Wastes disposed according to environmental regulations.</p>	3.2 Environmental Hazardous and Non-Hazardous Materials	

RANGE OF VARIABLES

VARIABLE	RANGE
1. Environmental Hazards	May include but not limited: 1.1 Tobacco Smoke 1.2 Asbestos 1.3 Lead 1.4 Combustion Gases 1.5 Chemicals 1.6 Pesticides 1.7 Pollutants 1.8 Contaminated Drinking Water 1.9 Noise 1.10 Dust
2. Environmental Work Standards	May include but not limited: 2.1 Air Quality Standards 2.2 Emission Standards 2.3 ISO 14001: Environmental Management System 2.4 Environmental Statements 2.5 Environmental Quality Standards 2.6 Work Environment Measurement Standard
3. Required Resources	May include but not limited: 3.1 Electric 3.2 Water 3.3 Fuel 3.4 Telecommunications 3.5 Supplies and Materials 3.6 Trash Cans 3.7 Relevant Data Sheets 3.8 Barriers or Barricades
4. Environmental Protection	May include (but not limited to) protection against 4.1 Overconsumption of Resources 4.2 Destruction of Ecosystems 4.3 Habitat Destructions 4.4 Extinction of Wildlife 4.5 Pollutions 4.6 Water Degradation
5. Environmental Work Procedures	May include but not limited: 5.1 Environmental pollution control measures 5.2 Oil and Fuel use 5.3 Disposal and Reuse 5.4 Herbicide applications 5.5 Breed Bird Mitigation 5.6 Tree Removal Works 5.7 Erosion Protection 5.8 Scrub Clearance 5.9 Bankside sediment clearance
6. Environmental Hazardous and Non-Hazardous Materials	May include but not limited: 6.1 Acids 6.2 Adhesives 6.3 Aerosols 6.4 Asbestos 6.5 Batteries

VARIABLE	RANGE
	6.6 Chemicals 6.7 Compact fluorescent lamps 6.8 Drugs 6.9 Dyes 6.10 E-Waste 6.11 Gasoline 6.12 Grease 6.13 Lead 6.14 Motor Oil 6.15 Solvents 6.16 Weed Killers
7. Environmental Regulations	May include but not limited: 7.1 Clean Air Act 7.2 Clean Water Act 7.3 Endangered Species Act 7.4 Resource Conservation and Recovery Act 7.5 Cave Resources and Management Act 7.6 Fisheries Code 7.7 Forestry Code 7.8 Mining Act

EVIDENCE GUIDE

<p>1. Critical aspects of Competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Interpreted the Environmental Work Standards in accordance to relevant policies 1.2 Prepared required resources to minimize effects of environmental hazards based on relevant environmental work standards 1.3 Practiced environmental protection pre-cautionary activities based on environmental work procedures 1.4 Executed work activities in accordance with environmental work procedures 1.5 Accomplished environmental protection post-activities based on environmental work procedures 1.6 Stored environmental hazardous and non-hazardous materials in accordance with environmental regulations 1.7 Disposed hazardous and non-hazardous wastes according to environmental regulations
<p>2. Resource Implications</p>	<p>The following resources should be provided:</p> <ul style="list-style-type: none"> 2.1 Workplace with storage facilities 2.2 Tools, materials and equipment relevant to the tasks (ex. Cleaning tools, cleaning materials, trash bags, etc.) 2.3 PPE 2.4 Manuals and references
<p>3. Methods of Assessment</p>	<p>Competency in this unit may be assessed through:</p> <ul style="list-style-type: none"> 3.1 Demonstration 3.2 Oral questioning 3.3 Written examination
<p>4. Context for Assessment</p>	<ul style="list-style-type: none"> 4.1 Competency assessment may occur in workplace or any appropriately simulated environment 4.2 Assessment shall be observed while task are being undertaken whether individually or in-group

UNIT OF COMPETENCY : ADOPT ENTREPRENEURIAL MINDSET IN THE WORKPLACE

UNIT CODE : 400311109

UNIT DESCRIPTOR : This unit covers the outcomes required to support and internalize an entrepreneurial mindset and observe basic entrepreneurial practices in the workplace.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Determine entrepreneurial mindset	1.1 Entrepreneurial mindset in the workplace is determined from enterprise practices and policies. 1.2 Entrepreneurial mindset in the workplace is studied and affirmed based on current enterprise practices. 1.3 Clarification from reliable sources is sought regarding entrepreneurial mindset and corporate culture.	1.1 Workplace policies and practices relating to entrepreneurship 1.2 Elements of corporate culture 1.3 Entrepreneurial mindset 1.4 Entrepreneurial practices in the workplace 1.5 Desirable attitudes: 1.5.1 Willingness to learn 1.5.2 Attention to details	1.1 Identifying entrepreneurial mindset 1.2 Studying and affirming entrepreneurial mindset 1.3 Selecting and emulating desirable entrepreneurial practices 1.4 Communication skills
2. Identify entrepreneurial practices	2.1 Entrepreneurial practices are determined based on enterprise requirements. 2.2 Entrepreneurial practices is performed following workplace and client requirements. 2.3 Cost-effective measures are complied with reference to workplace best practices.	2.1 Quality assurance practices 2.2 Workplace and client requirements 2.3 Types of cost-effective measures 2.4 Workplace quality policy 2.5 Attitude: 2.5.1 Patience 2.5.2 Attention to details	2.1 Performing quality assurance practices 2.2 Complying quality assurance requirements 2.3 Complying to cost-effective measures 2.4 Communication skills

RANGE OF VARIABLES

VARIABLE	RANGE
1. Entrepreneurial mindset	May include (but not limited to) workplace thinking relating to: <ul style="list-style-type: none"> 1.1 Economy in the use of resources 1.2 Waste management 1.3 Quality-consciousness 1.4 Cost-consciousness 1.5 Safety- and health- consciousness
2. Quality assurance practices	May include but not limited to: <ul style="list-style-type: none"> 2.1 Use of quality procedures manual 2.2 Quality policy 2.3 Best/Good practices 2.4 Continuous improvement program
3. Reliable sources	May include but not limited to: <ul style="list-style-type: none"> 3.1 Supervisors 3.2 Colleagues 3.3 Clients/Partners

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Demonstrated affirmation of entrepreneurial mindset 1.2 Observed entrepreneurial practices 1.3 Complied with cost effective measures
2. Resource Implications	The following resources should be provided: 2.1 Simulated or actual workplace 2.2 Tools, materials and supplies needed to demonstrate the required tasks 2.3 References and manuals
3. Methods of Assessment	Competency in this unit may be assessed through : 3.1 Written examination 3.2 Demonstration/observation with oral questioning 3.3 Third-party report
4. Context of Assessment	4.1 Competency may be assessed in workplace or in a simulated workplace setting 4.2 Assessment shall be observed while tasks are being undertaken whether individually or in-group

COMMON COMPETENCIES

UNIT OF COMPETENCY : APPLY SAFETY PRACTICES

UNIT CODE : MEE722201

UNIT DESCRIPTOR : This unit covers the competencies required to apply safety practices in the workplace.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify hazards	1.1 Hazards are identified correctly in accordance with OHS principles. 1.2 Safety signs and symbols are identified and adhered to.	1.1 Shop safety signs, symbols and alarms	1.1 Basic communication skills 1.2 Interpersonal skills 1.3 Reading skills required to understand safety signs and symbols 1.4 Reporting / recording accidents and potential hazards
2. Use protective clothing and devices	2.1 Appropriate protective clothing and devices correctly selected and used in accordance with OHS requirements or industry/ company policy.	2.1 Safety precautionary measures 2.2 General OSH principles and legislation	2.1 Basic communication skills 2.2 Interpersonal skills 2.3 Reading skills required to understand use of protective clothing and devices
3. Perform safe handling of tools, equipment and materials	3.1 Safety procedures for pre-use check and operation of tools and equipment followed in accordance with industry/ company policies. 3.2 Tools, equipment and materials handled safely in accordance with OHS requirements and industry/ company policies.	3.1 Operating of machine tools 3.2 Handling tools and materials 3.3 Environmental requirements relative to work safety	3.1 Basic communication skills 3.2 Interpersonal skills 3.3 Reading skills required to interpret instructions 3.4 Communicating with superiors and co-workers
4. Perform first aid	4.1 First aid treatment of injuries are	4.1 Types of injuries	4.1 Basic communication

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	carried out according to recommended procedures.		skills 4.2 Interpersonal skills 4.3 Reading skills required to interpret instructions 4.4 Basic First Aid application skills
5. Use fire extinguisher	5.1 Fire extinguisher selected and operated correctly according to the <i>type of fire.</i>	5.1 Identification of types of fire	5.1 Basic communication skills 5.2 Interpersonal skills 5.3 Reading skills required to interpret instructions 5.4 Proper handling of Fire Extinguisher

RANGE OF VARIABLES

VARIABLE	RANGE
1. Hazards	Cluttered tools and materials 1.1 Slippery floors (caused by oil, grease or any liquid) 1.2 Exposed electrical wires 1.3 Sharp edges 1.4 Machine without guards or with exposed moving parts 1.5 Uncollected chips or other wastes, etc.
2. Protective clothing and devices	Protective clothing and devices may include but is not limited to: 2.1 Safety glasses/goggles 2.2 Safety shoes 2.3 Overalls 2.4 Cap
3. Injuries	Injuries may include: 3.1 Burns/scalds 3.2 Fractures 3.3 Cuts and abrasions 3.4 Poisoning 3.5 Foreign bodies in the eye 3.6 Concussion 3.7 Shock
4. Type of fires	Fires involving or caused by: 4.1 Common combustibles (wood, cloth, paper, rubber and plastic) 4.2 Flammable liquids (gasoline, oil, solvents, paints, etc.) 4.3 Energized electrical equipment (wiring, fuse boxes, circuit breakers, appliances, etc.) 4.4 Combustible metals (magnesium, sodium, etc.)

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Identified hazardous area 1.2 Used protective clothing and devices 1.3 Handled tools, equipment and materials properly 1.4 Performed first aid 1.5 Used fire extinguisher
2. Resource implications	The following resources MUST be provided 2.1 Tools, equipment and facilities appropriate to processes or activity 2.2 Materials relevant to the proposed activity
3. Method of assessment	Competency may be assessed through: 3.1 Demonstration 3.2 Written or oral short answer questions 3.3 Practical exercises
4. Context for assessment	Competency may be assessed individually in the actual workplace or simulation environment in TESDA accredited institutions

UNIT OF COMPETENCY : INTERPRET WORKING DRAWINGS And SKETCHES

UNIT CODE : MEE722202

UNIT DESCRIPTOR : This unit covers the competencies required to read and interpret drawings and sketches.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Interpret technical drawing	1.1 Components, assemblies or objects recognized as required. 1.2 Dimensions identified as appropriate. 1.3 Instructions identified and followed as required. 1.4 Material requirements identified as required. 1.5 Symbols recognized as appropriate in the drawing . 1.6 Tolerance , limits and fits identified in the drawing.	1.1 Alphabet of lines 1.2 Projections 1.3 Drawing symbols 1.4 Dimensioning techniques 1.5 Tolerance, limits and fits 1.6 Engineering materials 1.7 Drawing tools and supplies	1.1 Basic communication skills 1.2 Reading skills required to interpret technical drawing 1.3 Reading skills required to interpret instructions 1.4 Ability to identify kinds of material
2. Prepare freehand sketch of parts	2.1 Sketch drawn correctly and appropriately. 2.2 Sketch depicted objects or part appropriately. 2.3 Dimensions indicated in sketch are clear and correct. 2.4 Instructions included in sketch are clear and correct. 2.5 Base line or datum points indicated as	2.1 Alphabet of lines 2.2 Projections 2.3 Drawing symbols 2.4 Dimensioning techniques 2.5 Drawing tools and supplies	2.1 Basic communication skills 2.2 Reading skills required to interpret technical drawing 2.3 Reading skills required to interpret instructions 2.4 Basic skills in freehand drawing

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	required.		
3. Interpret details from freehand sketch	3.1 Components, assemblies or objects recognized as required. 3.2 Dimensions identified as appropriate. 3.3 Instructions identified and followed as required. 3.4 Material requirements identified as required. 3.5 Symbols recognized as appropriate in the drawing.	3.1 Alphabet of lines 3.2 Projections 3.3 Drawing symbols 3.4 Dimensioning techniques 3.5 Tolerance, limits and fits 3.6 Engineering materials 3.7 Drawing tools and supplies	3.1 Basic communication skills 3.2 Reading skills required to interpret technical drawing 3.3 Reading skills required to interpret instructions 3.4 Ability to identify kinds of material

RANGE OF VARIABLES

VARIABLE	RANGE
1. Drawing	1.1 Drawing technique include 1.1.1 Perspective 1.1.2 Exploded view 1.1.3 Hidden view technique 1.2 Projections 1.2.1 First angle projections 1.2.2 Third angle projections
2. Tolerance	May include: 2.1 General tolerance 2.2 Angular tolerance 2.3 Geometric tolerance

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Interpreted technical drawing 1.2 Prepared sketches 1.3 Interpreted sketches
2. Resource implications	The following resources MUST be provided 2.1 Drafting room/facilities and drafting instruments and supplies appropriate to the activity 2.2 Measuring tools 2.3 Drawings, sketches or blueprint 2.4 Specimen parts/components
3. Method of assessment	Competency may be assessed through: 3.1 Direct observation 3.2 Written or oral short answer questions 3.3 Demonstration 3.4 Project/work sample 3.5 Portfolio
4. Context for assessment	Competency may be assessed individually in the actual workplace or simulation environment in TESDA accredited institutions

UNIT OF COMPETENCY : SELECT AND CUT WORKSHOP MATERIALS

UNIT CODE : MEE722203

UNIT DESCRIPTOR : This unit covers the skills and knowledge required to select and cut workshop materials.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Determine job requirement	1.1 Plans/ drawings are interpreted to produce component to specification. 1.2 Sequence of operation is determined to produce component to specification.	1.1 Alphabet of lines 1.2 Projections 1.3 Drawing symbols 1.4 Dimensioning techniques 1.5 Tolerance, limits and fits 1.6 Engineering materials 1.7 Drawing tools and supplies	1.1 Basic communication skills 1.2 Reading skills required to interpret technical drawing 1.3 Reading skills required to interpret instructions 1.4 Ability to identify kinds of material 1.5 Ability to visualize and determine sequence of operation
2. Select and measure materials	2.1 Materials are selected according to the requirement of the operation. 2.2 Materials are measured to required level of accuracy using measuring tools. 2.3 Measuring tools are used according to manufacturer's specification.	2.1 Shop safety practices 2.1.1 Safe working habits 2.1.2 Safe handling of tools and materials 2.2 Blueprint reading 2.2.1 Standard drawing scales, symbols and abbreviations 2.2.2 Assembly and details of drawing 2.2.3 Dimensions 2.3 Measurement 2.3.1 Linear measuring tools 2.4 Materials and	2.1 Basic communication skills 2.2 Reading skills required to interpret technical drawing 2.3 Ability to identify kinds of material 2.4 Ability to select material 2.5 Ability to use measuring tools

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		related science 2.4.1 Classification and mechanical properties of engineering materials	
3. Cut materials	3.1 Materials are cut according to plans/drawing instruction. 3.2 <i>Cutting tools/equipment</i> are used based on manufacturers specification, appropriate techniques or the <i>safety procedure.</i>	3.1 Hacksaw blade teeth configuration 3.2 Shop safety practices 3.3 Safe working habits 3.4 Safe handling of tools, equipment and materials	3.1 Reading skills required to interpret instructions in using equipment and cutting tools 3.2 Reading skills required to interpret technical drawing 3.3 Ability to use Hand hacksaw 3.4 Ability to operate Power hacksaw

RANGE OF VARIABLES

VARIABLE	RANGE
1. Plan/drawings	May include: 1.1 Dimensions 1.2 Tolerance
2. Materials	May include: 2.1 Ferrous 2.2 Non-ferrous
3. Measuring tools	May include: 3.1 Steel rule 3.2 Steel tape measure
4. Cutting tools/equipment	May include: 4.1 Hand hacksaw 4.2 Power hacksaw
5. Safety procedure	Safety involves the handling of: 5.1 Equipment 5.2 Tools 5.3 Materials

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Interpreted plans/drawings 1.2 Selected natural according to the requirement 1.3 Performed cutting operation 1.4 Cutting tools/equipment used safely
2. Resource implications	The following resources MUST be provided 2.1 Tools, equipment and facilities appropriate processes of an activity 2.2 Materials relevant to the proposal activity 2.3 Drawings/plans
3. Method Assessment	Competency may be assessed through: 5.1 Direct observation 5.2 Oral short answer question 5.3 Practical exercises
4. Context for assessment	Competency may be assessed in the workplace or in simulated work environment

UNIT OF COMPETENCY : PERFORM SHOP COMPUTATIONS (BASIC)

UNIT CODE : MEE722204

UNIT DESCRIPTOR : This unit covers the competencies required to perform basic calculations using the four fundamental operation.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Perform four fundamental operations	1.1 Simple calculations are performed using four fundamental operations .	1.1 Basic knowledge in arithmetic using four fundamental operations	1.1 Fundamental skills in arithmetic
2. Perform basic calculations involving fractions and decimals	2.1 Simple calculations are performed involving fractions and decimals using the four fundamental operations. 2.2 Decimal are converted into fraction (and vice versa) accurately.	2.1 Knowledge in calculating fractions, mixed numbers and decimals 2.2 Reversible calculation of decimal and fraction	2.1 Ability to convert from English to Metric system of measurement 2.2 Ability to calculate decimals and fractions in measurements
3. Perform basic calculations involving percentages	3.1 Simple calculations are performed to obtain percentages from information expressed in either fractional or decimal format.	3.1 Conversion of fraction and decimal to percent	3.1 Ability to calculate decimals and fractions into percent
4. Perform basic calculation involving ratio and proportion	4.1 Simple calculations are performed involving ratio and proportion using whole numbers, fractions and decimals.	4.1 Calculating ratio and proportion from whole numbers, fractions, and decimals	4.1 Ability to apply ratio and proportion using whole numbers, fractions and decimals
5. Perform calculations on algebraic expressions	5.1 Simple calculations are performed on algebraic expressions using the four fundamental operations. 5.2 Simple transposition of formulae is carried out to isolate the variable required, involving the four fundamental operations.	5.1 Deriving the variable required using algebraic expression	5.1 Ability to calculate tap drill size, feed and speed

RANGE OF VARIABLES

VARIABLE	RANGE
1. Four fundamental operations	May include: 1.1 Addition 1.2 Subtraction 1.3 Multiplication 1.4 Division
2. Algebraic expressions	Calculation using formula for determining 2.1 Tap drill size 2.2 Feed 2.3 Speed

EVIDENCE GUIDE

<p>1. Critical aspects of Competency</p>	<p>Assessment requires evidence that the candidate performed calculations:</p> <ul style="list-style-type: none"> 1.1 Using four fundamental operations 1.2 Involving fractions and mixed numbers 1.3 Involving fractions and decimals 1.4 Involving percentages 1.5 Involving ratio and proportion 1.6 On algebraic expressions 1.7 Of simple formulae
<p>2. Resource implications</p>	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> 2.1 Tools, equipment and facilities appropriate to processes or activity 2.2 Materials relevant to the proposed activity
<p>3. Method of assessment</p>	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> 3.1 Written or oral short answer questions 3.2 Practical exercises
<p>4. Context for assessment</p>	<p>Competency may be assessed in the workplace or in simulated workplace environment.</p>

UNIT OF COMPETENCY : MEASURE WORKPIECE (BASIC)

UNIT CODE : MEE722205

UNIT DESCRIPTOR : This unit covers the competencies required to measure workpieces using measuring instruments such as steel rule, Vernier caliper, micrometer, etc.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Select and use measuring tools	1.1 Measuring tools are selected and used according to the level of accuracy required. 1.2 Measurements taken are accurate to the finest graduation of the selected measuring instrument. 1.3 Measuring technique used is correct and appropriate to the device used.	1.1 Shop safety practices 1.2 Safe working habits 1.3 Safe handling of measuring tools 1.4 Measurement 1.5 Linear measuring tools 1.6 Angle measuring tools 1.7 Bore measuring tools	1.1 Ability to use measuring tools safely 1.2 Ability to handle measuring tools safely 1.3 Reading skills to interpret manufacturer's instructions
2. Clean and store measuring tools	2.1 Care and storage of devices undertaken to manufacturer's specifications or standard operating procedures.	2.1 Safe handling and storage of measuring tools	2.1 Ability to handle measuring tools safely 2.2 Reading skills to interpret manufacturer's instructions

RANGE OF VARIABLES

VARIABLE	RANGE
1. Measuring tools	Measuring tools include: 1.1 Steel tape 1.2 Steel rule 1.3 Straight edge 1.4 Combination square 1.5 Steel square 1.6 Divider or trammel 1.7 Caliper 1.8 Protractor 1.9 Vernier caliper 1.10 Micrometer
2. Measurements	2.1 Length 2.2 Diameter 2.3 Depth 2.4 Flatness 2.5 Straightness 2.6 Squareness

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Selected and used measuring instruments 1.2 Cleaned and stored measuring instruments
2. Resource implications	The following resources MUST be provided 2.1 Tools, equipment and facilities appropriate to the activity 2.2 Specimen component or part to the proposed activity
3. Method of assessment	Competency may be assessed through: 3.1 Direct observation 3.2 Demonstration 3.3 Written or oral short answer questions 3.4 Portfolio
4. Context for assessment	Competency may be assessed in the workplace or in simulated workplace environment.

