TRAINING REGULATIONS

MANUAL METAL ARC WELDING (MMAW) NC III

METALS AND ENGINEERING SECTOR

TECHNICAL EDUCATION AND SKILLS DEVELOPMENT AUTHORITY
East Service Road, South Luzon Expressway (SLEX), Taguig City, Metro Manila

(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) serve as basis for the:

1 Registration and delivery of training programs; and
2 Development of curriculum and assessment instruments;
3 Competency assessment and certification;
.

Each TR has four sections:

Section 1 **Definition of Qualification** – describes the qualification and defines the competencies that comprise the qualification.

Section 2 **Competency Standards** 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 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 per unit of competency.

Section 4 **Assessment and Certification Arrangements** - describe the policies governing assessment and certification procedures for the qualification.

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MANUAL METAL ARC WELDING (MMAW) NC III

SECTION 1 MANUAL METAL ARC WELDING (MMAW) NC III QUALIFICATION

The **Manual Metal Arc Welding** (**MMAW**) **NC III** Qualification consists of competencies that a person must achieve to weld austenitic stainless steel plates components as specified drawings, welding procedure specification or oral instructions using MMAW process. MMAW is also known as Shielded Metal Arc Welding (SMAW).

This Qualification conforms with the latest edition of ISO 9606-1: Qualification testing of welders — Fusion welding — Part 1: Steels, AWS D 1.6 Structural Welding Code- Stainless Steel; ASME IX (Boiler and Pressure Vessel Code) Welding, Brazing, and Fusing Qualifications; and Asian Welding Federation- Common Welders Certification Scheme (AWF-CWCS).

This Qualification is packaged from the competency map of the Metals and Engineering Sector as shown in Annex A.

The units of competency comprising this qualification include the following:

CODE NO.	BASIC COMPETENCIES
400311319	Lead workplace communication
400311320	Lead small teams
400311321	Apply critical thinking and problem-solving techniques in the workplace
400311322	Work in a diverse environment
400311323	Propose methods of applying learning and innovation in the organization
400311324	Use information systematically
400311325	Evaluate occupational safety and health work practices
400311326	Evaluate environmental work practices
400311327	Facilitate entrepreneurial skills for micro-small-medium enterprises (MSMEs)

CODE NO.	COMMON COMPETENCIES
MEE721202	Interpret Drawings and Sketches
MEE721210	Perform Basic Workshop Measurements & Computations
MEE721211	Contribute to Quality Management System
MEE721205	Use Hand Tools
MEE721212	Prepare Materials and Consumables

CODE NO.	CORE COMPETENCIES
MEE721321	Set up Welding Equipment
MEE721322	Prepare / Fit up Welding Joints
MEE721325	Weld Austenitic Stainless Steel Plates using MMAW

A person who has achieved this Qualification is competent to be a –

- Carbon Steel Plate/ Pipe Welder (MMAW)
- Austenitic Stainless Steel Plate Welder (MMAW)

SECTION 2 COMPETENCY STANDARDS

This section gives the details of the contents of the basic, common and core units of competency required in **MANUAL METAL ARC WELDING (MMAW) NC III.**

BASIC COMPETENCIES

UNIT OF COMPETENCY : LEAD WORKPLACE COMMUNICATION

UNIT CODE : 400311319

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to lead in the effective dissemination and discussion of ideas, information, and issues in the workplace. This includes preparation of written communication materials.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Communicate information about workplace processes	1.1 Relevant ***communication method*** is selected based on workplace procedures 1.2 Multiple operations involving several topics/areas are communicated following enterprise requirements 1.3 Questioning is applied to gain extra information 1.4 Relevant sources of information are identified in accordance with workplace/ client requirements 1.5 Information is selected and organized following enterprise procedures 1.6 Verbal and written reporting is undertaken when required 1.7 Communication and negotiation skills are applied and maintained in all relevant situations	1.1. Organization requirements for written and electronic communication methods 1.2. Effective verbal communication methods 1.3. Business writing 1.4. Workplace etiquette	1.1 Organizing information 1.2 Conveying intended meaning 1.3 Participating in a variety of workplace discussions 1.4 Complying with organization requirements for the use of written and electronic communication methods 1.5 Effective business writing 1.6 Effective clarifying and probing skills 1.7 Effective questioning techniques (clarifying and probing)