UNIT OF COMPETENCY : PERFORM ROUTINE HOUSEKEEPING

UNIT CODE : MEE722206

UNIT DESCRIPTOR : This unit covers the competencies required to maintain an organized and clean work area.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Organize work area	1.1 Work area maintained in a safe, uncluttered and organized manner according to <i>workshop policy</i> . 1.2 All tasks carried out safely, effectively and efficiently with minimum inconvenience according to workshop policy. 1.3 Workshop policies and procedures for tidying work areas and placing items in designated areas applied.	1.1 Principles of 5S 1.2 Work policies and procedures 1.3 Safety signs and symbols 1.4 General OSH principles and legislation 1.5 Environmental requirements relative to work safety	1.1 Basic communication skills 1.2 Area management skills like tagging and separation of hazardous substances, flammable liquids and noxious chemicals
2. Clean work area	2.1 Shop policies and procedures applied for cleaning <i>work area</i> . 2.2 Wastes promptly removed and disposed of according to shop policies and environmental requirements. 2.3 Spills, wastes and other potential hazards reported to appropriate personnel and removed according to shop policies and environmental requirements. 2.4 Signage promptly displayed in regard to unsafe areas. 2.5 Consumable	2.1 Principles of 5S 2.2 Work policies and procedures 2.3 Safety signs and symbols 2.4 General OSH principles and legislation 2.5 Environmental requirements relative to work safety 2.6 Safe keeping of left-over consumable materials	2.1 Basic communication skills 2.2 Reading skills required to interpret instructions 2.3 Literacy and calculation skills in reading and comprehending label and instructions for the handling and use of chemicals and hazardous substances 2.4 Reporting/recording accidents and potential hazards

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	materials maintained and stored correctly after use. 2.6 Tools and equipment (including guards) cleaned and used in accordance with manufacturer's instructions.		

RANGE OF VARIABLES

VARIABLE	RANGE
1. Workshop policy	Shop policy and procedure in regard to: 1.1 Housekeeping practices 1.2 Maintenance and storage of cleaning equipment 1.3 Use and storage of cleaning chemicals
2. Work area	Work area may include 2.1 Work benches 2.2 Walkways and aisles 2.3 Fixtures and other working surfaces
3. Tools and Equipment	Equipment and tools may include 3.1 Drill Press 3.2 Pedestal Grinder 3.3 Surface plate 3.4 Layout and marking tools 3.5 Cutting tools (hacksaw, chisel, files) 3.6 Inspection and measuring tools (templates, Vernier caliper, micrometer, straight edge, gages, etc...)

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate organized and cleaned work area according shop policies and environmental requirements.
2. Resource implications	The following resources MUST be provided: 2.1 Tools, equipment and facilities appropriate to processes or activity 2.2 Materials and documentation relevant to the proposed activity 2.3 Shop policy and/or procedures manual on housekeeping, cleaning and occupational health and safety
3. Method of assessment	Competency may be assessed through: 3.1 Direct observation 3.2 Demonstration or role play 3.3 Written or oral short answer questions 3.4 Identify colleagues/clients who can be approached for the collection of competency evidence, where appropriate
4. Context for assessment	Competency may be assessed in the workplace or in simulated workplace environment.

UNIT OF COMPETENCY : PERFORM PREVENTIVE AND CORRECTIVE MAINTENANCE

UNIT CODE : MEE722211

UNIT DESCRIPTOR : This unit covers the knowledge and skills required in performing preventive and corrective maintenance such as inspection and repair of hand tools, cleaning and lubrication of machine parts and changing drive pulley and belts.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Perform inspection of machine	1.1 Machine <i>inspected</i> according to worksite procedures. 1.2 Status/Report recorded on proforma or reported orally according to worksite procedure.	1.1 Procedure in proper machine inspection 1.2 Locating main electrical switches of the machines 1.3 Procedure in reporting / recording of machines and tools status	1.1 Regularly inspecting the machines 1.2 Reporting orally and recording on machine / tools checklist the status
2. Perform cleaning and lubricating of machine	2.1 <i>Machines</i> lubricated as per manufacturer's recommendation using appropriate <i>tools and materials</i> 2.2 Fluids and lubricants replaced and/or topped up according to prescribed schedule.	2.1 Proper cleaning and oiling of machines 2.2 Knowledge in identifying kinds of oil, cutting oil, coolant or compound substances 2.3 Procedures in cleaning and disposal of wastes	2.1 Ability to distinguish new, old and polluted coolant 2.2 Ability to select and replace accordingly the coolant, cutting oil or compound substances 2.3 Housekeeping skills in disposing metal scraps, chips and other wastes
3. Perform minor machine repair and adjustments	3.1 Minor machine repairs performed according to manufacturer's instruction or worksite procedures. 3.2 Machine moving parts adjusted to manufacturer's specifications.	3.1 Work policies and worksite procedures in minor machine repairs 3.2 Parts and function of machine tools 3.3 Proper adjustments of moving parts 3.4 Use of PPEs	3.1 Skills in using hand tools and wrenches to adjust or replace drive pulleys and belts and other machine parts
4. Maintain hand tools	4.1 Cutting tools ground to recommended	4.1 Geometry of cutting tools 4.2 Use of PPEs	4.1 Skills in using pedestal grinder and portable

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	specifications 4.2 Hand tools lubricated and stored according to prescribed procedure	4.3 Procedure in correct handling and storage of hand tools	grinder safely 4.2 Reading skills to interpret lubricating and storage procedures

RANGE OF VARIABLES

VARIABLE	RANGE
1. Inspected	Inspected machine parts include: 1.1 V-belt 1.2 Bearing 1.3 Gears 1.4 Clutch 1.5 Drive pulley
2. Machines	Machine include but not limited to: 2.1 Lathe machine 2.2 Milling machine 2.3 Grinding machine
3. Tools and materials	Tools and materials used include: 3.1 Lubricants 3.2 Oil can 3.3 Grease gun 3.4 Oil 3.5 Coolant or compound

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that that the candidate: 1.1 Performed inspection of machine 1.2 Performed cleaning and lubricating of machine 1.3 Performed minor machine repairs and adjustments
2. Resource Implications	The following resources MUST be provided: 2.1 Tools, equipment and facilities appropriate to processes or activity 2.2 Materials relevant to the proposed activity
3. Method of Assessment	Competency may be assessed through: 3.1 Direct observation of activities 3.2 Oral or written questioning
4. Context for Assessment	Competency may be assessed in the workplace or in simulated workplace environment.

CORE COMPETENCIES

UNIT OF COMPETENCY : **PERFORM BENCH WORK (BASIC)**

UNIT CODE : **MEE722311**

UNIT DESCRIPTOR : This unit covers the competencies required to determine job requirements, perform basic bench work operations (i.e. layout; cutting with hacksaw and chisel; filing; drilling; tapping etc.) and check the components for conformance to specifications.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Conduct pre-bench work operation	1.1 Drawing is interpreted and confirmed with the supervisor. 1.2 Sequence of operation is determined to produce component to specifications. 1.3 Tools, materials and supplies are obtained and checked according to drawing specifications with instruction of immediate supervisor. 1.4 Cutting tools and marking tools are sharpened following industry procedure and industry guidelines . 1.5 Materials' dimensions are checked using measuring tools to maximize material's usage and industry guidelines . 1.6 Checklist is accomplished according to company procedures.	1.1 Kinds of Bench work materials, tools and supplies 1.2 Sequence of Operation 1.3 Procedures in checking tools and materials 1.4 Procedure of Off-hand grinding of cutting and marking tools 1.5 Measurement of dimensions 1.6 English to metric conversion 1.7 Interpretation of drawing and alphabet of lines 1.8 OSH Rule No. 1080 – Personal Protective Equipment & Devices 1.9 OSH Rule No. 1150 – Materials Handling & Storage 1.10 Air pollution 1.11 Noise pollution 1.12 Quality control	1.1 Obtaining materials 1.2 Interpreting drawing 1.3 Applying safety procedures 1.4 Checking workpiece 1.5 Sharpening of cutting and marking tools 1.6 Identifying and segregating defective cutting tools and materials
2. Conduct bench work operations	2.1 Bench work operations are performed according to industry standards and industry guidelines . 2.2 Workpiece is checked/measured in	2.1 ISO Metal Manufacturing standards 2.2 Procedures in chipping workpiece to its squareness 2.3 Procedures in	2.1 Using bench work tools 2.2 Using clamping device 2.3 Cutting, chipping and filing flat rectangular or round bar

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	<p>conformance to drawing specification and industry guidelines.</p> <p>2.3 Rejected workpiece is reported following industry procedures.</p>	<p>filing of workpiece</p> <p>2.4 Procedures in cutting of workpiece using hacksaw</p> <p>2.5 Procedures in replacing a dull hacksaw blade</p> <p>2.6 Procedures in checking workpiece</p> <p>2.7 Classification of file</p> <p>2.8 Classification of hacksaw blade</p> <p>2.9 Measurement of dimensions</p> <p>2.10 English to metric conversion</p> <p>2.11 OSH Rule No. 1070 – Occupational Health & Environmental Control</p> <p>2.12 OSH Rule No. 1080 – Personal Protective Equipment & Devices</p> <p>2.13 Air pollution</p> <p>2.14 Noise pollution</p>	<p>2.4 Applying safety procedures</p> <p>2.5 Checking workpiece</p>
3. Conduct post bench work operations	<p>3.1 Report of accomplishment is prepared and submitted to immediate supervisor following industry standards</p> <p>3.2 Good housekeeping is performed following 5S</p> <p>3.3 Wastes are managed according to Ecological Solid Waste Management Act of 2000.</p> <p>3.4 Safety practices are applied following OSHS</p>	<p>3.1 ISO Metal Manufacturing standards</p> <p>3.2 5S</p> <p>3.3 3Rs</p> <p>3.4 OSHS</p> <p>3.5 RA 9003- Ecological Solid Waste Management Act of 2000</p> <p>3.6 Preparation of report</p>	<p>3.1 Managing wastes</p> <p>3.2 Reporting skills</p> <p>3.3 Applying OSHS</p>

RANGE OF VARIABLES

VARIABLE	RANGE
1. Materials	Includes: 1.1 Ferrous 1.2 Non-ferrous
2. Layout tools and supplies	May include: 2.1 Bench work tools: 2.1.1 V-block 2.1.2 Angle plates 2.1.3 Surface plate 2.1.4 Scriber 2.1.5 Center punch 2.1.6 Ball peen hammer 2.1.7 Angle square 2.1.8 Spot facing tool 2.1.9 Thread pitch gauge 2.1.10 Tap wrench 2.1.11 Drill point sharpening gauge 2.1.12 Set of combination wrench 2.2 Supplies: 2.2.1 Dyes 2.2.2 Sand paper 2.2.3 Rags 2.2.4 Safety glasses 2.2.5 Gloves 2.2.6 Dust mask 2.2.7 Ear plugs 2.2.8 Lubricants/cutting oil 2.2.9 Paint brushes, 1" 2.2.10 File card 2.2.11 Steel brush 2.2.12 Bench work table, 3'x6' 2.2.13 Bench work chair 2.2.14 Grinding Wheel 2.2.15 Grinding wheel dresser
3. Measuring tools	May include: 3.1 Steel rule, 300mm 3.2 Vernier Caliper, 150mm 3.3 Vernier Caliper, 300mm 3.4 Combination square, 12" (300mm) 3.5 Micrometers, 0-25mm, 25-50mm 3.6 Protractor, 100mm
4. Bench work operations	Include: 4.1 Laying - out 4.2 Cutting/hacksaw 4.3 Chipping 4.4 Filing 4.5 Drilling 4.6 Counter boring 4.7 Counter sinking

VARIABLE	RANGE
	4.8 Reaming 4.9 Manual threading using Tap and/or Stock and Die 4.10 Spot-facing 4.11 Off-Hand grinding
5. Cutting tools	May include: 5.1 File 5.2 Chisel 5.3 Set of twist drill, dia 1-14mm 5.4 Hacksaw 5.5 #3 Center drill 5.6 Spot facing tool 5.7 Set of stock and dies, M4-M14 5.8 Grinding Wheel 5.9 Countersink 5.10 Counter bore drill, dia 20mm 5.11 Set of hand taps, M4-M14 5.12 Set of fixed reamers, dia 4-14mm
6. Industry guidelines	May include: 6.1 OSH Rule No. 1070 – Occupational Health & Environmental Control 6.2 OSH Rule No. 1080 – Personal Protective Equipment & Devices 6.3 OSH Rule No. 1150 – Materials Handling & Storage

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Conducted pre-bench work operations 1.2 Conducted bench work operations 1.3 Conducted post bench work operations 1.4 Applied safety practices
2. Resource implications	The following resources MUST be provided: 2.1 Tools, equipment and facilities appropriate to processes or activity 2.2 Materials relevant to the proposed activity 2.3 Drawings, sketches or blueprint
3. Method of assessment	Competency may be assessed through: 3.1 Direct observation 3.2 Written exam 3.3 Oral questioning 3.4 Demonstration 3.5 Third party report 3.6 Portfolio 3.7 Interview
4. Context for assessment	Competency may be assessed in the workplace or in simulated workplace environment.

UNIT OF COMPETENCY : TURN WORKPIECE

UNIT CODE : MEE722312

UNIT DESCRIPTOR : This unit covers the skills required to set-up and turn workpiece to drawing specifications. It details the requirements for performing lathe operations such as facing and straight turning; cutting grooves, drilling and boring, knurling; cutting single start external V-threads; and cutting tapers using compound slide.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Confirm job requirements	1.1 Drawing is interpreted and confirmed with the supervisor. 1.2 Sequence of operation is determined to produce component specifications. 1.3 Materials, hand tools and supplies are prepared and inspected based on the drawing with instruction of immediate supervisor and industry guidelines . 1.4 Machine condition is verified for serviceability and industry guidelines . 1.5 Cutting tools and measuring tools are prepared according to the requirements of the operation and industry guidelines . 1.6 Defective materials and tools are reported to immediate supervisor following industry standards. 1.7 Materials' dimensions are	1.1 Drafting/drawing skills to include ability to apply knowledge in limits, fits, tolerances and surface texture of workpiece 1.2 Determination of sequence of operation 1.3 Different forms of cutting tools 1.4 Preparation of cutting tools 1.5 Different types of materials, supplies and tools 1.6 Measuring of dimensions 1.7 English to metric conversion 1.8 OSH Rule No. 1070 – Occupational Health & Environmental Control 1.9 OSH Rule No. 1080 – Personal Protective Equipment & Devices 1.10 OSH Rule No. 1150 – Materials Handling & Storage 1.11 OSH Rule No. 1200 – Machine Guarding	1.1 Interpreting drawing 1.2 Determining the sequence of operation 1.3 Obtaining materials 1.4 Preparing and checking material and tools 1.5 Preparing and checking cutting tools 1.6 Measuring workpiece 1.7 Conducting machine dry run 1.8 Performing off-hand grinding of cutting tools

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	checked using measuring tools to maximize materials' usage and industry guidelines .	1.12 OSH Rule No. 1210 – Electrical Safety 1.13 Noise pollution 1.14 Air pollution	
2. Set up workpiece	2.1 Workpiece is matched with the machine following work requirements. 2.2 Workpiece is mounted and centered on chuck according to industry standards and work requirements and industry guidelines . 2.3 Centering instruments are used according to work requirements and industry guidelines .	2.1 Use and types of centering instruments 2.2 Setting-up work piece and machine safely 2.3 Types of materials, supplies and tools 2.4 Measuring of dimensions 2.5 English to metric conversion 2.6 OSH Rule No. 1070 – Occupational Health & Environmental Control 2.7 OSH Rule No. 1080 – Personal Protective Equipment & Devices 2.8 OSH Rule No. 1150 – Materials Handling & Storage 2.9 Noise pollution 2.10 Air pollution	2.1 Mounting and centering workpiece 2.2 Setting-up workpiece and machine 2.3 Measuring workpiece 2.4 Applying safety procedures
3. Set up cutting tools	3.1 Cutting tools and cutting holders are selected according to job requirements and industry guidelines . 3.2 Cutting tools are mounted to the holder following industry standards and industry guidelines . 3.3 Tool holder is mounted on the tool post following established industry practices.	3.1 Mounting procedure 3.2 Centering procedure 3.3 Centering tools 3.4 OSH Rule No. 1070 – Occupational Health & Environmental Control 3.5 OSH Rule No. 1080 – Personal Protective Equipment & Devices	3.1 Mounting cutting tools and tool holder 3.2 Centering cutting tools 3.3 Applying safety procedures

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	3.4 Cutting tool is aligned to the tail stock with centering tools following established industry practices.		
4. Perform turning operations	<p>4.1 Speeds and feeds are calculated based on job requirements.</p> <p>4.2 Lathe is set-up according to calculated speeds and feeds and industry guidelines.</p> <p>4.3 Lathe accessories are used according to job requirements and industry guidelines.</p> <p>4.4 Turning is conducted according to work requirements and industry guidelines.</p> <p>4.5 Performance of the machine and cutting tools are monitored based on the manufacturer's manual and industry guidelines.</p> <p>4.6 Workpiece is checked and measured during and after turning operations following work specifications and industry guidelines.</p> <p>4.7 Irregularities are reported to immediate supervisor following industry standards.</p>	<p>4.1 Selection of lathe accessories</p> <p>4.2 Operation of lathe</p> <p>4.3 Use of water-based coolant</p> <p>4.4 Types of materials, supplies and tools</p> <p>4.5 English to metric conversion</p> <p>4.6 Computation speeds, feeds and spindle revolution</p> <p>4.7 Interpretation of drawing and alphabet of lines</p> <p>4.8 Set-up cutting speed and feeds, & depth of cut</p> <p>4.9 Cutting speed and feeds reference chart</p> <p>4.10 Procedures in reporting irregularities</p> <p>4.11 OSH Rule No. 1060 – Premises of Establishments</p> <p>4.12 OSH Rule No. 1070 – Occupational Health & Environmental Control</p> <p>4.13 OSH Rule No. 1080 – Personal Protective Equipment & Devices</p> <p>4.14 OSH Rule No. 1200 – Machine Guarding</p> <p>4.15 Noise pollution</p> <p>4.16 Air pollution</p>	<p>4.1 Computing speeds, feeds and spindle revolution</p> <p>4.2 using appropriate lathe accessories</p> <p>4.3 Conducting lathe operation</p> <p>4.4 Applying safety procedures</p> <p>4.5 Wearing PPEs</p> <p>4.6 Checking workpiece</p>

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
5. Perform post-turning operations	<p>5.1 Finished workpiece is checked and submitted to immediate supervisor following industry procedure and industry guidelines.</p> <p>5.2 Accomplishment report is prepared following workplace procedures.</p> <p>5.3 Lathe is shutdown according to manufacturer's manual and industry guidelines.</p> <p>5.4 Tools are maintained and stored based on established procedures and industry guidelines.</p> <p>5.5 Defective tools and machines are tagged and reported according to workplace procedures.</p> <p>5.6 Good housekeeping is performed following 5S.</p> <p>5.7 Wastes are managed according to Ecological Solid Waste Management Act of 2000.</p>	<p>5.1 Checking of finished workpiece</p> <p>5.2 Preparation of report</p> <p>5.3 Procedure of shutting down of lathe</p> <p>5.4 Storage of tools and materials</p> <p>5.5 Tagging of defective tools and machine</p> <p>5.6 5S of good housekeeping</p> <p>5.7 3Rs</p> <p>5.8 Waste management</p> <p>5.9 Environmental laws related to post turning activities</p> <p>5.10 Application of anti-corrosion agents</p> <p>5.11 OSH Rule No. 1070 – Occupational Health & Environmental Control</p> <p>5.12 OSH Rule No. 1080 – Personal Protective Equipment & Devices</p> <p>5.13 OSH Rule No. 1150 – Materials Handling & Storage</p> <p>5.14 RA 6969-Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990</p> <p>5.15 RA 9003-Ecological Solid Waste Management Act of 2000</p>	<p>5.1 Shutting down lathe</p> <p>5.2 Cleaning and storing tools and materials</p> <p>5.3 Performing good housekeeping</p> <p>5.4 Preparing accomplishment report</p> <p>5.5 Tagging defective tools and equipment</p> <p>5.6 Managing wastes</p> <p>5.7 Applying safety practices</p>

RANGE OF VARIABLES

VARIABLE	RANGE
1. Sequence of operation	May include: 1.1 Facing 1.2 Center drilling 1.3 Straight turning 1.4 Chamfering 1.5 Drilling 1.6 Boring 1.7 External threading 1.8 Counter boring 1.9 Cutting recess 1.10 Shoulders 1.11 Cutting Grooves 1.12 External taper turning 1.13 Knurling 1.14 External profile turning 1.15 Cutting off
2. Materials	Includes: 2.1 Ferrous 2.2 Non-ferrous
3. Supplies	May include: 3.1 Dyes 3.2 Sand paper 3.3 Rags 3.4 Safety glasses 3.5 Dust mask 3.6 Ear plugs 3.7 Coolant/Lubricants/cutting oil 3.8 Paint brushes, 1" 3.9 File card 3.10 Steel brush 3.11 Safety shoes 3.12 Hand gloves
4. Hand tools	May include: 4.1 T-wrench 4.2 Open wrench 4.3 Allen wrench 4.4 Rubber mallet
5. Cutting tools and measuring tools	May include: 5.1 Cutting tools 5.1.1 High Speed Steel(HSS) Tool bits 5.1.2 Carbide inserts 5.1.3 Center drill 5.1.4 Twist drill 5.1.5 Knurling tools 5.2 Measuring tools: 5.2.1 Micrometers, 0-25mm, 25-50mm 5.2.2 Vernier Caliper, 150mm, 300mm 5.2.3 Thread pitch gauge, set in Metric system

VARIABLE	RANGE
	5.2.4 Thread pitch gauge, set in English system 5.2.5 Dial indicator
6. Lathe accessories	May include: 6.1 Lathe Dog 6.2 Dead Center 6.3 Live Center 6.4 Tail stock 6.5 Drill chuck with key 6.6 Four Jaw Chuck independent 6.7 Three Jaw Chuck universal 6.8 Left Hand tool holder 6.9 Right Hand tool holder 6.10 Neutral (straight) tool holder
7. Mounting of workpiece	May include: 7.1 Using four-jaw chuck (independent) 7.2 Using three-jaw chuck (universal)
8. Centering of workpiece	May include: 8.1 Centering gauge 8.2 Dial indicator gauge
9. Centering tools	Includes: 9.1 Live center 9.2 Dead center
10. Performance of machine and cutting tools	May include: 10.1 Appearance of workpiece 10.2 Sound of engine lathe with and without load 10.3 Vibration of lathe 10.4 Dullness of cutting tools
11. Machine condition	May include: 11.1 Electrical 11.1.1 Switches 11.1.2 Wiring connections and conditions 11.2 Mechanical 11.2.1 Gears 11.2.2 Lead screw 11.2.3 Transversal (Cross) slide 11.2.4 Foot brake 11.3 Coolant system 11.3.1 Motor pump 11.3.2 Coolant circulation 11.3.3 Coolant water level
12. Industry guidelines	May include: 12.1 OSH Rule No. 1060 – Premises of Establishments 12.2 OSH Rule No. 1070 – Occupational Health & Environmental Control 12.3 OSH Rule No. 1080 – Personal Protective Equipment & Devices 12.4 OSH Rule No. 1150 – Materials Handling & Storage 12.5 OSH Rule No. 1200 – Machine Guarding 12.6 OSH Rule No. 1210 – Electrical Safety 12.7 RA 6969-Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990 12.8 RA 9003-Ecological Solid Waste Management Act of 2000

EVIDENCE GUIDE

1. Critical aspects of Competency	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Confirmed job requirements 1.2 Set up workpiece 1.3 Set up cutting tools 1.4 Performed turning operations 1.5 Checked workpiece 1.6 Performed post-turning operations 1.7 Applied safety practices
2. Resource implications	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> 2.1 Tools, equipment and facilities appropriate to processes or activities 2.2 Materials relevant to the proposed activity 2.3 Drawings, sketches or blueprint
3. Method of assessment	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> 3.1 Direct observation 3.2 Written exam 3.3 Oral questioning 3.4 Demonstration 3.5 Third party report 3.6 Portfolio 3.7 Interview
4. Context for assessment	<p>Competency may be assessed in the workplace or in simulated workplace environment.</p>

UNIT OF COMPETENCY : MILL WORKPIECE

UNIT CODE : MEE722313

UNIT DESCRIPTOR : This unit covers the skills required to set up and mill work piece to drawing specifications. It details the requirements for performing vertical milling operations such as drilling, countersinking, boring, milling blocks, shoulder, parallel faces; milling slots and keyways.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Confirm job requirements	1.1 Drawing is interpreted and confirmed with the supervisor. 1.2 Material is matched with the vertical milling machine following work requirements and industry guidelines . 1.3 Sequence of operation is determined to produce component to specifications. 1.4 Material is prepared and inspected based on the drawing and industry guidelines . 1.5 Machine condition is verified for serviceability and industry guidelines . 1.6 Cutting tools and measuring tools are prepared according to the requirements of the operation and industry guidelines . 1.7 Defective materials and tools are reported to immediate supervisor following industry standards	1.1 Drafting/ drawing skills to include ability to apply knowledge in limits, fits, tolerances and surface texture of workpiece 1.2 Determination of sequence of operation 1.3 Different forms of cutting tools 1.4 Preparation of cutting tools 1.5 Different types of materials, and tools 1.6 Measuring of dimensions 1.7 English to metric conversion 1.8 OSH Rule No. 1070 – Occupational Health & Environmental Control 1.9 OSH Rule No. 1080 – Personal Protective Equipment & Devices 1.10 OSH Rule No. 1200 – Machine Guarding 1.11 OSH Rule No. 1210 – Electrical Safety 1.12 Noise pollution 1.13 Air pollution	1.1 Interpreting drawing 1.2 Determining the sequence of operation 1.3 Obtaining materials 1.4 Preparing and checking material and tools 1.5 Preparing and checking cutting tools 1.6 Measuring workpiece 1.7 Conducting machine dry run

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	<p>and industry guidelines.</p> <p>1.8 Materials' dimensions are checked using measuring tools to maximize materials' usage and industry guidelines.</p>		
2. Set up machine vice	<p>2.1 Machine vice is mounted on milling machine table based on industry standards and industry guidelines.</p> <p>2.2 Machine vice is aligned on machine x-axis according to operations' manual and industry guidelines.</p> <p>2.3 Machine vice is clamped on machine table following established procedure and industry guidelines.</p>	<p>2.1 Procedure in mounting, aligning and clamping of machine vice</p> <p>2.2 Sizes of machine vice</p> <p>2.3 Operations manual</p> <p>2.4 OSH Rule No. 1070 – Occupational Health & Environmental Control</p> <p>2.5 OSH Rule No. 1080 – Personal Protective Equipment & Devices</p> <p>2.6 OSH Rule No. 1150 – Materials Handling & Storage</p>	<p>2.1 Mounting machine vice</p> <p>2.2 Aligning machine vice</p> <p>2.3 Clamping machine vice</p> <p>2.4 Applying safety practices</p> <p>2.5 Wearing of PPEs</p>
3. Set up workpiece	<p>3.1 Workpiece is matched with the machine following work requirements and industry guidelines.</p> <p>3.2 Workpiece is mounted and centered on machine vice according to industry standards and work requirements and industry guidelines.</p>	<p>3.1 Setting up workpiece and machine</p> <p>3.2 Computation of cutting speed, feed and spindle speed</p> <p>3.3 Types of materials, supplies and tools</p> <p>3.4 Measuring of dimensions</p> <p>3.5 English to metric conversion</p> <p>3.6 Interpretation of drawing and alphabet of lines</p> <p>3.7 OSH Rule No. 1070 –</p>	<p>3.1 Mounting and centering workpiece</p> <p>3.2 Setting up workpiece and machine</p> <p>3.3 Measuring workpiece</p> <p>3.4 Applying safety procedures</p>

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		Occupational Health & Environmental Control 3.8 OSH Rule No. 1080 – Personal Protective Equipment & Devices 3.9 OSH Rule No. 1150 – Materials Handling & Storage 3.10 Noise pollution 3.11 Air pollution	
4. Set up cutting tools	4.1 Cutting tools and cutting holders are selected according to job requirements and industry guidelines . 4.2 Cutting holder with tool is mounted on the spindle following established industry practices and industry guidelines .	4.1 Types of cutting tools 4.2 Types of holder 4.3 Measuring of dimensions 4.4 English to metric conversion 4.5 OSH Rule No. 1080 – Personal Protective Equipment & Devices 4.6 Noise pollution 4.7 Air pollution 4.8 Mounting procedure 4.9 Hierarchy of hazard control measures	4.1 Selecting of cutting tools 4.2 Mounting cutting tools and tool holder 4.3 Applying safety practices
5. Perform milling operations	5.1 Speeds and feeds are calculated based on job requirements. 5.2 Milling machine is set-up according to calculated speeds and feeds and industry guidelines . 5.3 Milling machine accessories are used according to job requirements and industry guidelines . 5.4 Milling is conducted according to job	5.1 Selection of milling machine accessories 5.2 Procedure in operating milling machine 5.3 Use of PPEs 5.4 Procedure in checking workpiece 5.5 English to metric conversion 5.6 Computation speeds, feeds and spindle revolution 5.7 Interpretation of drawing and	5.1 Computing speeds, feeds and spindle revolution 5.2 Procedure in using appropriate milling accessories 5.3 Conducting milling operation 5.4 Applying safety procedures 5.5 Checking workpiece 5.6 Wearing of PPEs

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	<p>requirements following manufacturer's manual and industry guidelines.</p> <p>5.5 Performance of the machine and cutting tools are monitored based on the accepted industry standards and industry guidelines.</p> <p>5.6 Workpiece is checked and measured during and after milling operations following work specification and industry guidelines.</p> <p>5.7 Irregularities are reported to immediate supervisor following industry standards.</p>	<p>alphabet of lines</p> <p>5.8 Set-up cutting speed and feeds, & depth of cut</p> <p>5.9 Cutting speed and feeds reference chart</p> <p>5.10 Procedures in reporting irregularities</p> <p>5.11 OSH Rule No. 1070 – Occupational Health & Environmental Control</p> <p>5.12 OSH Rule No. 1080 – Personal Protective Equipment & Devices</p> <p>5.13 OSH Rule No. 1150 – Materials Handling & Storage</p> <p>5.14 Noise pollution</p> <p>5.15 Air pollution</p>	
6. Perform post-milling operations	<p>6.1 Finished workpiece is checked and submitted to immediate supervisor following industry procedure and industry guidelines.</p> <p>6.2 Accomplishment report is prepared following workplace procedures.</p> <p>6.3 Milling is shutdown according to manufacturer's manual and industry guidelines.</p> <p>6.4 Tools are maintained and stored based on established procedures and industry guidelines.</p>	<p>6.1 Checking of finished workpiece</p> <p>6.2 Preparation of report</p> <p>6.3 Procedure of shutting down of milling</p> <p>6.4 Storage of tools and materials</p> <p>6.5 Tagging of defective tools and machine</p> <p>6.6 5S of good housekeeping</p> <p>6.7 3Rs</p> <p>6.8 Waste management</p> <p>6.9 Application of anti-corrosion agents</p> <p>6.10 OSH Rule No. 1080 – Personal Protective Equipment &</p>	<p>6.1 Shutting down milling</p> <p>6.2 Cleaning and storing tools and materials</p> <p>6.3 Performing good housekeeping</p> <p>6.4 Preparing accomplishment report</p> <p>6.5 Tagging defective tools and machine</p> <p>6.6 Managing wastes</p> <p>6.7 Applying safety practices</p>

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	<p>6.5 Defective tools and machines are tagged and reported according to workplace procedures.</p> <p>6.6 Good housekeeping is performed following 5S.</p> <p>6.7 Waste management is practiced according to <i>industry guidelines.</i></p>	<p>Devices</p> <p>6.11 OSH Rule No. 1210 – Electrical Safety</p> <p>6.12 RA 6969-Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990</p> <p>6.13 RA 9003-Ecological Solid Waste Management Act of 2000</p>	

RANGE OF VARIABLES

VARIABLE	RANGE
1. Sequence of operation	May include: 1.1 Face Milling 1.2 Side Milling 1.3 Center Drilling 1.4 Drilling 1.5 Boring 1.6 Counter-Boring 1.7 Spot Facing 1.8 Slotting 1.9 Slitting 1.10 Plunging with End-mill 1.11 Countersinking
2. Cutting tools	May include: 2.1 Face Milling Cutter 2.2 End Milling Cutter 2.3 Side Milling Cutter 2.4 Angular Milling Cutter 2.5 Center Drill 2.6 Formed Milling Cutter 2.7 Tee-slot Cutter 2.8 Dovetail Cutter 2.9 Slitting Cutter 2.10 Ply Milling Cutter 2.11 Twist Drill 2.12 Reamer 2.13 Countersink
3. Milling machine accessories	May include: 3.1 Machine Vise 3.2 Rotary Table 3.3 Angle Plate 3.4 Tee -Bolts and Nuts 3.5 Dial Indicator 3.6 Clamp down 3.7 Parallel bars 3.8 Precision square
4. Machine condition	May include: 4.1 Electrical 4.1.1 Switches 4.2 Mechanical 4.2.1 Transversal (cross) slide (Y-axis) 4.2.2 Longitudinal slide (X-axis) 4.2.3 Spindle slide (Z-axis) 4.2.4 Spindle rotation 4.3 Coolant system 4.3.1 Motor pump 4.3.2 Coolant circulation 4.3.3 Coolant water level
5. Measuring tools for workpiece	Includes: 5.1 Micrometers, 0-25mm, 25-50mm 5.2 Vernier Calipers, 150mm, 300mm

VARIABLE	RANGE
	5.3 Dial indicator 5.4 Gauges (bore, surface finish, radius, depth) 5.5 Depth micrometers 0-25mm,25-50mm
6. Performance of machine and cutting tools	May include: 6.1 Appearance of workpiece 6.2 Sound of milling machine with and without load 6.3 Vibration of milling machine 6.4 Dullness of cutting tools
7. Materials	Includes: 7.1 Ferrous 7.2 Non-ferrous
8. Industry guidelines	May include: 8.1 OSH Rule No. 1070 – Occupational Health & Environmental Control 8.2 OSH Rule No. 1080 – Personal Protective Equipment & Devices 8.3 OSH Rule No. 1150 – Materials Handling & Storage 8.4 OSH Rule No. 1200 – Machine Guarding 8.5 OSH Rule No. 1210 – Electrical Safety 8.6 RA 6969-Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990 8.7 RA 9003-Ecological Solid Waste Management Act of 2000

EVIDENCE GUIDE

<p>1. Critical aspects of competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Confirmed job requirements 1.2 Set up machine vice 1.3 Set up Workpiece 1.4 Set up cutting tools 1.5 Checked workpiece 1.6 Performed milling operations 1.7 Performed post-milling operations 1.8 Applied safety practices
<p>2. Resource implications</p>	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> 2.1 Tools, equipment and facilities appropriate to processes or activities 2.2 Materials relevant to the proposed activity 2.3 Drawings, sketches or blueprint
<p>3. Method of assessment</p>	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> 3.1 Direct observation 3.2 Written exam 3.3 Oral questioning 3.4 Demonstration 3.5 Third party report 3.6 Portfolio 3.7 Interview
<p>4. Context for assessment</p>	<p>Competency may be assessed in the workplace or in simulated workplace environment.</p>

UNIT OF COMPETENCY : GRIND WORKPIECE

UNIT CODE : MEE722314

UNIT DESCRIPTOR : This unit covers the skills required to set up and surface grind pre-milled work piece to drawing specifications. It details the requirements for grinding parallel surfaces and square surfaces.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Confirm job requirements	1.1 Drawing is interpreted and confirmed with the supervisor. 1.2 Sequence of operation is determined to produce component to specifications. 1.3 Workpiece is prepared and inspected based on the drawing and industry guidelines . 1.4 Grinding wheel and measuring tools are prepared according to the requirements of the operation and industry guidelines . 1.5 Machine condition is verified for serviceability and industry guidelines . 1.6 Defective workpiece and grinding wheel are reported to immediate supervisor following industry standards and industry guidelines .	1.1 Drafting/ drawing skills to include ability to apply knowledge in fits, tolerances and surface texture of workpiece 1.2 Determination of sequence of operation 1.3 Types of grinding wheels 1.4 Types of materials and supplies 1.5 Measuring of dimensions 1.6 English to metric conversion 1.7 Hot work permit system 1.8 OSH Rule No. 1070 – Occupational Health and Environmental Control 1.9 OSH Rule No. 1080 – Personal Protective Equipment and Devices 1.10 OSH Rule No. 1150 – Materials Handling and Storage 1.11 Noise pollution 1.12 Air pollution	1.1 Interpreting drawing 1.2 Selecting of materials 1.3 Determining the sequence of operation 1.4 Selecting grinding wheels 1.5 Measuring workpiece 1.6 Conducting machine dry run
2. Set up workpiece	2.1 Workpiece is matched to grinding machine following work requirements	2.1 Setting up work piece and machine 2.2 Use of magnetic	2.1 Setting up workpiece applying OSH

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	<p>and industry guidelines.</p> <p>2.2 Workpiece is mounted on work holding devices according to industry standards and industry guidelines.</p> <p>2.3 Precision vice is used to hold workpiece following industry standards and industry guidelines.</p>	<p>plate</p> <p>2.3 Use of precision vice</p> <p>2.4 OSH Rule No. 1080 – Personal Protective Equipment and Devices</p> <p>2.5 OSH Rule No. 1150 – Materials Handling and Storage</p>	
3. Set up surface grinding machine	<p>3.1 Grinding wheel is selected based on job requirements and industry guidelines.</p> <p>3.2 Grinding wheel is mounted based on job requirements and industry guidelines.</p> <p>3.3 Grinding wheel is dressed based on established industry practices and industry guidelines.</p>	<p>3.1 Types of grinding wheel</p> <p>3.2 Procedure in mounting grinding wheel</p> <p>3.3 Types of dressing wheel</p> <p>3.4 OSH Rule No. 1070 – Occupational Health and Environmental Control</p> <p>3.5 OSH Rule No. 1080 – Personal Protective Equipment and Devices</p>	3.1 Selecting, mounting, and dressing grinding wheel
4. Perform grinding operations	<p>4.1 Grinding machine accessories are used according to job requirements and industry guidelines.</p> <p>4.2 Surface grinding is conducted according to job requirements and industry guidelines.</p> <p>4.3 Performance of grinding wheel is monitored based on industry standards and industry guidelines.</p> <p>4.4 Workpiece is checked and measured during and after grinding operation following work specification</p>	<p>4.1 Appropriate use of grinding machine accessories</p> <p>4.2 Procedure in operating grinding machine</p> <p>4.3 Procedure in checking workpiece</p> <p>4.4 Safety practices using PPEs</p> <p>4.5 Procedures in reporting irregularities</p> <p>4.6 OSH Rule No. 1070 – Occupational Health and Environmental Control</p>	<p>4.1 Using grinding machine accessories</p> <p>4.2 Operating grinding machine</p> <p>4.3 Applying safety practices</p> <p>4.4 Checking workpiece</p> <p>4.5 Reporting irregularities</p>

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	<p>and industry guidelines.</p> <p>4.5 Irregularities are reported to immediate supervisor following industry standards.</p>	<p>4.7 OSH Rule No. 1080 – Personal Protective Equipment and Devices</p> <p>4.8 OSH Rule No. 1090 – Hazardous Materials</p> <p>4.9 OSH Rule No. 1150 – Materials Handling and Storage</p> <p>4.10 OSH Rule No. 1200 – Machine Guarding</p>	
5. Perform post-grinding operations	<p>5.1 Finished workpiece is checked and submitted to immediate supervisor following industry procedure and industry guidelines.</p> <p>5.2 Accomplishment report is prepared following workplace procedures.</p> <p>5.3 Grinding machine is shutdown according to manufacturer's manual and industry guidelines.</p> <p>5.4 Tools are maintained and stored based on established procedures and industry guidelines.</p> <p>5.5 Defective tools and machines are tagged and reported according to workplace procedures.</p> <p>5.6 Good housekeeping is performed following 5S.</p> <p>5.7 Solid waste management is practiced according to Ecological Solid Waste Management Act of 2000.</p>	<p>5.1 Checking of finished workpiece</p> <p>5.2 Preparation of report</p> <p>5.3 Procedure of shutting down of grinding machine</p> <p>5.4 Storage of tools and materials</p> <p>5.5 Tagging of defective tools and lathe</p> <p>5.6 5S of good housekeeping</p> <p>5.7 3Rs</p> <p>5.8 Application of anti-corrosion agents</p> <p>5.9 OSH Rule No. 1080 – Personal Protective Equipment and Devices</p> <p>5.10 OSH Rule No. 1150 – Materials Handling and Storage</p> <p>5.11 RA 9003- Ecological Solid Waste Management Act of 2000</p>	<p>5.1 Shutting down grinding machine</p> <p>5.2 Cleaning and storing tools and materials</p> <p>5.3 Performing good housekeeping</p> <p>5.4 Preparing accomplishment report</p> <p>5.5 Tagging defective tools and equipment</p> <p>5.6 Managing wastes</p> <p>5.7 Applying safety practices</p>

RANGE OF VARIABLES

VARIABLE	RANGE
1. Sequence of operation	May include: 1.1 Surfaces to flatness 1.2 Sides to squareness 1.3 Angular cuts 1.4 Undercuts or slots 1.5 Shoulders
2. Work holding devices	May include: 2.1 Magnetic Plate 2.2 Magnetic V-block 2.3 Parallel Bars 2.4 Precision vise 2.5 Magnetic sine chuck 2.6 Cylindrical grinding attachment
3. Grinding machine accessories	May include: 3.1 Precision Vise 3.2 Magnetic Plate 3.3 Parallel bars 3.4 Grinding Wheel Dresser 3.5 Grinding wheel hub
4. Measuring tools	Includes: 4.1 Micrometers, 0-25mm,25-50mm 4.2 Vernier Caliper, 150mm 4.3 Dial indicator 4.4 Depth micrometers, 0-25mm,25-50mm
5. Workpiece	Includes: 5.1 Pre-milled Steel Plate 5.2 Pre-milled Steel Bars
6. Machine condition	May include: 6.1 Electrical 6.1.1 Switches 6.2 Mechanical 6.2.1 Table travel (horizontal and transversal) 6.2.2 Spindle rotation 6.2.3 Spindle travel (vertical) 6.3 Dust collector 6.3.1 Motor pump 6.3.2 Vacuum filter 6.4 Coolant System 6.4.1 Motor Pump 6.4.2 Coolant Circulation 6.4.3 Coolant water level
7. Industry guidelines	May include: 7.1 OSH Rule No. 1070 – Occupational Health and Environmental Control 7.2 OSH Rule No. 1080 – Personal Protective

VARIABLE	RANGE
	Equipment and Devices 7.3 OSH Rule No. 1090 – Hazardous Materials 7.4 OSH Rule No. 1150 – Materials Handling and Storage 7.5 OSH Rule No. 1200 – Machine Guarding 7.6 RA 9003-Ecological Solid Waste Management Act of 2000

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: <ul style="list-style-type: none"> 1.1 Confirmed job requirements 1.2 Set up workpiece 1.3 Set up surface grinding machine 1.4 Performed grinding operations 1.5 Checked workpiece 1.6 Performed post-grinding operations 1.7 Applied safety practices
2. Resource implications	The following resources MUST be provided <ul style="list-style-type: none"> 2.1 Tools, equipment and facilities appropriate to processes or activities 2.2 Materials relevant to the proposed activity 2.3 Drawings, sketches or blueprint
3. Method of assessment	Competency may be assessed through: <ul style="list-style-type: none"> 3.1 Direct observation 3.2 Written exam 3.3 Oral questioning 3.4 Demonstration 3.5 Third party report 3.6 Portfolio 3.7 Interview
4. Context for assessment	Competency may be assessed in the workplace or in simulated workplace environment.