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Lead workplace discussions	2.1 Response to workplace issues are sought following enterprise procedures 2.2 Response to workplace issues are provided immediately 2.3 Constructive contributions are made to ***workplace discussions*** on such issues as production, quality and safety 2.4 Goals/ objectives and action plans undertaken in the workplace are communicated promptly	2.1 Organization requirements for written and electronic communication methods 2.2 Effective verbal communication methods 2.3 Workplace etiquette	2.1 Organizing information 2.2 Conveying intended meaning 2.3 Participating in variety of workplace discussions 2.4 Complying with organization requirements for the use of written and electronic communication methods 2.5 Effective clarifying and probing skills
3. Identify and communicate issues arising in the workplace	3.1 Issues and problems are identified as they arise 3.2 Information regarding problems and issues are organized coherently to ensure clear and effective communication 3.3 Dialogue is initiated with appropriate personnel 3.4 Communication problems and issues are raised as they arise 3.5 Identify barriers in communication to be addressed appropriately	3.1 Organization requirements for written and electronic communication methods 3.2 Effective verbal communication methods 3.3 Workplace etiquette 3.4 Communication problems and issues 3.5 Barriers in communication	3.1 Organizing information 3.2 Conveying intended meaning 3.3 Participating in a variety of workplace discussions 3.4 Complying with organization requirements for the use of written and electronic communication methods 3.5 Effective clarifying and probing skills 3.6 Identifying issues 3.7 Negotiation and communication skills

RANGE OF VARIABLES

VARIABLE	RANGE
1. Methods of communication	May include: 1.1. Non-verbal gestures 1.2. Verbal 1.3. Face-to-face 1.4. Two-way radio 1.5. Speaking to groups 1.6. Using telephone 1.7. Written 1.8. Internet
2. Workplace discussions	May include: 2.1. Coordination meetings 2.2. Toolbox discussion 2.3. Peer-to-peer discussion

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Dealt with a range of communication/information at one time 1.2 Demonstrated leadership skills in workplace communication 1.3 Made constructive contributions in workplace issues 1.4 Sought workplace issues effectively 1.5 Responded to workplace issues promptly 1.6 Presented information clearly and effectively written form 1.7 Used appropriate sources of information 1.8 Asked appropriate questions 1.9 Provided accurate information
2. Resource Implications	**The following resources should be provided:** 2.1 Variety of Information 2.2 Communication tools 2.3 Simulated workplace
3. Methods of Assessment	**Competency in this unit may be assessed through:** Case problem 3.1. Third-party report 3.2. Portfolio 3.3. Interview 3.4. Demonstration/Role-playing
4. Context for Assessment	4.1. Competency may be assessed in the workplace or in a simulated workplace environment

UNIT OF COMPETENCY : LEAD SMALL TEAMS

UNIT CODE : 400311320

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes to lead small teams including setting, maintaining and monitoring team and individual performance standards.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Provide team leadership	1.1 ***Work requirements*** are identified and presented to team members based on company policies and procedures 1.2 Reasons for instructions and requirements are communicated to team members based on company policies and procedures 1.3 ***Team members' and leaders' concerns*** are recognized, discussed and dealt with based on company practices	1.1 Facilitation of Team work 1.2 Company policies and procedures relating to work performance 1.3 Performance standards and expectations 1.4 Monitoring individual's and team's performance vis a vis client's and group's expectations	1.1 Communication skills required for leading teams 1.2 Group facilitation skills 1.3 Negotiating skills 1.4 Setting performance expectation
2. Assign responsibilities	2.1. Responsibilities are allocated having regard to the skills, knowledge and aptitude required to undertake the assigned task based on company policies. 2.2. Duties are allocated having regard to individual preference, domestic and personal considerations, whenever possible	2.1 Work plan and procedures 2.2 Work requirements and targets 2.2 Individual and group expectations and assignments 2.3 Ways to improve group leadership and membership	2.1 Communication skills 2.2 Management skills 2.3 Negotiating skills 2.4 Evaluation skills 2.5 Identifying team member's strengths and rooms for improvement
3. Set performance	3.1 Performance expectations are	3.1 One's roles and responsibilities in	3.1 Communication skills