UNIT OF COMPETENCY : SHAPE WORKPIECE

UNIT CODE : MEE722315

UNIT DESCRIPTOR : This unit covers the skills required to set-up and shape workpiece to drawing specifications. It details the requirements for performing shaping operations such as facing, squaring, grooving and making keyways.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Confirm job requirements	1.1 Drawing is interpreted and confirmed with the supervisor. 1.2 Sequence of operation is determined to produce component to specifications. 1.3 Material is prepared and inspected based on the drawing and industry guidelines . 1.4 Machine condition is verified for serviceability. 1.5 Tool bits and measuring tools are prepared according to the requirements of the operation and industry guidelines . 1.6 Defective workpiece and tools are reported to immediate supervisor following industry standards. 1.7 Materials' dimensions are checked using measuring tools to maximize materials' usage and according to industry guidelines .	1.1 Determination of sequence of operation 1.2 Types of materials 1.3 Preparation of tool bit and measuring tools 1.4 Measuring of dimensions 1.5 English to metric conversion 1.6 Interpretation of drawing and alphabet of lines 1.7 OSH Rule No. 1070 – Occupational Health and Environmental Control 1.8 OSH Rule No. 1080 – Personal Protective Equipment and Devices 1.9 OSH Rule No. 1150 – Materials Handling and Storage 1.10 OSH Rule No. 1210 – Electrical Safety 1.11 Noise pollution 1.12 Air pollution	1.1 Interpreting drawing 1.2 Selecting of workpiece 1.3 Determining the sequence of operation 1.4 Preparing tool bit and measuring tools 1.5 Measuring workpiece 1.6 Using measuring tools
2. Setup workpiece and machine	2.1 Workpiece is matched with the shaper machine following work requirements and industry guidelines . 2.2 Workpiece is mounted and centered on vice	2.1 Setting-up work piece and machine 2.2 Types of materials, supplies and cutting tools	2.1 Matching workpiece to shaper machine 2.2 Mounting and centering workpiece 2.3 Setting-up

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	<p>according to industry standards and <i>industry guidelines.</i></p> <p>2.3 Machine length of stroke, cutting speed and feed are set based on workpiece dimension and according to <i>industry guidelines.</i></p>	<p>2.3 Measuring of dimensions</p> <p>2.4 English to metric conversion</p> <p>2.5 Setting cutting speed, feed rate</p> <p>2.6 Interpretation of drawing and alphabet of lines</p> <p>2.7 OSH Rule No. 1070 – Occupational Health and Environmental Control</p> <p>2.8 OSH Rule No. 1080 – Personal Protective Equipment and Devices</p> <p>2.9 OSH Rule No. 1150 – Materials Handling and Storage</p> <p>2.10 Noise pollution</p> <p>2.11 Air pollution</p>	<p>workpiece and equipment</p> <p>2.4 Measuring workpiece</p>
3. Set up tool bit	<p>3.1 Tool bit is selected according to size of tool bit holder and job requirements, and following <i>industry guidelines.</i></p> <p>3.2 Tool bit is attached to tool bit holder following <i>industry guidelines.</i></p> <p>3.3 Holder with tool bit is mounted to tool post according to job requirement and <i>industry guidelines.</i></p>	<p>3.1 Safe handling of tools, equipment and materials</p> <p>3.2 Shaper cutters and holders</p> <p>3.3 OSH Rule No. 1080 – Personal Protective Equipment and Devices</p>	<p>3.1 Mounting tool bit to tool holder to tool post</p> <p>3.2 Applying safety practices</p> <p>3.3 Wearing PPEs</p>
4. Perform shaping operations	<p>4.1 Shaping operation is conducted according to job requirements and <i>industry guidelines.</i></p> <p>4.2 <i>Performance of the machine and tool bit</i> are monitored based on the accepted industry standards and <i>industry guidelines.</i></p> <p>4.3 Workpiece is checked and measured during</p>	<p>4.1 Procedure in operating shaper machine</p> <p>4.2 Types of materials and cutting tools</p> <p>4.3 English to metric conversion</p> <p>4.4 Interpretation of drawing and alphabet of lines</p> <p>4.5 OSH Rule No.</p>	<p>4.1 Operating shaper</p> <p>4.2 Applying safety procedures</p> <p>4.3 Checking workpiece</p>

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	<p>and after shaping operation following work specification and industry guidelines.</p> <p>4.4 Irregularities are reported to immediate supervisor following industry standards.</p>	<p>1070 – Occupational Health and Environmental Control</p> <p>4.6 OSH Rule No. 1080 – Personal Protective Equipment and Devices</p> <p>4.7 OSH Rule No. 1200 – Machine Guarding</p> <p>4.8 Noise pollution</p> <p>4.9 Air pollution</p>	
5. Perform post-shaping operations	<p>5.1 Finished workpiece is checked and submitted to immediate supervisor following industry procedure and industry guidelines.</p> <p>5.2 Accomplishment report is prepared following workplace procedures.</p> <p>5.3 Shaper is shutdown according to manufacturer’s manual and industry guidelines.</p> <p>5.4 Tools are maintained and stored based on established procedures and industry guidelines.</p> <p>5.5 Defective tools and machines are tagged and reported according to workplace procedures.</p> <p>5.6 Good housekeeping is performed following 5S.</p> <p>5.7 Solid waste management is practiced according to Ecological Solid Waste Management Act of 2000.</p>	<p>5.1 Checking of finished workpiece</p> <p>5.2 Preparation of report</p> <p>5.3 Procedure of shutting down of shaper</p> <p>5.4 Storage of tools and materials</p> <p>5.5 Tagging of defective tools and shaper</p> <p>5.6 5S of good housekeeping</p> <p>5.7 3Rs</p> <p>5.8 OSH Rule No. 1070 – Occupational Health and Environmental Control</p> <p>5.9 OSH Rule No. 1080 – Personal Protective Equipment and Devices</p> <p>5.10 OSH Rule No. 1210 – Electrical Safety</p> <p>5.11 RA 9003- Ecological Solid Waste Management Act of 2000</p>	<p>5.1 Shutting down shaper</p> <p>5.2 Cleaning and storing tools and materials</p> <p>5.3 Performing good housekeeping</p> <p>5.4 Preparing accomplishment report</p> <p>5.5 Tagging defective tools and machine</p> <p>5.6 Managing wastes</p> <p>5.7 Applying safety practices</p>

RANGE OF VARIABLES

VARIABLE	RANGE
1. Sequence of operation	May include: 1.1 Facing 1.2 Squaring 1.3 Grooving 1.4 Machining keyways
2. Materials	Includes: 2.1 Ferrous 2.2 Non-ferrous
3. Shape accessories	May include: 3.1 Machine Vice 3.2 Parallel bars 3.3 V-blocks 3.4 Clamps 3.5 T-bolts and nuts 3.6 Rubber mallet
4. Mounting of workpiece	May include: 4.1 Using machine vice 4.2 Using three-jaw chuck (universal)
5. Measuring tools	May include: 5.1 Steel Rule, 300mm 5.2 Vernier Caliper, 150mm
6. Machine condition	May include: 6.1 Electrical 6.1.1 Switches 6.2 Mechanical 6.2.1 Table travel (horizontal) 6.2.2 Tool post travel (vertical) 6.2.3 Ram travel (transversal)
7. Performance of machine and tool bit	May include: 7.1 Appearance of workpiece 7.2 Sound of shaper with and without load 7.3 Vibration of shaper 7.4 Dullness of tool bit
8. Industry guidelines	May include: 8.1 OSH Rule No. 1070 – Occupational Health and Environmental Control 8.2 OSH Rule No. 1080 – Personal Protective Equipment and Devices 8.3 OSH Rule No. 1150 – Materials Handling and Storage 8.4 OSH Rule No. 1200 – Machine Guarding 8.5 OSH Rule No. 1210 – Electrical Safety 8.6 RA 9003-Ecological Solid Waste Management Act of 2000

EVIDENCE GUIDE

1. Critical aspects of competency	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Confirmed job requirements 1.2 Set up workpiece and machine 1.3 Set up tool bit 1.4 Performed shaping operations 1.5 Performed post-shaping operations 1.6 Applied safety practices
2. Resource implications	<p>The following resources MUST be provided</p> <ul style="list-style-type: none"> 2.1 Tools, equipment and facilities appropriate to processes or activities 2.2 Materials relevant to the proposed activity 2.3 Drawings, sketches or blueprint
3. Method of assessment	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> 3.1 Direct observation 3.2 Written exam 3.3 Oral questioning 3.4 Demonstration 3.5 Third party report 3.6 Portfolio 3.7 Interview
4. Context for assessment	<p>Competency may be assessed in the workplace or in simulated workplace environment.</p>

UNIT OF COMPETENCY : REPAIR WORKPIECE

UNIT CODE : MEE722316

UNIT DESCRIPTOR : This unit covers the skills required to perform basic welding of workpiece.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Conduct preparatory activities	1.1 Work requirements are determined according to drawing. 1.2 Workpiece, tools and materials , and electric welding machine are prepared according to industry standards and industry guidelines . 1.3 PPEs are worn following OSHS.	1.1 Procedure in conducting preparatory activities 1.2 Selection of electrode according to workpiece 1.3 Dimensions English to Metric conversion 1.4 Interpretation of drawing and alphabet of lines 1.5 Interpretation of welding symbols 1.6 Use of PPEs 1.7 OSH Rule No. 1070 – Occupational Health and Environmental Control 1.8 OSH Rule No. 1080 – Personal Protective Equipment and Devices 1.9 Air pollution 1.10 Noise pollution	1.1 Determining job work requirements 1.2 Preparing workpiece, materials, tools and electric welding machine 1.3 Applying OSHS 1.4 Wearing of PPEs
2. Prepare welding machine and holding devices	2.1 Welding machine is set-up in accordance with manufacturer’s instructions and industry guidelines . 2.2 Holding devices are positioned in conformity with job requirements and industry guidelines . 2.3 Workpiece and	2.1 Procedure in setting up of Welding machine and work holding devices 2.2 Steps in protecting workpiece and welding machine from getting wet 2.3 Hot work permit system 2.4 OSH Rule No. 1070 –	2.1 Preparing welding machine 2.2 Positioning of holding devices 2.3 Protecting workpiece and welding machine 2.4 Applying safety practices 2.5 Wearing of PPEs

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	welding machine are protected from strong winds, drafts and rainfall according to industry guidelines .	Occupational Health and Environmental Control 2.5 OSH Rule No. 1080 – Personal Protective Equipment and Devices	
3. Weld workpiece	<p>3.1 Tack welding is performed in accordance with drawing and industry guidelines.</p> <p>3.2 Root pass is performed in accordance with drawing and industry guidelines.</p> <p>3.3 Root pass is cleaned and freed from defects and discontinuities following industry practices and industry guidelines.</p> <p>3.4 Cover pass is performed in accordance with the drawing and industry guidelines.</p> <p>3.5 Welded workpiece is visually checked based on work specifications.</p>	<p>3.1 Procedure in welding workpiece</p> <p>3.2 Different types of tack welding</p> <p>3.3 Procedure in checking workpiece</p> <p>3.4 Knowledge on weld defects</p> <p>3.5 Fire safety</p> <p>3.6 Exhaust ventilation/ fume extractor</p> <p>3.7 OSH Rule No. 1070 – Occupational Health and Environmental Control</p> <p>3.8 OSH Rule No. 1080 – Personal Protective Equipment and Devices</p> <p>3.9 OSH Rule No. 1100 – Gas and Electric Welding and Cutting Operations</p> <p>3.10 OSH Rule on 1940 – Fire Protection and Control</p>	<p>3.1 Performing Tack welding</p> <p>3.2 Performing Root Pass</p> <p>3.3 Performing cover pass</p> <p>3.4 Cleaning of Root Pass</p> <p>3.5 Visual checking of Weld</p> <p>3.6 Applying safety practices</p> <p>3.7 Wearing of PPEs</p> <p>3.8 Checking workpiece</p>
4. Perform post-welding operation	4.1 Welded workpiece is checked and submitted to immediate supervisor following industry procedure according to specifications and industry	<p>4.1 Checking of finished workpiece</p> <p>4.2 Preparation of report</p> <p>4.3 Procedure of shutting down of welding machine</p> <p>4.4 Storage of tools</p>	<p>4.1 Shutting down welding machine</p> <p>4.2 Cleaning and storing tools and materials</p> <p>4.3 Restoring workplace</p> <p>4.4 Performing good housekeeping</p>

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	<p>guidelines.</p> <p>4.2 Accomplishment report is prepared following workplace procedures.</p> <p>4.3 Welding machine is shutdown according to manufacturer's manual and industry guidelines.</p> <p>4.4 Tools are maintained and stored based on established procedures and industry guidelines.</p> <p>4.5 Defective tools and machines are tagged and reported according to workplace procedures.</p> <p>4.6 Good housekeeping is performed following 5S.</p> <p>4.7 Solid waste management is practiced according to Ecological Solid Waste Management Act of 2000.</p>	<p>and materials</p> <p>4.5 Tagging of defective tools and lathe</p> <p>4.6 5S of good housekeeping</p> <p>4.7 3Rs</p> <p>4.8 OSH Rule No. 1070 – Occupational Health and Environmental Control</p> <p>4.9 OSH Rule No. 1080 – Personal Protective Equipment and Devices</p> <p>4.10 OSH Rule No. 1210 – Electrical Safety</p> <p>4.11 RA 9003- Ecological Solid Waste Management Act of 2000</p>	<p>4.5 Preparing accomplishment report</p> <p>4.6 Tagging defective tools and equipment</p> <p>4.7 Managing wastes</p> <p>4.8 Applying safety practices</p>

RANGE OF VARIABLES

VARIABLE	RANGE
1. Tools and materials	Includes: 1.1 Tools: 1.1.1 Slag hammer 1.1.2 Steel brush 1.1.3 Ballpeen hammer 1.1.4 Portable grinder 1.1.5 Flat file 1.1.6 Half round file 1.1.7 Adjustable wrench 1.2 Material: 1.2.1 Low carbon steel welding rod 1.2.2 High carbon steel welding rod
2. PPEs	May include: 2.1 Welder's helmet 2.2 Apron, leather 2.3 Safety shoes 2.4 Safety gloves, leather 2.5 Welder's mask
3. Setting-up of welding machine	Includes: 3.1 Connecting to an independent power supply 3.2 Adjustment or fine-tuning of current and voltage
4. Holding devices	May include: 4.1 Braces 4.2 Stiffeners 4.3 Rails 4.4 Other jigs
5. Tack welding	Includes: 5.1 Bridge tacking 5.2 Permanent tacking 5.3 Temporary tacking
6. Industry guidelines	May include: 6.1 OSH Rule No. 1070 – Occupational Health and Environmental Control 6.2 OSH Rule No. 1080 – Personal Protective Equipment and Devices 6.3 OSH Rule No. 1100 – Gas and Electric Welding and Cutting Operations 6.4 OSH Rule No. 1150 – Materials Handling and Storage 6.5 OSH Rule No. 1200 – Machine Guarding 6.6 OSH Rule No. 1210 – Electrical Safety 6.7 OSH Rule on 1940 – Fire Protection and Control 6.8 RA 9003-Ecological Solid Waste Management Act of 2000

EVIDENCE GUIDE

<p>1. Critical aspects of competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Conducted preparatory activities 1.2 Efficiently set up the welding machine and holding devices 1.3 Applied weld and visually checked the work piece 1.4 Performed post-welding operations 1.5 Applied safety practices
<p>2. Resource implications</p>	<p>The following resources MUST be provided</p> <ul style="list-style-type: none"> 2.1 Tools, equipment and facilities appropriate to processes or activities 2.2 Materials relevant to the proposed activity 2.3 Drawings, sketches or blueprint
<p>3. Method of assessment</p>	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> 3.1 Direct observation of welding activities 3.2 Written or oral short answer questions 3.3 Practical exercises 3.4 Identify colleagues/clients who can be approached for the collection of competency evidence, where appropriate
<p>4. Context for assessment</p>	<p>Competency may be assessed in the workplace or in simulated workplace environment.</p>

SECTION 3. TRAINING ARRANGEMENTS

These guidelines are set to provide the Technical and Vocational Education and Training (TVET) providers with information and other important requirements to consider when designing training programs for MACHINING NC I.

3.1 CURRICULUM DESIGN

Course Title: **MACHINING** NC Level: **NC I**

Nominal Training Duration: 47 Hours (Basic Competencies)
60 Hours (Common Competencies)
859 Hours (Core Competencies)
624 Hours (SIT)

1,590 Hours

Nominal Training Duration : 1,590 Hours

Course Description:

This course is designed to provide the learner with knowledge, practical skills and attitude, applicable in performing work activities involve in performing bench work (basic), turning workpiece, milling workpiece, grinding workpiece, shaping workpiece and repairing workpiece. This include classroom learning activities and practical work in actual work site or simulation area.

Upon completion of the course, the learners are expected to demonstrate the above-mentioned competencies to be employed. To obtain this, all units prescribed for this qualification must be achieve.

**BASIC COMPETENCIES
(47 HOURS)**

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
1. Receive and respond to workplace communication	1.1 Follow routine spoken messages	<ul style="list-style-type: none"> • Exercise Conciseness in receiving and clarifying messages/ information/ communication 	<ul style="list-style-type: none"> • Group discussion • Interaction • Reportorial • Modular 	<ul style="list-style-type: none"> • Interviews/ • Questioning • Practical/ • Performance Test • Observation 	4 Hours
	1.2 Perform workplace duties following written notices	<ul style="list-style-type: none"> • Practice Accuracy in following written/ oral instruction/ information • Practice written and oral communication skills • Case Study in handling written communication • Practice relaying/ disseminating messages/ information • Analyze different messages 	<ul style="list-style-type: none"> • Lecture/ • Discussion • Demonstration • Case Study 	<ul style="list-style-type: none"> • Written • Practical • Written • Demonstration 	4 Hours
2. Work with others	2.1 Develop effective workplace relationships	<ul style="list-style-type: none"> • Read job description and organizations policies relevant to work role • Read personnel code of conduct and discipline • Role play on cooperation and good relationship • Study table of organization and identify team members • Role play on team work. • Role play on receiving feedback from supervisor • Role play on providing feedback. • Listen to lecture on Valuing and 	<ul style="list-style-type: none"> • Individual Work • Discussion • Role Play • Lecture 	<ul style="list-style-type: none"> • Role Play • Structured activity • Written Test 	2 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		exemplifying respect and empathy in the workplace			
	2.2 Contribute to work group activities	<ul style="list-style-type: none"> • Discussion on creative collaboration, social perceptiveness and problem sensitivity • Role play on creative collaboration, social perceptiveness and problem sensitivity. • Participate in a goal setting activity • Participate in planning and implementation of a group activity. • Participate in evaluation of the group activity 	<ul style="list-style-type: none"> • Lecture/ Discussion • Role Play • Group Work 	<ul style="list-style-type: none"> • Role Play • Structured activity • Written Test 	1 hour
3. Solve/address routine problems	3.1 Identify the problem	<ul style="list-style-type: none"> • Show mastery of the current industry hardware and software products and services <ul style="list-style-type: none"> ○ Show mastery of knowledge and understanding of the process, normal operating parameters, and product quality to recognize non-standard situations ○ Relevant equipment and operational processes ○ Enterprise goals, targets and measures ○ Enterprise quality OHS and environmental requirement ○ Enterprise information systems 	<ul style="list-style-type: none"> • Interactive Lecture • Appreciative Inquiry • Demonstration 	<ul style="list-style-type: none"> • Case Formulation • Life Narrative Inquiry (Interview) • Standardized test 	1 hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		<ul style="list-style-type: none"> and data collation <ul style="list-style-type: none"> ○ Industry codes and standards • Use range of formal problem-solving techniques (e.g., planning, attention, simultaneous and successive processing of information) • Identify and clarify the nature of the problem 			
	3.2 Assess fundamental causes of problem	<ul style="list-style-type: none"> • Show mastery of the current industry hardware and software products and services <ul style="list-style-type: none"> ○ Show mastery of knowledge and understanding of the process, normal operating parameters, and product quality to recognize non-standard situations ○ Relevant equipment and operational processes ○ Enterprise goals, targets and measures ○ Enterprise quality OHS and environmental requirement ○ Enterprise information systems and data collation ○ Industry codes and standards • Use range of formal problem-solving techniques (e.g., planning, attention, simultaneous and successive processing of information) 	<ul style="list-style-type: none"> • Group discussion • Lecture • Demonstration • Role play 	<ul style="list-style-type: none"> • Case Formulation • Life Narrative Inquiry (Interview) • Standardized test 	1 hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		<ul style="list-style-type: none"> • Identify and clarify the nature of the problem 			
	3.3 Determine corrective action	<ul style="list-style-type: none"> • Show mastery of the current industry hardware and software products and services <ul style="list-style-type: none"> ○ Show mastery of knowledge and understanding of the process, normal operating parameters, and product quality to recognize non-standard situations ○ Relevant equipment and operational processes ○ Enterprise goals, targets and measures ○ Enterprise quality OHS and environmental requirement ○ Enterprise information systems and data collation ○ Industry codes and standards • Use range of formal problem-solving techniques (e.g., planning, attention, simultaneous and successive processing of information) • Identify and clarify the nature of the problem 	<ul style="list-style-type: none"> • Group discussion • Lecture • Demonstration • Role play 	<ul style="list-style-type: none"> • Case Formulation • Life Narrative Inquiry (Interview) • Standardized test 	1 hour
	3.4 Communicate action plans and recommendations to routine	<ul style="list-style-type: none"> • Show mastery of the current industry hardware and software products and services <ul style="list-style-type: none"> ○ Show mastery of knowledge and understanding of the 	<ul style="list-style-type: none"> • Group discussion • Lecture • Demonstration • Role playing 	<ul style="list-style-type: none"> • Case Formulation • Life Narrative Inquiry (Interview) • Standardized test 	1 hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	problems	<p>process, normal operating parameters, and product quality to recognize non-standard situations</p> <ul style="list-style-type: none"> ○ Relevant equipment and operational processes ○ Enterprise goals, targets and measures ○ Enterprise quality OHS and environmental requirement ○ Enterprise information systems and data collation ○ Industry codes and standards <ul style="list-style-type: none"> ● Use range of formal problem-solving techniques (e.g., planning, attention, simultaneous and successive processing of information) ● Identify and clarify the nature of the problem 			
4. Enhance Self-Management Skills	4.1 Set personal and career goals	<ul style="list-style-type: none"> ● Define and set personal goals and career goals ● Describe the SMART Model for goal setting ● Create personal and career goals using SMART Model for goal setting ● Explain and apply the principles of goal setting according to Locke & Latham 	<ul style="list-style-type: none"> ● Discussion ● Making of personal and career goals by students ● Brainstorming 	<ul style="list-style-type: none"> ● Demonstration or simulation with oral questioning ● Case problems involving workplace diversity issues 	1 hour
	4.2 Recognize emotions	<ul style="list-style-type: none"> ● Identify common positive and negative emotions manifested in 	<ul style="list-style-type: none"> ● Discussion ● Interactive Lecture 	<ul style="list-style-type: none"> ● Demonstration or simulation with 	1 hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		<p>the workplace</p> <ul style="list-style-type: none"> • Distinguish professional and non-professional behaviors in the workplace • Recognize triggers and implications of positive and negative emotions in the workplace • Respond with appropriate emotions and identify possible consequences of inappropriate emotional responses in a social and work-related context 	<ul style="list-style-type: none"> • Brainstorming 	<p>oral questioning</p> <ul style="list-style-type: none"> • Case problems involving workplace diversity issues 	
	<p>4.3 Describe oneself as a learner</p>	<ul style="list-style-type: none"> • Review Kolb's Theory of Learning Styles • Describe VAK Learning Style Model (Visual, Auditory, Kinesthetic) • Cite learning strategies appropriate to specific tasks and describe work practices that assist learning • Identify factors and strategies that assist learning • Apply learning styles to positively influence school/work performance • Use appropriate learning strategies to improve study habits and learning 	<ul style="list-style-type: none"> • Discussion • Interactive Lecture • Brainstorming • Simulation 	<ul style="list-style-type: none"> • Demonstration or simulation with oral questioning • Case problems involving workplace diversity issues 	<p>1 hour</p>
<p>5. Support Innovation</p>	<p>5.1 Identify the need for innovation in one's area of</p>	<ul style="list-style-type: none"> • Show mastery of the clear-cut definition of innovation and its characteristics • Identify the need for innovation in 	<ul style="list-style-type: none"> • Interactive Lecture • Appreciative Inquiry • Demonstration 	<ul style="list-style-type: none"> • Psychological and behavioral Interviews • Performance 	<p>1 hour</p>

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	work	one's work area <ul style="list-style-type: none"> • Identify work procedures needing change • Contribute to brainstorming sessions with co-workers on identifying tasks needing change 	<ul style="list-style-type: none"> • Group work 	Evaluation <ul style="list-style-type: none"> • Life Narrative Inquiry • Review of portfolios of evidence and third-party workplace reports of on-the-job performance. • Standardized assessment of character strengths and virtues applied 	
	5.2 Recognize innovative and creative ideas	<ul style="list-style-type: none"> • Identify resources needed for change and potential obstacles as well • Show positive attitudes and behaviors in accepting and in needing change in one's work area • Delineate differences between creativity and innovation 	<ul style="list-style-type: none"> • Interactive Lecture • Appreciative Inquiry • Demonstration • Group work 	<ul style="list-style-type: none"> • Psychological and behavioral Interviews • Performance Evaluation • Life Narrative Inquiry • Review of portfolios of evidence and third-party workplace reports of on-the-job performance. • Standardized assessment of character 	1 hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	5.3 Support individuals' access to flexible and innovative ways of working	<ul style="list-style-type: none"> • Identify different roles of employees/workers in the improvement of practices in the organization • Identify practices for flexible and innovative ways of working • Share information with co-workers • Detect potential problems in implementing flexible ways of working 	<ul style="list-style-type: none"> • Interactive Lecture • Appreciative Inquiry • Demonstration • Group work 	<p>strengths and virtues applied</p> <ul style="list-style-type: none"> • Psychological and behavioral Interviews • Performance Evaluation • Life Narrative Inquiry • Review of portfolios of evidence and third-party workplace reports of on-the-job performance. • Standardized assessment of character strengths and virtues applied 	1 hour
6. Access and maintain information	6.1 Identify and gather needed information	<ul style="list-style-type: none"> • Lecture and discussion on: <ul style="list-style-type: none"> ○ Policies, procedures and guidelines relating to information handling in the public and private sector, including confidentiality, privacy, security, freedom of information 	<ul style="list-style-type: none"> • Lecture • Demonstration • Practical exercises 	<ul style="list-style-type: none"> • Oral evaluation • Written Test • Observation 	3 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		<ul style="list-style-type: none"> ○ Data collection and management procedures ○ Public/private sector standards ● Identify sources to produce required information ● Perform exercises on information gathering 			
	6.2 Search for information on the internet or an intranet	<ul style="list-style-type: none"> ● Lecture and discussion on: <ul style="list-style-type: none"> ○ Techniques in finding useful information ○ Search engines for information ● Find and select appropriate information ● Perform information searching on the internet using different search engines 	<ul style="list-style-type: none"> ● Group discussion ● Lecture ● Demonstration ● Practical exercises 	<ul style="list-style-type: none"> ● Oral evaluation ● Written Test ● Observation ● Presentation 	2 Hours
	6.3 Examine information	<ul style="list-style-type: none"> ● Lecture and discussion on: <ul style="list-style-type: none"> ○ Data evaluation procedures ○ Cultural aspects of information and meaning ○ Sources of public sector work-related information ● Evaluation of searched information 	<ul style="list-style-type: none"> ● Group discussion ● Lecture ● Demonstration ● Practical exercises 	<ul style="list-style-type: none"> ● Oral evaluation ● Written Test ● Observation ● Presentation 	2 Hours
	6.4 Secure information	<ul style="list-style-type: none"> ● Lecture and discussion on: <ul style="list-style-type: none"> ○ Basic file-handling techniques ○ Techniques in handling, organizing and saving files ○ Electronic and manual filing systems ● Performance of basic file-handling techniques ● Application of electronic and 	<ul style="list-style-type: none"> ● Group discussion ● Lecture ● Demonstration ● Role Play ● Practical exercises 	<ul style="list-style-type: none"> ● Oral evaluation ● Written Test ● Observation ● Presentation 	3 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		manual filing systems			
	6.5 Manage information	<ul style="list-style-type: none"> • Lecture and discussion on: <ul style="list-style-type: none"> ○ Organizational information handling and storage procedures ○ Databases and data storage systems • Managing databases and data storage systems 	<ul style="list-style-type: none"> • Group discussion • Lecture • Demonstration • Practical exercises 	<ul style="list-style-type: none"> • Oral evaluation • Written Test • Observation • Presentation 	2 Hours
7. Follow Occupational Safety And Health Policies And Procedures	7.1 Identify relevant occupational safety and health policies and procedures	<ul style="list-style-type: none"> • Discussion of Risks and Hazards • Risk and Hazard Identification 	<ul style="list-style-type: none"> • Lecture • Group Discussion 	<ul style="list-style-type: none"> • Written Exam • Demonstration • Observation • Interviews / • Questioning 	2 hours
	7.2 Perform relevant occupational safety and health procedures	<ul style="list-style-type: none"> • Demonstration of proper use of Personal Protective Equipment and Materials Handling • Practice Emergency Plan 	<ul style="list-style-type: none"> • Lecture • Group Discussion 	<ul style="list-style-type: none"> • Written Exam • Demonstration • Observation • Interviews / • Questioning 	2 hours
	7.3 Comply with relevant occupational safety and health policies and standards	<ul style="list-style-type: none"> • Discussion on Personal Hygiene and Preventive Control Measures • Practice 5S and waste segregation 	<ul style="list-style-type: none"> • Lecture • Group Discussion 	<ul style="list-style-type: none"> • Written Exam • Demonstration • Observation • Interviews / • Questioning 	4 hours
8. Apply Environmental Work Standards	8.1 Identify environmental work hazards	<ul style="list-style-type: none"> • Discussions in <ul style="list-style-type: none"> ○ Reduction in greenhouse gas emissions, ○ Increase the share of renewables of gross final 	<ul style="list-style-type: none"> • Lecture • Group Discussion 	<ul style="list-style-type: none"> • Written Exam • Demonstration • Observation • Interviews / • Questioning 	1 hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		energy consumption, <ul style="list-style-type: none"> ○ Long-term reduction of energy consumption, ○ Release of materials into the environment should, in the long run, not exceed the adaptability of the eco-system, ○ Dangers and unjustifiable risks to human health ○ Energy and natural resource consumption and the provision of transport services 			
	8.2 Follow environmental work procedures	<ul style="list-style-type: none"> • Discussions Protection against <ul style="list-style-type: none"> ○ Human Dangers ○ Overconsumption of Resources ○ Destruction of Ecosystems ○ Habitat Destructions ○ Extinction of Wildlife ○ Pollutions ○ Water Degradation 	<ul style="list-style-type: none"> • Lecture • Group Discussion • Demonstration 	<ul style="list-style-type: none"> • Written Exam • Demonstration • Observation • Interviews / • Questioning 	1 hour
	8.3 Comply with environmental work requirements	<ul style="list-style-type: none"> • Discussions Environmental Regulations and its requirements relevant to the industry and work activities • Demonstration and Practice Environmental Compliance 	<ul style="list-style-type: none"> • Lecture • Group Discussion • Demonstration 	<ul style="list-style-type: none"> • Written Exam • Demonstration • Observation • Interviews / • Questioning 	1 hour
9. Adopt Entrepreneurial Mindset in the Workplace	9.1 Determine entrepreneurial mindset	<ul style="list-style-type: none"> • Discussion on Entrepreneurial Mindset • Games to develop entrepreneurial mind set 	<ul style="list-style-type: none"> • Lecture • discussion • Games 	<ul style="list-style-type: none"> • Written Test • Role play 	2 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	9.2 Identify entrepreneurial practices	<ul style="list-style-type: none"> • Case study- quality assurance practices • Discussion on cost effective measures • Discussion on Workplace quality Policy 	<ul style="list-style-type: none"> • Case study • Lecture discussion 	<ul style="list-style-type: none"> • Written Test • Case Study 	1 hour

COMMON COMPETENCIES
60 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
1. Apply safety practices	1.1 Identify hazards	<ul style="list-style-type: none"> • Discuss shop safety signs, symbols and alarms • Discuss OHS principles • Identify hazards • Identify safety signs and symbols • Apply OHS 	<ul style="list-style-type: none"> • Lecture • Group discussion • Interaction • Role playing/ Simulation 	<ul style="list-style-type: none"> • Observation • Demonstration • Interview/ Questioning 	2 Hours
	1.2 Use protective clothing and devices	<ul style="list-style-type: none"> • Describe different protective clothing and devices • Discuss OHS requirements • Enumerate safety precautionary measures • Select protective clothing and devices • Use protective clothing and devices • Apply OHS 	<ul style="list-style-type: none"> • Lecture • Group discussion • Interaction • Role playing/ Simulation 	<ul style="list-style-type: none"> • Observation • Demonstration • Interview/ Questioning 	2 Hours
	1.3 Perform safe handling of tools, equipment and materials	<ul style="list-style-type: none"> • Discuss the proper handling of tools and materials • Enumerate environmental requirements relative to work safety • Apply safety procedures in checking and operating tools and equipment • Handle tools, equipment and materials • Apply OHS requirements 	<ul style="list-style-type: none"> • Lecture • Group discussion • Interaction • Role playing/ Simulation 	<ul style="list-style-type: none"> • Observation • Demonstration • Interview/ Questioning 	2 Hours
	1.4 Perform first aid	<ul style="list-style-type: none"> • Describe the types of injuries • Discuss first aid treatment for injury 	<ul style="list-style-type: none"> • Lecture • Group discussion 	<ul style="list-style-type: none"> • Observation • Demonstration 	2 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		<ul style="list-style-type: none"> Identify injury Apply first aid treatment for injury 	<ul style="list-style-type: none"> Interaction Role playing/ Simulation 	<ul style="list-style-type: none"> Interview/ Questioning 	
	1.5 Use fire extinguisher	<ul style="list-style-type: none"> Describe the types of fire Discuss the operation of fire extinguisher Identify types of fire Select fire extinguisher Operate fire extinguisher 	<ul style="list-style-type: none"> Lecture Group discussion Interaction Role playing/ Simulation 	<ul style="list-style-type: none"> Observation Demonstration Interview/ Questioning 	2 Hours
2. Interpret working drawings and sketches	2.1 Interpret technical drawing	<ul style="list-style-type: none"> Describe components, assemblies or objects Read projections, drawing symbols Discuss different dimensioning techniques Discuss tolerance, limits, and fits Identify engineering materials Enumerate drawing tools and supplies Interpret technical drawing 	<ul style="list-style-type: none"> Lecture Group discussion Interaction 	<ul style="list-style-type: none"> Observation Interview/ Questioning 	4 Hours
	2.2 Prepare freehand sketch of parts	<ul style="list-style-type: none"> Identify object and parts for sketching Sketch object and parts Indicate dimensions of object and parts, instructions, and base line or datum points on sketch 	<ul style="list-style-type: none"> Lecture Group discussion Interaction 	<ul style="list-style-type: none"> Observation Interview/ Questioning 	4 Hours
	2.3 Interpret details from freehand sketch	<ul style="list-style-type: none"> Enumerate components, assemblies or objects Describe dimensions Discuss instructions Describe material requirements Describe symbols 	<ul style="list-style-type: none"> Lecture Group discussion Interaction 	<ul style="list-style-type: none"> Observation Interview/ Questioning 	2 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		<ul style="list-style-type: none"> • Identify components, assemblies or objects • Identify dimensions • Read and follow instructions • Identify material requirements • Identify symbols 			
3. Select and cut workshop materials	3.1 Determine requirement	<ul style="list-style-type: none"> • Describe plans/drawings • Enumerate sequence of operation • Interpret plans/drawings • Determine sequence of operation 	<ul style="list-style-type: none"> • Lecture • Demonstration • Practical exercise 	<ul style="list-style-type: none"> • Demonstration • Observation • Performance test • Interview/ Questioning 	2 Hours
	3.2 Select and measure materials	<ul style="list-style-type: none"> • Identify materials • Describe level of accuracy • Discuss the procedure in measuring materials • Identify measuring tools • Select materials • Measure materials • Use measuring tools 	<ul style="list-style-type: none"> • Lecture • Demonstration • Practical exercise 	<ul style="list-style-type: none"> • Demonstration • Observation • Performance test • Interview/ Questioning 	2 Hours
	3.3 Cut materials	<ul style="list-style-type: none"> • Discuss hacksaw blade teeth configuration • Discuss shop safety practices • Discuss safe handling of tools, equipment and materials • Select and use cutting tools/ equipment • Cut materials 	<ul style="list-style-type: none"> • Lecture • Demonstration • Practical exercise 	<ul style="list-style-type: none"> • Demonstration • Observation • Performance test • Interview/ Questioning 	6 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
4. Perform shop computations (Basic)	4.1 Perform four fundamental operations	<ul style="list-style-type: none"> • Discuss the four fundamental operations • Compute using the four fundamental operations 	<ul style="list-style-type: none"> • Lecture • Demonstration • Practical exercise 	<ul style="list-style-type: none"> • Demonstration • Observation • Performance test • Interview/ Questioning 	2 Hours
	4.2 Perform basic calculations involving fractions and decimals	<ul style="list-style-type: none"> • Discuss fractions, mixed numbers and decimals • Discuss conversion of decimal and fraction • Calculate fractions and decimals • Convert decimal to fraction • Convert fraction to decimal 	<ul style="list-style-type: none"> • Lecture • Demonstration • Practical exercise 	<ul style="list-style-type: none"> • Demonstration • Observation • Performance test • Interview/ Questioning 	2 Hours
	4.3 Perform basic calculations involving percentages	<ul style="list-style-type: none"> • Discuss conversion of fraction and decimal to percentage • Convert fraction to percentage • Convert decimal to percentage 	<ul style="list-style-type: none"> • Lecture • Demonstration • Practical exercise 	<ul style="list-style-type: none"> • Demonstration • Observation • Performance test • Interview/ Questioning 	2 Hours
	4.4 Perform basic calculations involving ratio and proportion	<ul style="list-style-type: none"> • Discuss ratio and proportion from whole numbers, fractions, and decimals • Compute ratio and proportion of whole numbers • Compute ratio and proportion of fractions • Compute ratio and proportion of decimals 	<ul style="list-style-type: none"> • Lecture • Demonstration • Practical exercise 	<ul style="list-style-type: none"> • Demonstration • Observation • Performance test • Interview/ Questioning 	2 Hours
	4.5 Perform calculations on algebraic expressions	<ul style="list-style-type: none"> • Discuss algebraic expressions • Discuss derivation of variable • Compute for algebraic expressions • Perform derivation of variable 	<ul style="list-style-type: none"> • Lecture • Demonstration • Practical exercise 	<ul style="list-style-type: none"> • Demonstration • Observation • Performance test • Interview/ Questioning 	2 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
5. Measure workpiece (Basic)	5.1 Select and use measuring tools	<ul style="list-style-type: none"> Describe measuring tools Discuss the procedure in checking the accuracy of measurements Explain measuring techniques Select and use measuring tools Check accuracy of measurements Use measuring techniques 	<ul style="list-style-type: none"> Lecture Demonstration Practical exercise 	<ul style="list-style-type: none"> Demonstration Observation Performance test Interview/Questioning 	4 Hours
	5.2 Clean and store measuring tools	<ul style="list-style-type: none"> Explain the safe handling and storage of measuring tools Handle and store measuring tools 	<ul style="list-style-type: none"> Lecture Demonstration Practical exercise 	<ul style="list-style-type: none"> Demonstration Observation Performance test Interview/Questioning 	2 Hours
6. Perform routine housekeeping	6.1 Organize work area	<ul style="list-style-type: none"> Discuss the principles of 5S, work policies and procedures, general OSH principles and legislation Describe safety signs and symbols Explain the environmental requirements to work safety Discuss the workshop policies and procedure in maintaining a work area Enumerate the procedure in carrying out task Maintain work area applying workshop policies and procedures Carry out task 	<ul style="list-style-type: none"> Lecture Group discussion Simulation Practical exercise 	<ul style="list-style-type: none"> Demonstration Observation Performance test Interview/Questioning 	2 Hours
	6.2 Clean work area	<ul style="list-style-type: none"> Discuss shop policies and procedures in cleaning work area Describe different wastes and other potential hazards in work area Explain environmental laws related 	<ul style="list-style-type: none"> Lecture Group discussion Simulation Practical exercise 	<ul style="list-style-type: none"> Demonstration Observation Performance test Interview/Questioning 	4 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		<p>to waste disposal</p> <ul style="list-style-type: none"> • Enumerate the procedure in reporting wastes and potential hazards • Discuss proper removal and disposal of wastes • Differentiate signage for unsafe areas. • Enumerate different consumable materials • Discuss the procedure in maintaining and storing consumable materials • Discuss the procedure in cleaning and usage of tools and equipment • Apply shop policies and procedures in cleaning work area • Identify wastes and potential hazards • Report wastes and potential hazards • Remove and dispose wastes • Identify and display proper signage for unsafe areas • Maintain and store consumable materials • Clean and use tools and equipment 			
7. Perform preventive and corrective maintenance	7.1 Perform inspection of machine	<ul style="list-style-type: none"> • Explain the procedure in proper machine inspection • Describe the main electrical switches of the machines • Discuss the procedure in reporting/ 	<ul style="list-style-type: none"> • Lecture • Demonstration • Group discussion • Practical exercise 	<ul style="list-style-type: none"> • Demonstration • Observation • Performance test • Interview/ Questioning 	2 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		recording the status of machines and tools <ul style="list-style-type: none"> • Inspect machine • Record and report the status of machines 			
	7.2 Perform cleaning and lubricating of machine	<ul style="list-style-type: none"> • Discuss the proper cleaning and oiling of machines • Differentiate kinds of oil, cutting oil, coolant or compound substances • Discuss the procedure in cleaning and disposing wastes • Lubricate machines • Replace and topped up fluids and lubricants 	<ul style="list-style-type: none"> • Lecture • Demonstration • Group discussion • Practical exercise 	<ul style="list-style-type: none"> • Demonstration • Observation • Performance test • Interview/ Questioning 	2 Hours
	7.3 Perform minor machine repair and adjustments	<ul style="list-style-type: none"> • Explain the work policies and worksites procedures in minor repair of machines • Describe parts and function of machine tools • Discuss the procedure in adjusting moving parts • Enumerate PPEs in performing minor machine repair and adjustments • Perform minor machine repairs • Adjust moving parts of the machine 	<ul style="list-style-type: none"> • Lecture • Demonstration • Group discussion • Practical exercise 	<ul style="list-style-type: none"> • Demonstration • Observation • Performance test • Interview/ Questioning 	2 Hours
	7.4 Maintain hand tools	<ul style="list-style-type: none"> • Explain the geometry of cutting tools • Describe the PPEs in maintaining hand tools • Enumerate the procedure in correct handling and storing hand tools 	<ul style="list-style-type: none"> • Lecture • Demonstration • Group discussion • Practical exercise 	<ul style="list-style-type: none"> • Demonstration • Observation • Performance test • Interview/ Questioning 	2 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		<ul style="list-style-type: none"> • Lubricate and store hand tools 			