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
expectations for team members	established based on client needs 3.2 Performance expectations are based on individual team members knowledge, skills and aptitude 3.3 Performance expectations are discussed and disseminated to individual team members	the team 3.2 Feedback giving and receiving 3.3 Performance expectation	3.2 Accurate empathy 3.3 Congruence 3.4 Unconditional positive regard 3.5 Handling of Feedback
4. Supervise team performance	4.1 Performance is monitored based on defined performance criteria and/or assignment instruction 4.2 Team members are provided with ***feedback***, positive support and advice on strategies to overcome any deficiencies based on company practices 4.3 ***Performance issues*** which cannot be rectified or addressed within the team are referred to appropriate personnel according to employer policy 4.4 Team members are kept informed of any changes in the priority allocated to assignments or tasks which might impact on client/customer needs and	4.1 Performance Coaching 4.2 Performance management 4.3 Performance Issues	4.1 Communication skills required for leading teams 4.2 Coaching skill

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	satisfaction 4.5 Team operations are monitored to ensure that employer/client needs and requirements are met 4.6 Follow-up communication is provided on all issues affecting the team 4.7 All relevant documentation is completed in accordance with company procedures		

RANGE OF VARIABLES

VARIABLE	RANGE
1. Work requirements	May include: 1.1. Client Profile 1.2. Assignment instructions
2. Team member's concerns	May include: 2.1. Roster/shift details
3. Monitor performance	May include: 3.1. Formal process 3.2. Informal process
4. Feedback	May include: 4.1. Formal process 4.2. Informal process
5. Performance issues	May include: 5.1. Work output 5.2. Work quality 5.3. Team participation 5.4. Compliance with workplace protocols 5.5. Safety 5.6. Customer service

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1. Maintained or improved individuals and/or team performance given a variety of possible scenario 1.2. Assessed and monitored team and individual performance against set criteria 1.3. Represented concerns of a team and individual to next level of management or appropriate specialist and to negotiate on their behalf 1.4. Allocated duties and responsibilities, having regard to individual's knowledge, skills and aptitude and the needs of the tasks to be performed 1.5. Set and communicated performance expectations for a range of tasks and duties within the team and provided feedback to team members
2. Resource Implications	**The following resources should be provided:** 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
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1. Written Examination 3.2. Oral Questioning 3.3. Portfolio
4. Context for Assessment	4.1 Competency may be assessed in actual workplace or at the designated TESDA Accredited Assessment Center.

UNIT OF COMPETENCY : APPLY CRITICAL THINKING AND PROBLEM-SOLVING TECHNIQUES IN THE WORKPLACE

UNIT CODE : 400311321

UNIT DESCRIPTOR : This unit 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/s of specific problems in the workplace.

ELEMENTS	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Examine specific workplace challenges	1.1 Variances are examined from normal operating **parameters;** and product quality. 1.2 Extent, cause and nature of the specific problem are defined through observation, investigation and ***analytical techniques***. 1.3 ***Problems*** are clearly stated and specified.	1.1 Competence includes a thorough 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, enough for the identification of fundamental causes of specific workplace challenges. 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 analytical techniques (e.g., planning, attention, simultaneous and successive processing of information) in examining specific challenges in the workplace. 1.2 Identifying extent and causes of specific challenges in the workplace.

ELEMENTS	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Analyze the causes of specific workplace challenges.	2.1 Possible causes of specific problems are identified based on experience and the use of problem solving tools **/** analytical techniques. 2.2 Possible cause statements are developed based on findings. 2.3 Fundamental causes are identified per results of investigation conducted.	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, sufficient for the identification of fundamental cause, determining the corrective action and provision of recommendations. 2.3 Relevant equipment and operational processes. 2.4 Enterprise goals, targets and measures. 2.5 Enterprise quality OSH and environmental requirement. 2.6 Enterprise information systems and data collation. 2.7 Industry codes and standards.	2.1 Using range of analytical techniques (e.g., planning, attention, simultaneous and successive processing of information) in examining specific challenges in the workplace. 2.2 Identifying extent and causes of specific challenges in the workplace. 2.3 Providing clear-cut findings on the nature of each identified workplace challenges.