CORE COMPETENCIES
859 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
1. Perform Bench Work (Basic)	1.1 Conduct pre-benchwork operation	1.1.1 Discuss and explain the following: <ul style="list-style-type: none"> • Kinds of Bench work materials, tools and supplies • Sequence of Operation • Procedures in checking tools and materials • Procedure of Off-hand grinding of cutting and marking tools • Measurement of dimensions • English to metric conversion • Interpretation of drawing and alphabet of lines • OSH Rule No. 1080 – Personal Protective Equipment & Devices • OSH Rule No. 1150 – Materials Handling & Storage • Air pollution • Noise pollution • Quality control 1.1.2 Conduct pre-benchwork operation	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Video presentation 	<ul style="list-style-type: none"> • Written Exam • Oral Questioning • Demonstration 	41 hrs
	1.2 Conduct bench work operations	1.2.1 Discuss and explain the following: <ul style="list-style-type: none"> • ISO Metal Manufacturing 	<ul style="list-style-type: none"> • Lecture • Discussion 	<ul style="list-style-type: none"> • Oral Questioning • Demonstration 	81 hrs

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		standards <ul style="list-style-type: none"> • Procedures in chipping workpiece to its squareness • Procedures in filing of workpiece • Procedures in cutting of workpiece using hacksaw • Procedures in replacing a dull hacksaw blade • Procedures in checking workpiece • Classification of file • Classification of hacksaw blade • Measurement of dimensions • English to metric conversion • OSH Rule No. 1070 – Occupational Health & Environmental Control • OSH Rule No. 1080 – Personal Protective Equipment & Devices • Air pollution • Noise pollution 1.2.2 Conduct bench work operation	<ul style="list-style-type: none"> • Demonstration • Video presentation 	<ul style="list-style-type: none"> • Written Exam 	
	1.3 Conduct post bench work operations	1.3.1 Discuss and explain the following: <ul style="list-style-type: none"> • ISO Metal Manufacturing standards • 5S • 3Rs • OSHS 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Video presentation 	<ul style="list-style-type: none"> • Oral Questioning • Demonstration • Written Exam 	24 hrs

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		<ul style="list-style-type: none"> • RA 9003-Ecological Solid Waste Management Act of 2000 • Preparation of report 1.3.2 Conduct post bench work operations			
2. Turn Workpiece	2.1 Confirm job requirements	2.1.1 Discuss and explain the following: <ul style="list-style-type: none"> • Drafting/drawing skills to include ability to apply knowledge in limits, fits, tolerances and surface texture of workpiece • Determination of sequence of operation • Different forms of cutting tools • Preparation of cutting tools • Different types of materials, supplies and tools • Measuring of dimensions • English to metric conversion • OSH Rule No. 1070 – Occupational Health & Environmental Control • OSH Rule No. 1080 – Personal Protective Equipment & Devices • OSH Rule No. 1150 – Materials Handling & Storage • OSH Rule No. 1200 – 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Video presentation 	<ul style="list-style-type: none"> • Written Exam • Oral Questioning • Demonstration 	80.5 hrs

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		Machine Guarding <ul style="list-style-type: none"> • OSH Rule No. 1210 – Electrical Safety • Noise pollution • Air pollution 2.1.2 Confirm job requirements			
	2.2 Set-up workpiece	2.2.1 Discuss and explain the following: <ul style="list-style-type: none"> • Use and types of centering instruments • Setting-up work piece and machine safely • Types of materials, supplies and tools • Measuring of dimensions • English to metric conversion • OSH Rule No. 1070 – Occupational Health & Environmental Control • OSH Rule No. 1080 – Personal Protective Equipment & Devices • OSH Rule No. 1150 – Materials Handling & Storage • Noise pollution • Air pollution 2.2.2 Set-up workpiece	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Video presentation 	<ul style="list-style-type: none"> • Written Exam • Oral Questioning • Demonstration 	4.5 hrs
	2.3 Set up cutting tools	2.3.1 Discuss and explain the following: <ul style="list-style-type: none"> • Mounting procedure • Centering procedure 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Video presentation 	<ul style="list-style-type: none"> • Written Exam • Oral Questioning • Demonstration 	4.5 hrs

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		<ul style="list-style-type: none"> • Centering tools • OSH Rule No. 1070 – Occupational Health & Environmental Control • OSH Rule No. 1080 – Personal Protective Equipment & Devices <p>2.3.2 Set up cutting tools</p>			
	2.4 Perform turning operations	<p>2.4.1 Discuss and explain the following:</p> <ul style="list-style-type: none"> • Selection of lathe accessories • Operation of lathe • Use of water-based coolant • Types of materials, supplies and tools • English to metric conversion • Computation speeds, feeds and spindle revolution • Interpretation of drawing and alphabet of lines • Set-up cutting speed and feeds, & depth of cut • Cutting speed and feeds reference chart • Procedures in reporting irregularities • OSH Rule No. 1060 – Premises of Establishments • OSH Rule No. 1070 – Occupational Health & Environmental Control 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Video presentation 	<ul style="list-style-type: none"> • Written Exam • Oral Questioning • Demonstration 	80.5 hrs

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		<ul style="list-style-type: none"> • OSH Rule No. 1080 – Personal Protective Equipment & Devices • OSH Rule No. 1200 – Machine Guarding • Noise pollution • Air pollution 2.4.2 Perform turning operations			
	2.5 Perform post-turning operations	2.5.1 Discuss and explain the following: <ul style="list-style-type: none"> • Checking of finished workpiece • Preparation of report • Procedure of shutting down of lathe • Storage of tools and materials • Tagging of defective tools and machine • 5S of good housekeeping • 3Rs • Waste management • Environmental laws related to post turning activities • Application of anti-corrosion agents • OSH Rule No. 1070 – Occupational Health & Environmental Control • OSH Rule No. 1080 – Personal Protective Equipment & Devices 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Video presentation 	<ul style="list-style-type: none"> • Written Exam • Oral Questioning • Demonstration 	24 hrs

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		<ul style="list-style-type: none"> • OSH Rule No. 1150 – Materials Handling & Storage • RA 6969-Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990 • RA 9003-Ecological Solid Waste Management Act of 2000 			
3. Mill Workpiece	3.1 Confirm job requirements	2.5.2 Perform post-turning operations 3.1.1 Discuss and explain the following: <ul style="list-style-type: none"> • Drafting/ drawing skills to include ability to apply knowledge in limits, fits, tolerances and surface texture of workpiece • Determination of sequence of operation • Different forms of cutting tools • Preparation of cutting tools • Different types of materials, and tools • Measuring of dimensions • English to metric conversion • OSH Rule No. 1070 – Occupational Health & Environmental Control • OSH Rule No. 1080 – Personal Protective Equipment & Devices 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Video presentation 	<ul style="list-style-type: none"> • Written Exam • Oral Questioning • Demonstration 	80 hrs

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		<ul style="list-style-type: none"> • OSH Rule No. 1200 – Machine Guarding • 1.11 OSH Rule No. 1210 – Electrical Safety • Noise pollution • Air pollution 3.1.2 Confirm job requirements			
	3.2 Set up machine vice	3.2.1 Discuss and explain the following: <ul style="list-style-type: none"> • Procedure in mounting, aligning and clamping of machine vice • Sizes of machine vice • Operations manual • OSH Rule No. 1070 – Occupational Health & Environmental Control • OSH Rule No. 1080 – Personal Protective Equipment & Devices • OSH Rule No. 1150 – Materials Handling & Storage 3.2.2 Set up machine vice	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Video presentation 	<ul style="list-style-type: none"> • Written Exam • Oral Questioning • Demonstration 	4.5 hrs
	3.3 Set up workpiece	3.3.1 Discuss and explain the following: <ul style="list-style-type: none"> • Setting up workpiece and machine • Computation of cutting speed, feed and spindle speed • Types of materials, supplies 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Video presentation 	<ul style="list-style-type: none"> • Written Exam • Oral Questioning • Demonstration 	2.5 hrs

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		and tools <ul style="list-style-type: none"> • Measuring of dimensions • English to metric conversion • Interpretation of drawing and alphabet of lines • OSH Rule No. 1070 – Occupational Health & Environmental Control • OSH Rule No. 1080 – Personal Protective Equipment & Devices • OSH Rule No. 1150 – Materials Handling & Storage • Noise pollution • Air pollution 3.3.2 Set up workpiece			
	3.4 Set up cutting tools	3.4.1 Discuss and explain the following: <ul style="list-style-type: none"> • Types of cutting tools • Types of holder • Measuring of dimensions • English to metric conversion • OSH Rule No. 1080 – Personal Protective Equipment & Devices • Noise pollution • Air pollution • Mounting procedure • Hierarchy of hazard control measures 3.4.2 Set up cutting tools	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Video presentation 	<ul style="list-style-type: none"> • Written Exam • Oral Questioning • Demonstration 	2.5 hrs

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	3.5 Perform milling operations	3.5.1 Discuss and explain the following: <ul style="list-style-type: none"> • Selection of milling machine accessories • Procedure in operating milling machine • Use of PPEs • Procedure in checking workpiece • English to metric conversion • Computation speeds, feeds and spindle revolution • Interpretation of drawing and alphabet of lines • Set-up cutting speed and feeds, & depth of cut • Cutting speed and feeds reference chart • Procedures in reporting irregularities • OSH Rule No. 1070 – Occupational Health & Environmental Control • OSH Rule No. 1080 – Personal Protective Equipment & Devices • OSH Rule No. 1150 – Materials Handling & Storage • Noise pollution • Air pollution 3.5.2 Perform milling operations	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Video presentation 	<ul style="list-style-type: none"> • Written Exam • Oral Questioning • Demonstration 	80.5 hrs

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	3.6 Perform post-milling operations	3.6.1 Discuss and explain the following: <ul style="list-style-type: none"> • Checking of finished workpiece • Preparation of report • Procedure of shutting down of milling • Storage of tools and materials • Tagging of defective tools and machine • 5S of good housekeeping • 3Rs • Waste management • Application of anti-corrosion agents • OSH Rule No. 1080 – Personal Protective Equipment & Devices • OSH Rule No. 1210 – Electrical Safety • RA 6969-Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990 • RA 9003-Ecological Solid Waste Management Act of 2000 3.6.2 Perform post-milling operations	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Video presentation 	<ul style="list-style-type: none"> • Written Exam • Oral Questioning • Demonstration 	24 hrs
4. Grind Workpiece	4.1 Confirm job requirements	4.1.1 Discuss and explain the following: <ul style="list-style-type: none"> • Drafting/ drawing skills to include ability to apply 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Video presentation 	<ul style="list-style-type: none"> • Written Exam • Demonstration • Oral Questioning • Demonstration 	80 hrs

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		<p>knowledge in fits, tolerances and surface texture of workpiece</p> <ul style="list-style-type: none"> • Determination of sequence of operation • Types of grinding wheels • Types of materials and supplies • Measuring of dimensions • English to metric conversion • Hot work permit system • OSH Rule No. 1070 – Occupational Health and Environmental Control • OSH Rule No. 1080 – Personal Protective Equipment and Devices • OSH Rule No. 1150 – Materials Handling and Storage • Noise pollution • Air pollution <p>4.1.2 Confirm job requirements</p>			
	4.2 Set up workpiece	<p>4.2.1 Discuss and explain the following:</p> <ul style="list-style-type: none"> • Setting up work piece and machine • Use of magnetic plate • Use of precision vice • OSH Rule No. 1080 – Personal Protective Equipment and Devices 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Video presentation 	<ul style="list-style-type: none"> • Written Exam • Demonstration • Oral Questioning • Demonstration 	2.5 hrs

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		<ul style="list-style-type: none"> • OSH Rule No. 1150 – Materials Handling and Storage <p>4.2.2 Set up workpiece</p>			
	4.3 Set up surface grinding machine	<p>4.3.1 Discuss and explain the following:</p> <ul style="list-style-type: none"> • Types of grinding wheel • Procedure in mounting grinding wheel • Types of dressing wheel • OSH Rule No. 1070 – Occupational Health and Environmental Control • OSH Rule No. 1080 – Personal Protective Equipment and Devices <p>4.3.2 Set up surface grinding machine</p>	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Video presentation 	<ul style="list-style-type: none"> • Written Exam • Demonstration • Oral Questioning • Demonstration 	4.5 hrs
	4.4 Perform grinding operations	<p>4.4.1 Discuss and explain the following:</p> <ul style="list-style-type: none"> • Appropriate use of grinding machine accessories • Procedure in operating grinding machine • Procedure in checking workpiece • Safety practices using PPEs • Procedures in reporting irregularities • OSH Rule No. 1070 – Occupational Health and Environmental Control 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Video presentation 	<ul style="list-style-type: none"> • Written Exam • Demonstration • Oral Questioning • Demonstration 	41 hrs

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		<ul style="list-style-type: none"> • OSH Rule No. 1080 – Personal Protective Equipment and Devices • OSH Rule No. 1090 – Hazardous Materials • OSH Rule No. 1150 – Materials Handling and Storage • OSH Rule No. 1200 – Machine Guarding 			
	4.5 Perform post-grinding operations	4.4.2 Perform grinding operations 4.5.1 Discuss and explain the following: <ul style="list-style-type: none"> • Checking of finished workpiece • Preparation of report • Procedure of shutting down of grinding machine • Storage of tools and materials • Tagging of defective tools and lathe • 5S of good housekeeping • 3Rs • Application of anti-corrosion agents • OSH Rule No. 1080 – Personal Protective Equipment and Devices • OSH Rule No. 1150 – Materials Handling and Storage 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Video presentation 	<ul style="list-style-type: none"> • Written Exam • Demonstration • Oral Questioning • Demonstration 	24 hrs

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		<ul style="list-style-type: none"> RA 9003-Ecological Solid Waste Management Act of 2000 4.5.2 Perform post-grinding operations			
5. Shape workpiece	5.1 Confirm job requirements	5.1.1 Discuss and explain the following: <ul style="list-style-type: none"> Determination of sequence of operation Types of materials Preparation of tool bit and measuring tools Measuring of dimensions English to metric conversion Interpretation of drawing and alphabet of lines OSH Rule No. 1070 – Occupational Health and Environmental Control OSH Rule No. 1080 – Personal Protective Equipment and Devices OSH Rule No. 1150 – Materials Handling and Storage OSH Rule No. 1210 – Electrical Safety Noise pollution Air pollution 5.1.2 Confirm job requirements	<ul style="list-style-type: none"> Lecture Discussion Demonstration Video presentation 	<ul style="list-style-type: none"> Written Exam Demonstration Oral Questioning Demonstration 	40 hrs
	5.2 Setup workpiece and	5.2.1 Discuss and explain the following:	<ul style="list-style-type: none"> Lecture Discussion 	<ul style="list-style-type: none"> Written Exam Demonstration 	4.5 hrs

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	machine	<ul style="list-style-type: none"> • Setting-up work piece and machine • Types of materials, supplies and cutting tools • Measuring of dimensions • English to metric conversion • Setting cutting speed, feed rate • Interpretation of drawing and alphabet of lines • OSH Rule No. 1070 – Occupational Health and Environmental Control • OSH Rule No. 1080 – Personal Protective Equipment and Devices • OSH Rule No. 1150 – Materials Handling and Storage • Noise pollution • Air pollution 	<ul style="list-style-type: none"> • Demonstration • Video presentation 	<ul style="list-style-type: none"> • Oral Questioning • Demonstration 	
	5.3 Set up tool bit	5.2.2 Setup workpiece and machine 5.3.1 Discuss and explain the following: <ul style="list-style-type: none"> • Safe handling of tools, equipment and materials • Shaper cutters and holders • OSH Rule No. 1080 – Personal Protective Equipment and Devices 5.3.2 Set up tool bit	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Video presentation 	<ul style="list-style-type: none"> • Written Exam • Demonstration • Oral Questioning • Demonstration 	1.5 hr
	5.4 Perform	5.4.1 Discuss and explain the	• Lecture	• Written Exam	41 hrs

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	shaping operations	following: <ul style="list-style-type: none"> • Procedure in operating shaper machine • Types of materials and cutting tools • English to metric conversion • Interpretation of drawing and alphabet of lines • OSH Rule No. 1070 – Occupational Health and Environmental Control • OSH Rule No. 1080 – Personal Protective Equipment and Devices • OSH Rule No. 1200 – Machine Guarding • Noise pollution • Air pollution 5.4.2 Perform shaping operations	<ul style="list-style-type: none"> • Discussion • Demonstration • Video presentation 	<ul style="list-style-type: none"> • Demonstration • Oral Questioning • Demonstration 	
	5.5 Perform post-shaping operations	5.5.1 Discuss and explain the following: <ul style="list-style-type: none"> • Checking of finished workpiece • Preparation of report • Procedure of shutting down of shaper • Storage of tools and materials • Tagging of defective tools and shaper • 5S of good housekeeping • 3Rs 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Video presentation 	<ul style="list-style-type: none"> • Written Exam • Demonstration • Oral Questioning • Demonstration 	24 hrs

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		<ul style="list-style-type: none"> • OSH Rule No. 1070 – Occupational Health and Environmental Control • OSH Rule No. 1080 – Personal Protective Equipment and Devices • OSH Rule No. 1210 – Electrical Safety • RA 9003-Ecological Solid Waste Management Act of 2000 <p>5.5.2 Perform post-shaping operations</p>			
6. Repair workpiece	6.1 Conduct preparatory activities	<p>6.1.1 Discuss and explain the following:</p> <ul style="list-style-type: none"> • Procedure in conducting preparatory activities • Selection of electrode according to workpiece • Dimensions English to Metric conversion • Interpretation of drawing and alphabet of lines • Interpretation of welding symbols • Use of PPEs • OSH Rule No. 1070 – Occupational Health and Environmental Control • OSH Rule No. 1080 – Personal Protective Equipment and Devices 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Video show 	<ul style="list-style-type: none"> • Written Exam • Oral Questioning • Demonstration 	20 hrs

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		<ul style="list-style-type: none"> • Air pollution • Noise pollution 6.1.2 Conduct preparatory activities			
	6.2 Prepare welding machine and holding devices	6.2.1 Discuss and explain the following: <ul style="list-style-type: none"> • Procedure in setting up of Welding machine and work holding devices • Steps in protecting workpiece and welding machine from getting wet • Hot work permit system • OSH Rule No. 1070 – Occupational Health and Environmental Control • OSH Rule No. 1080 – Personal Protective Equipment and Devices 6.2.2 Prepare welding machine and holding devices	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Video show 	<ul style="list-style-type: none"> • Written Exam • Oral Questioning • Demonstration 	8 hrs
	6.3 Weld workpiece	6.3.1 Discuss and explain the following: <ul style="list-style-type: none"> • Procedure in welding workpiece • Different types of tack welding • Procedure in checking workpiece • Knowledge on weld defects • Fire safety • Exhaust ventilation/ fume extractor 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Video show 	<ul style="list-style-type: none"> • Written Exam • Oral Questioning • Demonstration 	10 hrs

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		<ul style="list-style-type: none"> • OSH Rule No. 1070 – Occupational Health and Environmental Control • OSH Rule No. 1080 – Personal Protective Equipment and Devices • OSH Rule No. 1100 – Gas and Electric Welding and Cutting Operations • OSH Rule on 1940 – Fire Protection and Control 			
	6.4 Perform post-welding operation	<p>6.3.2 Weld workpiece</p> <p>6.4.1 Discuss and explain the following:</p> <ul style="list-style-type: none"> • Checking of finished workpiece • Preparation of report • Procedure of shutting down of welding machine • Storage of tools and materials • Tagging of defective tools and lathe • 5S of good housekeeping • 3Rs • OSH Rule No. 1070 – Occupational Health and Environmental Control • OSH Rule No. 1080 – Personal Protective Equipment and Devices • OSH Rule No. 1210 – 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Video show 	<ul style="list-style-type: none"> • Written Exam • Oral Questioning • Demonstration 	24 hrs

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		Electrical Safety <ul style="list-style-type: none"> • RA 9003-Ecological Solid Waste Management Act of 2000 6.4.2 Perform post-welding operation			

3.2 TRAINING DELIVERY

1. The delivery of training shall adhere to the design of the curriculum. Delivery shall be guided by the principles of competency-based TVET.
 - a. Course design is based on competency standards set by the industry or recognized industry sector; (Learning system is driven by competencies written to industry standards)
 - b. Training delivery is learner-centered and should accommodate individualized and self-paced learning strategies;
 - c. Training can be done on an actual workplace setting, simulation of a workplace and/or through adoption of modern technology.
 - d. Assessment is based in the collection of evidence of the performance of work to the industry required standards;
 - e. Assessment of competency takes the trainee's knowledge and attitude into account but requires evidence of actual performance of the competency as the primary source of evidence.
 - f. Training program allows for recognition of prior learning (RPL) or current competencies;
 - g. Training completion is based on satisfactory performance of all specified competencies.
2. The competency-based TVET system recognizes various types of delivery modes, both on-and off-the-job as long as the learning is driven by the competency standards specified by the industry. The following training modalities and their variations/ components may be adopted singly or in combination with other modalities when designing and delivering training programs:

2.1. Institution- Based:

Classroom-based or school-based training conducted entirely within the school or center, with classroom and/or laboratory components.

- Dual Training System (DTS)/Dualized Training Program (DTP) which contain both in-school and in-industry training or fieldwork components. Details can be referred to the Implementing Rules and Regulations of the DTS Law and the TESDA Guidelines on the DTP;
- Distance learning is a formal education process in which majority of the instruction occurs when the students and instructor are not in the same place. Distance learning may employ correspondence study, audio, video, computer technologies or other modern technology that can be used to facilitate learning and formal and non-formal training. Specific guidelines on this mode shall be issued by the TESDA Secretariat.

- Supervised Industry Training (SIT) or on-the-job training (OJT) is an approach in training designed to enhance the knowledge and skills of the trainee through actual experience in the workplace to acquire specific competencies as prescribed in the training regulations. It is imperative that the deployment of trainees in the workplace is adhered to training programs agreed by the institution and enterprise and status and progress of trainees are closely monitored by the training institutions to prevent opportunity for work exploitation.
- The traditional classroom-based or in-center instruction may be enhanced through use of learner-centered methods as well as laboratory or field-work components.

2.2 Enterprise-Based:

- **Formal Apprenticeship** – Training within employment involving a contract between an apprentice and an enterprise on an approved apprenticeable occupation.
- **Informal Apprenticeship** - is based on a training (and working) agreement between an apprentice and a master craftsperson wherein the agreement may be written or oral and the master craftsperson commits to training the apprentice in all the skills relevant to his or her trade over a significant period of time, usually between one and four years, while the apprentice commits to contributing productively to the work of the business. Training is integrated into the production process and apprentices learn by working alongside the experienced craftsperson.
- **Enterprise-based Training-** where training is implemented within the company in accordance with the requirements of the specific company. Specific guidelines on this mode shall be issued by the TESDA Secretariat.

2.3 Community-Based

Refers to a short program conducted or coordinated by NGOs, LGUs, training centers and other TVET providers which are intended to address the specific needs of a community. Such programs are usually conducted in informal settings such as barangay hall, basketball courts and other available venues in a community.

3.2 TRAINEE ENTRY REQUIREMENTS

This section specifies the qualifications of trainees and educational experience. Other requirements like health and physical requirements are also stated.

- Able to read and write
- Can perform basic mathematical computation
- Ability to communicate (non-verbal and verbal)
- Physically fit (health condition)

3.3 LIST OF TOOLS, EQUIPMENT AND MATERIALS

MACHINING NC I

Recommended list of tools, equipment and materials for the training of 25 trainees for Machining NC I.

Up-to-date tools, materials, and equipment of equivalent functions can be used as alternatives.

A. List of tools, equipment and materials for FULL QUALIFICATION

TOOLS	
QTY	DESCRIPTION
2pcs	Aluminum Silicate Grinding Wheel, dia 8" x dia 1" x 1" for Carbide diamond CBN
1pc	Angle Plate 150mmx150mm
4pcs	Angle square, 150mm size
1set	Angle wheel dresser and attachment
1pc	Angular Milling Cutter, dia 100mm
2pcs	Ball End-mill dia, 6mm
2pcs	Ball End-mill, dia 10mm
5pcs	Ball peen hammer, 200g
5pcs	Ball peen hammer, 250g
5pcs	Center drill, #3
2pcs	Center gauge, standard size
5pcs	Center punch, 150mm long
1pc	Combination square, 200mm size
1set	Concave Radius Gauge, 1mm to 14mm
1set	Convex Radius Gauge, 1mm to 14mm
2pcs	Countersink, dia 25mm
2sets	Cylindrical grinding attachment
2pcs	Dial indicator on Magnetic Stand
1pc	Diamond Wheel Dresser and holder
2pcs	Divider, 6"
1pc	Dovetail Cutter, dia 25mm
2sets	Drill chuck with key, tapered sleeve and drift key
2pcs	Drill point sharpening gauge, oil stone
1L can	Dye blue
2pcs	End Mill, dia 10mm
2pcs	End Mill, dia20mm
1pc	Face Milling Cutter, dia 50mm
1set	Fixed reamer, dia 6mm to 12mm
5pcs	Flat file, 8"
5pcs	Flat chisel
6pcs	Gap Bench Vise, 150mm
1pc	Gap Machine vise, 150mm
2pcs	Gap precision vise, 80mm x 200mm x 80mm with 100mm

TOOLS	
QTY	DESCRIPTION
5pcs	Hacksaw, 1 ft long
10pcs	Hacksaw blade, 1 ft long
5pcs	Half-round file, 6"
5pcs	Half-round file, 8"
5pcs	Hand tap wrench, medium size
5sets	Hand tap, M12 x1.75
1pc	Height gauge, 300mm
25 pcs	HSS Blank tool bit, 3/8" x std length
2pcs	Machine Tap, M12x1.75
2pcs	Magnetic Plate
2pcs	Magnetic Sine Chuck
4pcs	Magnetic V-block
2pcs	Micrometer, 0 to 25mm
2pcs	Micrometer, 25 to 50mm
6pcs	Parallel bars, 10mm x30mm x100mm
2 pcs	Parallel bars, 80mmx15mmx8mm
2 pcs	Parallel bars, 150mmx25mmx12mm
1pc	Plain Milling Cutter, dia 60mm
1pc	Ply Cutter, dia 80mm
2pcs	Protractor 200mm
1set	Radius wheel dresser and attachment
5pcs	Reamer dia 10mm
2pcs	Rubber Mallet, 200g
5pcs	Scriber, 200mm long
1pc	Side Milling Cutter, dia 100mm
1pc	Slag Hammer
2pcs	Slitting Cutter, dia 100mm
2pcs	Spot facing tool, 25mm
5pcs	Steel rule, 6"
2 pcs	Steel rule, 300mm
1pc	Steel tape, 3 m
1 set	Stock and die, M4 to M14
2sets	Stock and die, M12 x 1.75
1pc	Surface Texture Gauge (Rugo Test)
1pc	Tee-slot Cutter, dia 20mm
1set	Thread pitch gauge, English
1set	Thread pitch gauge, Metric
5pcs	Triangular file, 6"
1 set	Twist drill, 1mm to 13mm
5pcs	Twist drill dia 9.8mm
2 pcs	Vernier caliper, 50mm
5pcs	Vernier caliper, 150mm
2pcs	Vernier Caliper 300mm
2pcs	V-block, 50mm x 100mm
2 pcs	V-block, 50mmx50mmx75mm
	Clamping tools:
2pcs	3-Jaw Chuck

TOOLS	
QTY	DESCRIPTION
2pcs	4- Jaw Chuck
4pcs	Gap C-clamp, 100mm
2 pcs	Gap toggle clamp, 100mm
4pcs	Parallel clamp, 150mm length
	3/8 inch High Speed Steel (HSS) Tool Bits:
2pcs	Boring tool
2pcs	Cut-off
2pcs	Dial indicator on Magnetic Stand
2pcs	Knurling Tool, standard size
2pcs	Left Hand
2pcs	Right Hand
2pcs	Surface Gauge
2pcs	Threading
	Lathe accessories:
1pc	Adjustable Wrench, 150mm
2sets	Allen wrench, 1.5-12mm
2pcs	Dead Center
1pc	Face Plate
1pc	Follower Rest
1pc	Lathe Dog, small
1pc	Lathe Dog, big
2pcs	Live Center
2sets	Open wrench, 8-22mm
2pcs	Rubber mallet, 250g
1pc	Steady Rest
1pc	Taper Attachment
8 pairs	T-Bolts and Nuts
2pcs	T-wrench, standard size
	Tool holders
2pcs	Boring tool holder
2pcs	Cut-off tool holder
2pcs	Neutral (straight)
	Milling Machine Accessories:
2pcs	Angle Plate, 6" x 6"
2pcs	Gap Machine Vise, 6"
1pc	Rotary Table
8pcs	Tee -Bolts and Nuts

EQUIPMENT	
QTY	DESCRIPTION
1pc	Bench drill press machine and its accessories to include: drill chuck with key, tapered sleeve, and drift key
2pcs	Engine Lathe with working coolant system
1pc	Manual Surface Grinding Machine (500mm Bed length) with Dust extractor
1pc	Metal table, 500x 500 x 50 mm
1pc	Pedestal grinder (medium size) and its accessories to include: grinding wheel dresser, open wrench
1pc	Semi-Automatic Surface Grinding Machine (500mm Bed length) with Dust extractor
1 unit	Shaper Machine with complete Accessories
1pc	Universal Milling Machine
1pc	Vertical Milling Machine
2pcs	Working Chair
3pcs	Working Table, 3ft x 6ft
	Machine with complete Accessories
1 unit	Electric Welding Machine
1 unit	Portable grinder with complete accessories, std

MATERIALS	
QTY	DESCRIPTION
2 kg	Brass welding rod dia 3mm
25pcs	Cold Rolled Steel (CRS) dia 50 x 110 mm
20 L	Coolant
5pcs	File card
1set	First aid kit
5 kg	High carbon welding rod dia 3mm
10 kg	Low carbon welding rod dia 3mm
25pcs	MS Plate 102 x 102 x 10mm
25pcs	MS Rod dia 12mm x 50mm
25 pcs	MS Square Bar, 50mmx50mmx75mm
2pcs	Oil can, small
2pcs	Paint brush, 50mm
5pcs	Paint brush , 1"
50 pcs	Rags
25 sheet	Sand paper
2 kg	Stainless Steel welding rod dia 3mm
5pcs	Steel brush, standard size
1 kg	Tungsten welding rod dia 3mm
6pairs	T-bolt and nut (to fit t-slot of Shaper)
1L	Water container
	Personal Protective Equipment
25 pcs	Apron
25 pcs	Dust mask
25 pairs	Ear plugs
25 pairs	Safety gloves

MATERIALS	
QTY	DESCRIPTION
25 pcs	Safety goggles
25 pairs	Safety shoes
25 pcs	Welder's helmet
25 pcs	Welder's mask

List of tools, equipment and materials per COC

COC 1 – PERFORM TURNING OPERATION

TOOLS	
QTY	DESCRIPTION
1pc	Angle Plate, 150mmx150mm
4pcs	Angle square, 150mm size
5pcs	Ball peen hammer, 200g
5pcs	Center drill, #3
2pcs	Center gauge, standard size
5pcs	Center punch, 150mm long
1pc	Combination square, 200mm size
1set	Concave Radius Gauge, 1mm to 14mm
1set	Convex Radius Gauge, 1mm to 14mm
2pcs	Counter sink
2pcs	Dial indicator on Magnetic Stand
2pcs	Divider, 6"
2sets	Drill chuck with key, tapered sleeve and drift key
2pcs	Drill point sharpening gauge, Oil stone
1L can	Dye blue
1set	Fixed reamer, dia 6mm to 12mm
5pcs	Flat chisel
5pcs	Flat file, 8"
6pcs	Gap Bench Vise, 150mm
1pc	Gap Machine vise, 150mm
5pcs	Hacksaw, 1 ft long
10pcs	Hacksaw blade, 1 ft long
5pcs	Half-round file, 6"
1pc	Half round file, 8"
5sets	Hand tap, M12 x1.75
5pcs	Hand tap wrench, medium size
1pc	Height gauge, 300mm
2pcs	Micrometer, 0 to 25mm
2pcs	Micrometer, 25 to 50mm
6pcs	Parallel bars, 10mm x30mm x100mm
2pcs	Protractor, 200mm
5pcs	Reamer, dia 10mm
5pcs	Scriber 200mm long
1pc	Slag Hammer
2pcs	Spot facing tool, 25mm
5pcs	Steel rule, 6"
1pc	Steel tape, 3 m
1 set	Stock and die, M4 to M14
2sets	Stock and die, M12 x 1.75
1pc	Surface Texture Gauge (Rugo Test)
1set	Thread pitch gauge, English
1set	Thread pitch gauge, Metric
5pcs	Triangular file, 6"
5pcs	Twist drill, dia 9.8mm

TOOLS	
QTY	DESCRIPTION
5pcs	Vernier caliper, 150mm
2pcs	Vernier Caliper, 300mm
2pcs	V-block, 50mm x 100mm
	Clamping tools:
4pcs	C-clamp
4pcs	Parallel clamp
2pcs	Toggle clamp
2pcs	3-Jaw Chuck
2pcs	4- Jaw Chuck
	3/8 inch High Speed Steel (HSS) Tool Bits:
2pcs	Boring tool
2pcs	Cut-off
2pcs	Knurling Tool, standard size
2pcs	Left Hand
2pcs	Right Hand
2pcs	Surface Gauge
2pcs	Threading
	Lathe accessories:
1pc	Adjustable Wrench, 150mm
2sets	Allen wrench, 1.5-12mm
2pcs	Dead Center
1pc	Face Plate
1pc	Follower Rest
1pc	Lathe Dog, small
1pc	Lathe Dog, big
2pcs	Live Center
2sets	Open wrench, 8-22mm
2pcs	Rubber mallet, 250g
1pc	Steady Rest
1pc	Taper Attachment
8 pairs	T-Bolts and Nuts
2pcs	T-wrench, standard size
	Tool holders
2pcs	Boring tool holder
2pcs	Cut-off tool holder
2pcs	Neutral (straight)

EQUIPMENT	
QTY	DESCRIPTION
1pc	Bench drill press machine and its accessories to include: drill chuck with key, tapered sleeve, and drift key
1 pc	Chair, monoblock, with arm rest
2pcs	Engine Lathe with working coolant system
1pc	Metal table, 500x 500 x 50 mm
1pc	Metal working table with 4 legs (1m x 1m x 1m height)
1pc	Pedestal grinder (medium size) and its accessories to include: grinding wheel dresser, open wrench

EQUIPMENT	
QTY	DESCRIPTION
3pcs	Working Table, 3ft x 6ft
1pc	Working table with drawer (1m x 1/2m)
1pc	Working Chair
	Machine with complete Accessories
1 unit	Electric Welding Machine
1 unit	Portable grinder with complete accessories, std

MATERIALS	
QTY	DESCRIPTION
2pcs	Aluminum Silicate Grinding Wheel, dia 8" x dia 1" x 1"
25pcs	Cold Rolled Steel (CRS) dia 50 x 110 mm
20 L	Coolant
5pcs	File card
1set	First aid kit
25pcs	MS Plate 102 x 102 x 10mm
25pcs	MS Rod dia 12mm x 50mm
2pcs	Oil can, small
5pcs	Paint brush , 1"
50 pcs	Rags
25 sheet	Sand paper
5pcs	Steel brush, standard size
1L	Water container
10 kg	Low carbon welding rod dia 3mm
5 kg	High carbon welding rod dia 3mm
1 kg	Tungsten welding rod dia 3mm
2 kg	Brass welding rod dia 3mm
2 kg	Stainless Steel welding rod dia 3mm
	Personal Protective Equipment
25 pcs	Apron
25 pcs	Dust mask
25 pairs	Ear plugs
25 pairs	Safety gloves
25 pcs	Safety goggles
25 pairs	Safety shoes
25 pcs	Welder's helmet
25 pcs	Welder's mask

COC 2 – PERFORM MILLING OPERATION

TOOLS	
QTY	DESCRIPTION
1pc	Adjustable Wrench, 150mm
2pcs	Angle Plate, 6" x 6"
1pc	Angle Plate, 150mmx150mm
4pcs	Angle square, 150mm size
1pc	Angular Milling Cutter, dia 100mm
2pcs	Ball End-mill dia, 6mm
2pcs	Ball End-mill, dia 10mm
5pcs	Ball peen hammer, 200g
5pcs	Center drill, #3
5pcs	Center punch, 150mm long
1pc	Combination square, 200mm size
1set	Concave Radius Gauge, 1mm to 14mm
1set	Convex Radius Gauge, 1mm to 14mm
2pcs	Countersink, dia 25mm

TOOLS	
QTY	DESCRIPTION
2pcs	Dial indicator on Magnetic Stand
2pcs	Divider, 6"
1pc	Dovetail Cutter, dia 25mm
2pcs	Drill point sharpening gauge, oil stone
1L can	Dye blue
2pcs	End Mill, dia 10mm
2pcs	End Mill, dia20mm
1pc	Face Milling Cutter, dia 50mm
1set	Fixed reamer, Dia 6mm to 12mm
5pcs	Flat chisel
5pcs	Flat file, 8"
6pcs	Gap Bench Vise, 150mm
2pcs	Gap Machine Vise, 6"
1pc	Gap Machine vise, 150mm
5pcs	Hacksaw, 1 ft long
10pcs	Hacksaw blade, 1 ft long
5pcs	Half-round file, 6"
1pc	Half round file, 8"
5sets	Hand tap, M12 x1.75
5pcs	Hand tap wrench, medium size
2pcs	Machine Tap, M12x1.75
2pcs	Micrometer, 0 to 25mm
2pcs	Micrometer, 25 to 50mm
6pcs	Parallel bars, 10mm x30mm x100mm
1pc	Plain Milling Cutter, dia 60mm
1pc	Ply Cutter, dia 80mm
2pcs	Protractor 200mm
5pcs	Reamer, dia 10mm
2pcs	Rubber Mallet, 200g
5pcs	Scriber, 200mm long
1pc	Side Milling Cutter, dia 100mm
1pc	Slag Hammer
2pcs	Slitting Cutter, dia 100mm
2pcs	Spot facing tool, 25mm
5pcs	Steel rule, 6"
1pc	Steel tape, 3 m
1 set	Stock and die, M4 to M14
2sets	Stock and die, M12 x 1.75
8pcs	Tee -Bolts and Nuts
1pc	Tee-slot Cutter, dia 20mm
1set	Thread pitch gauge, Metric
1set	Thread pitch gauge, English
5pcs	Triangular file, 6"
1 set	Twist Drill, 1mm to 13mm
5pcs	Twist drill dia 9.8mm
5pcs	Vernier caliper, 150mm
2pcs	Vernier Caliper 300mm

TOOLS	
QTY	DESCRIPTION
2pcs	V-block, 50mm x 100mm
	Clamping tools:
4pcs	C-clamp
4pcs	Parallel clamp
2pcs	Toggle clamp

EQUIPMENT	
QTY	DESCRIPTION
1pc	Bench drill press machine and its accessories to include: drill chuck with key, tapered sleeve, and drift key
1pc	Metal table, 500x 500 x 50 mm
1pc	Metal working table with 4 legs (1m x 1m x 1m height)
1pc	Pedestal grinder (medium size) and its accessories to include: grinding wheel dresser, open wrench
1pc	Rotary Table
1pc	Universal Milling Machine
1pc	Vertical Milling Machine
3pcs	Working Table, 3ft x 6ft
2pcs	Working table with drawer (1x1/2meter)
2pcs	Working Chair
	Machine with complete Accessories
1 unit	Electric Welding Machine
1 unit	Portable grinder with complete accessories, std

MATERIALS	
QTY	DESCRIPTION
2pcs	Aluminum Silicate Grinding Wheel, dia 8" x dia 1" x 1"
2 kg	Brass welding rod dia 3mm
1set	First aid kit
5pcs	File card
5 kg	High carbon welding rod dia 3mm
10 kg	Low carbon welding rod dia 3mm
25pcs	MS Plate 102 x 102 x 10mm
25pcs	MS Rod dia 12mm x 50mm
2pcs	Oil can, small
5pcs	Paint brush , 1"
50 pcs	Rags
25 sheet	Sand paper
2 kg	Stainless Steel welding rod dia 3mm
5pcs	Steel brush, standard size
1 kg	Tungsten welding rod dia 3mm
1L	Water container
	Personal Protective Equipment
25 pcs	Apron
25 pcs	Dust mask
25 pairs	Ear plugs

MATERIALS	
QTY	DESCRIPTION
25 pcs	Safety goggles
25 pairs	Safety gloves
25 pairs	Safety shoes
25 pcs	Welder's helmet
25 pcs	Welder's mask

COC 3 – PERFORM SURFACE GRINDING OPERATION

TOOLS	
QTY	DESCRIPTION
1pc	Adjustable Wrench, 150mm
2pcs	Aluminum Silicate Grinding Wheel, dia 8" x dia 1" x 1"
1pc	Angle Plate, 150mmx150mm
4pcs	Angle square, 150mm size
1set	Angle wheel dresser and attachment
5pcs	Ball peen hammer, 200g
5pcs	Center drill, #3
5pcs	Center punch, 150mm long
1pc	Combination square, 200mm size
2pcs	Counter sink
2sets	Cylindrical grinding attachment
1pc	Diamond Wheel Dresser and holder
2pcs	Divider, 6"
2pcs	Drill point sharpening gauge, oil stone
1L can	Dye blue
1set	Fixed reamer, dia 6mm to 12mm
5pcs	Flat chisel
5pcs	Flat file, 8"
6pcs	Gap Bench Vise, 150mm
1pc	Gap Machine vise, 150mm
2pcs	Gap Precision vise, 80mm x 200mm x 80mm with 100mm
5pcs	Hacksaw, 1 ft long
10pcs	Hacksaw blade, 1 ft long
5pcs	Half-round file, 6"
1pc	Half round file, 8"
5sets	Hand tap, M12 x1.75
5pcs	Hand tap wrench, medium size
2pcs	Magnetic Plate
2pcs	Magnetic sine chuck
4pcs	Magnetic V-block
2pcs	Micrometer, 0-25mm
2pcs	Micrometer, 25-50mm
6pcs	Parallel bars, 10mm x30mm x100mm
2pcs	Protractor, 200mm
1set	Radius wheel dresser and attachment
5pcs	Reamer, dia 10mm
5pcs	Scriber, 200mm long
1pc	Slag Hammer

TOOLS	
QTY	DESCRIPTION
2pcs	Spot facing tool, 25mm
5pcs	Steel rule, 6"
1pc	Steel tape, 3 m
1 set	Stock and die, M4 to M14
2sets	Stock and die, M12 x 1.75
2pcs	Thread pitch gauge
5pcs	Triangular file 6"
5pcs	Twist drill, dia 9.8mm
5pcs	Vernier caliper, 150mm
2pcs	V-block, 50mm x 100mm
	Clamping tools:
4pcs	C-clamp
4pcs	Parallel clamp
2pcs	Toggle clamp

EQUIPMENT	
QTY	DESCRIPTION
1pc	Bench drill press machine and its accessories to include: drill chuck with key, tapered sleeve, and drift key
1pc	Manual Surface Grinding Machine (500mm Bed length) with Dust extractor
1pc	Metal table, 500x 500 x 50 mm
1pc	Metal working table with 4 legs (1m x 1m x 1m height)
1pc	Pedestal grinder (medium size) and its accessories to include: grinding wheel dresser, open wrench
1pc	Semi-Automatic Surface Grinding Machine (500mm Bed length) with Dust extractor
2pcs	Working Chair
3pcs	Working Table, 3ft x 6ft
	Machine with complete Accessories
1 unit	Electric Welding Machine
1 unit	Portable grinder with complete accessories, std

MATERIALS	
QTY	DESCRIPTION
2 kg	Brass welding rod dia 3mm
5pcs	File card
1set	First aid kit
5 kg	High carbon welding rod dia 3mm
10 kg	Low carbon welding rod dia 3mm
25pcs	MS Plate, 102 x 102 x 10mm
25pcs	MS Rod, dia 12mm x 50mm
2pcs	Oil can, small
5pcs	Paint brush, 1"
50 pcs	Rags
25 sheet	Sand paper
2 kg	Stainless Steel welding rod dia 3mm

5pcs	Steel brush, standard size
1 kg	Tungsten welding rod dia 3mm
1L	Water container
	Personal Protective Equipment
25 pcs	Apron
25 pcs	Dust mask
25 pairs	Ear plugs
25 pairs	Safety gloves
25 pcs	Safety goggles
25 pairs	Safety shoes
25 pcs	Welder's helmet
25 pcs	Welder's mask

COC 4 – PERFORM SHAPING OPERATION

TOOLS	
QTY	DESCRIPTION
1pc	Adjustable Wrench, 150mm
2pcs	Aluminum Silicate Grinding Wheel, dia 8" x dia 1" x 1"
1pc	Angle Plate, 150mmx150mm
4pcs	Angle square, 150mm size
5pcs	Ball peen hammer, 200g
1pcs	Ballpeen Hammer, 250 g
5pcs	Center drill, #3
5pcs	Center punch, 150mm long
1pc	Combination square, 200mm size
2pcs	Counter sink
2pcs	Divider, 6"
2pcs	Drill point sharpening gauge, oil stone
1L can	Dye blue
1set	Fixed reamer, da 6mm to 12mm
5pcs	Flat chisel
5pcs	Flat file, 8"
6pcs	Gap Bench Vise, 150mm
1 pc	Gap Machine Vise, 150mm
5pcs	Hacksaw, 1 ft long
10pcs	Hacksaw blade, 1 ft long
5pcs	Half-round file, 6"
1pc	Half round file, 8"
5sets	Hand tap, M12 x1.75
5pcs	Hand tap wrench, medium size
25 pcs	HSS Blank tool bit, 3/8" x std length
2pcs	Micrometer, 0-25mm
2pcs	Micrometer, 25-50mm
6pcs	Parallel bars, 10mm x30mm x100mm
2 pcs	Parallel bars, 80mmx15mmx8mm
2 pcs	Parallel bars, 150mmx25mmx12mm
2pcs	Protractor 200mm
5pcs	Reamer, dia 10mm
1 pc	Rubber mallet, 250g

TOOLS	
QTY	DESCRIPTION
5pcs	Scriber, 200mm long
1pc	Slag Hammer
2pcs	Spot facing tool, 25mm
5pcs	Steel rule, 6"
2 pcs	Steel rule, 300mm
1pc	Steel tape, 3 m
1 set	Stock and die, M4 to M14
2sets	Stock and die, M12 x 1.75
2pcs	Thread pitch gauge
5pcs	Triangular file, 6"
5pcs	Twist drill, dia 9.8mm
2 pcs	Vernier caliper, 50mm
5pcs	Vernier caliper, 150mm
2pcs	Vernier Caliper 300mm
2pcs	V-block, 50mm x 100mm
2 pcs	V-block, 50mmx50mmx75mm
	Clamping tools:
4pcs	Gap C-clamp, 100mm
2 pcs	Gap toggle clamp, 100mm
4pcs	Parallel clamp, 150mm length

EQUIPMENT	
QTY	DESCRIPTION
1pc	Bench drill press machine and its accessories to include: drill chuck with key, tapered sleeve, and drift key
1pc	Metal table, 500x 500 x 50 mm
1pc	Pedestal grinder (medium size) and its accessories to include: grinding wheel dresser, open wrench
1 unit	Shaper Machine with complete Accessories
1pc	Working Chair
3pcs	Working Table, 3ft x 6ft
1pc	Working table with drawer (1x1/2meter)
	Machine with complete Accessories
1 unit	Electric Welding Machine
1 unit	Portable grinder with complete accessories, std

MATERIALS	
QTY	DESCRIPTION
2 kg	Brass welding rod dia 3mm
5pcs	File card
1set	First aid kit
5 kg	High carbon welding rod dia 3mm
10 kg	Low carbon welding rod dia 3mm
25 pcs	MS Square Bar, 50mmx50mmx75mm
25pcs	MS Plate 102 x 102 x 10mm
25pcs	MS Rod dia 12mm x 50mm

MATERIALS	
QTY	DESCRIPTION
2pcs	Oil can, small
5pcs	Paint brush, 1"
2pcs	Paint brush, 50mm
50 pcs	Rags
25 sheet	Sand paper
2 kg	Stainless Steel welding rod dia 3mm
5pcs	Steel brush, standard size
1 kg	Tungsten welding rod dia 3mm
6pairs	T-bolt and nut (to fit t-slot of Shaper)
1L	Water container
	Personal Protective Equipment
25 pcs	Apron
25 pcs	Dust mask
25 pairs	Ear plugs
25 pairs	Safety gloves
25 pcs	Safety goggles
25 pairs	Safety shoes
25 pcs	Welder's helmet
25 pcs	Welder's mask

TRAINING FACILITIES

MACHINING NC I

The machining workshop must be of concrete structure. Based on class size of 25 students/trainees the space requirements for the teaching/learning and circulation areas are as follows:

SPACE REQUIREMENT	SIZE IN METERS	AREA IN SQ. METERS	TOTAL AREA IN SQ. METERS	GRAND TOTAL AREA IN SQ. METERS
A. Building (permanent)				253
• Student/Trainee Working Space	2.00 x 1.00 per student/trainee	2.00 per student	50.00	
• Learning Resource Center	3.00 x 5.00	15.00	15.00	
• Activity Room		7.50 per student	188.00	
○ Facilities	10.00 x 8.00			
○ Wash room & locker room	4.00 x 4.00			
○ Store room	5.00 x 5.00			
○ Dining/mess room	3.00 x 4.00			
○ Lecture room	5.00 x 10.00			

3.4 TRAINER'S QUALIFICATIONS FOR METALS AND ENGINEERING SECTOR

MACHINING NC I

- Must be a holder of NTTC in Machining NC II or higher level
- Must be physically fit
- Must have at least two (2) years job/industry experience within the last 5 years

3.5 INSTITUTIONAL ASSESSMENT

Institutional assessment is undertaken by trainees to determine their achievement of units of competency. A certificate of achievement is issued for each unit of competency.

SECTION 4 NATIONAL ASSESSMENT AND CERTIFICATION ARRANGEMENTS

Competency Assessment is the process of collecting evidence and making judgments whether competency has been achieved. The purpose of assessment is to confirm that an individual can perform to the standards expected at the workplace as expressed in relevant competency standards.

The assessment process is based on evidence or information gathered to prove achievement of competencies. The process may be applied to a full qualification or employable unit(s) of competency in partial fulfillment of the requirements of the national qualification.

4.1 NATIONAL ASSESSMENT AND CERTIFICATION ARRANGEMENTS

- 4.1.1 A National Certificate (NC) is issued when a candidate has demonstrated competence on all units of competency in a qualification with a promulgated Training Regulations.
- 4.1.2 A Certificate of Competency (CoC) is issued by the Authority to individuals who were assessed as competent in a single unit or cluster of related units of competency.

COC1 Perform Turning Operation

- Perform bench work
- Turn workpiece
- Repair workpiece

COC2 Perform Milling Operation

- Perform bench work
- Mill workpiece
- Repair workpiece

COC3 Perform Surface Grinding Operation

- Perform bench work
- Grind workpiece
- Repair workpiece

COC4 Perform Shaping Operation

- Perform bench work
- Shape workpiece
- Repair workpiece

- 4.1.3 Upon accumulation of the COCs acquired, an individual shall be issued the corresponding National Certificate for the Qualification.
- 4.1.4 Individuals wanting to be certified will have to be assessed in accordance with the requirements identified in the relevant unit/s of competency.

- 4.1.5 The industry shall determine assessment and certification requirements for each qualification with promulgated Training Regulations. It includes the following:
- a. Entry requirements for candidates
 - b. Evidence gathering methods
 - c. Qualification requirements of competency assessors
 - d. Specific assessment and certification arrangements as identified by industry
- 4.1.6 Recognition of Prior Learning (RPL). Candidates who have gained competencies through informal training, previous work or life experiences may apply for recognition in a particular qualification through a recognition/assessment process.

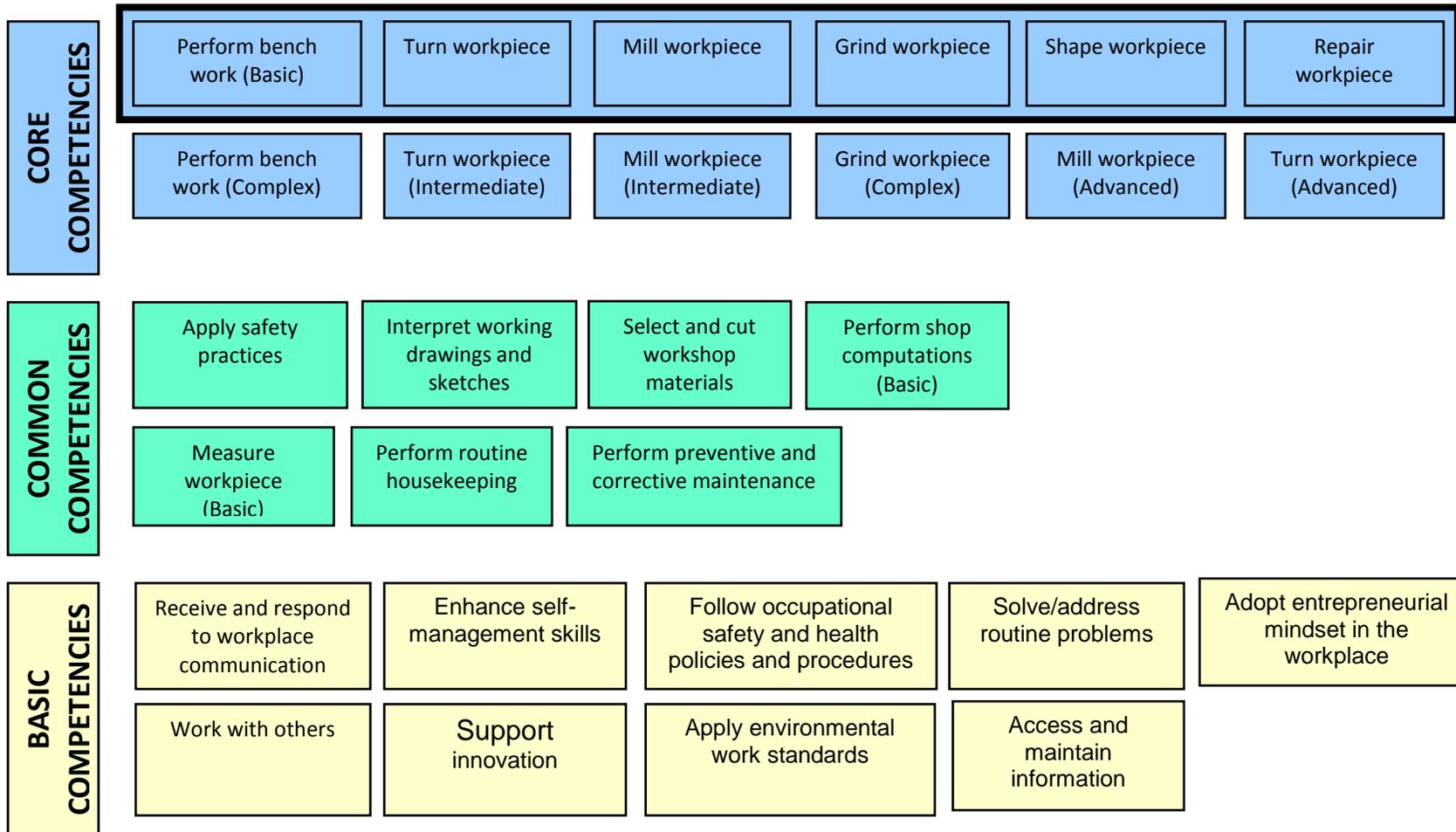
4.2 COMPETENCY ASSESSMENT REQUISITE

- 4.2.1 **Self-Assessment Guide.** The self-assessment guide (SAG) is accomplished by the candidate prior to actual competency assessment. SAG is a pre-assessment tool to help the candidate and the assessor determine what evidence is available, where gaps exist, including readiness for assessment.

This document can:

- a) Identify the candidate's skills and knowledge
 - b) Highlight gaps in candidate's skills and knowledge
 - c) Provide critical guidance to the assessor and candidate on the evidence that need to be presented
 - d) Assist the candidate to identify key areas in which practice is needed or additional information or skills that should be gained prior
- 4.2.2 **Accredited Assessment Center.** Only Assessment Center accredited by TESDA is authorized to conduct competency assessment. Assessment centers undergo a quality assured procedure for accreditation before they are authorized by TESDA to manage the assessment for National Certification.
- 4.2.3 **Accredited Competency Assessor.** Only accredited competency assessor is authorized to conduct assessment of competence. Competency assessors undergo a quality assured system of accreditation procedure before they are authorized by TESDA to assess the competencies of candidates for National Certification.

COMPETENCY MAP
For Metals and Engineering Sector
MACHINING NC I



Glossary of Terms

5S	Refers to 5S of Good Housekeeping (Seiri-Sort, Seiton-Segregate, Seiso-Sanitize, Seiketsu-Standardize, Shitsuke-Self Discipline)
3Rs	Refers to Reuse, Reduce, Recycle
Bench work	the operations incident to the process of laying out, fitting, assembling, etc... when the work is placed on the bench or in a bench vise
Boring	is the operation of enlarging a hole by means of an adjustable cutting tool with only one cutting edge
Chipping	is the operation of removing/cutting metal using hammer and chisel
Counter boring	is the operation of enlarging the end of a hole cylindrically
Grinding dresser or wheel dresser	is a tool to dress the surface of a grinding wheel. Grinding dressers are used for making different profile on grinding wheel. The dressing of a wheel in order to return the wheel to its original shape. Truing is also a method of wheel balancing.
Drilling	is the operation of producing a circular hole by removing solid metal
Facing	the lathe operation of finishing the ends of the work, to make the piece the right length. Also known as squaring
Grinding	refers to the removal of material from a workpiece with grinding wheel
Laying out	term used to include the marking or scribing of center points, circles, arcs, or straight lines upon metal surfaces, either curved or flat, for the guidance of the worker
Milling	refers to removal of metal by feeding a workpiece through the periphery of rotating circular cutter
Reaming	is an operation of sizing and finishing a hole by means of a cutting tool having several cutting edges. Reaming serves to make the hole smoother, straighter, and more accurate
Spot-facing	is the operation of smoothing and squaring the surface around a hole
Tapping	is the operation of forming internal threads by means of a tool called tap

Turning	refers to shaping a workpiece by gripping it in a work holding device and rotating it under power against a suitable cutting tool
Trepanning	the lathe operation of removing a disc or cylindrical core from a metal plate
Welding	the process of joining surfaces of metals by heating up to a plastic or fluid state and then allowing the metals to flow together with or without the addition of other molten metal
Workpiece	raw material or partially finished piece that is shaped by performing various operations.



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