ELEMENTS	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Formulate resolutions to specific workplace challenges	3.1 All possible options are considered for resolution of the problem. 3.2 Strengths and weaknesses of possible options are considered. 3.3 Corrective actions are determined to resolve the problem and possible future causes. 3.4 **Action *plans*** are developed identifying measurable objectives, resource needs and timelines in accordance with safety and operating procedures	3.1 Competence to include the ability to apply and explain, sufficient for the identification of fundamental cause, determining the corrective action and provision of recommendations 3.2Relevant equipment and operational processes 3.3 Enterprise goals, targets and measures 3.4 Enterprise quality OSH and environmental requirement 3.5 Principles of decision making strategies and techniques 3.6 Enterprise information systems and data collation 3.7 Industry codes and standards	3.1 Using range of analytical techniques (e.g., planning, attention, simultaneous and successive processing of information) in examining specific challenges in the workplace. 3.2 Identifying extent and causes of specific challenges in the workplace. 3.3 Providing clear-cut findings on the nature of each identified workplace challenges. 3.4 Devising, communicating, implementing and evaluating strategies and techniques in addressing specific workplace challenges.

ELEMENTS	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
4. Implement action plans and communicate results	4.1 Action plans are implemented and evaluated. 4.2 Results of plan implementation and recommendations are prepared. 4.2 Recommendations are presented to appropriate personnel. 4.3 Recommendations are followed-up, if required.	4.1 Competence to include the ability to apply and explain, sufficient for the identification of fundamental cause, determining the corrective action and provision of recommendations 4.2. Relevant equipment and operational processes 4.3 Enterprise goals, targets and measures 4.4 Enterprise quality, OSH and environmental requirement 4.5 Principles of decision making strategies and techniques 4.6 Enterprise information systems and data collation 4.7 Industry codes and standards	4.1 Using range of analytical techniques (e.g., planning, attention, simultaneous and successive processing of information) in examining specific challenges in the workplace. 4.2 Identifying extent and causes of specific challenges in the workplace. 4.3 Providing clear-cut findings on the nature of each identified workplace challenges. 4.4 Devising, communicating, implementing and evaluating strategies and techniques in addressing specific workplace challenges.

RANGE OF VARIABLES

VARIABLES	RANGE
1. Parameters	May include: 1.1 Processes 1.2 Procedures 1.3 Systems
2. Analytical techniques	May include: 2.1. Brainstorming 2.2. Intuitions/Logic 2.3. Cause and effect diagrams 2.4. Pareto analysis 2.5. SWOT analysis 2.6. Gant chart, Pert CPM and graphs 2.7. Scattergrams
3. Problem	May include: 3.1. Routine, non – routine and complex workplace and quality problems 3.2. Equipment selection, availability and failure 3.3. Teamwork and work allocation problem 3.4. Safety and emergency situations and incidents 3.5. Risk assessment and management
4. Action plans	May include: 4.1. Priority requirements 4.2. Measurable objectives 4.3. Resource requirements 4.4. Timelines 4.5. Co-ordination and feedback requirements 4.6. Safety requirements 4.7. Risk assessment 4.8. Environmental requirements

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1. Examined specific workplace challenges. 1.2. Analyzed the causes of specific workplace challenges. 1.3. Formulated resolutions to specific workplace challenges. 1.4. Implemented action plans and communicated results on specific workplace challenges.
2. Resource Implications	2.1. Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios / case studies / what ifs will be required as well as bank of questions which will be used to probe the reason behind the observable action.
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1. Observation 3.2. Case Formulation 3.3. Life Narrative Inquiry 3.4. Standardized test 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. These assessment activities should include a range of problems, including new, unusual and improbable situations that may have happened.
4. Context for Assessment	In all workplace, it may be appropriate to assess this unit concurrently with relevant teamwork or operation units.

UNIT OF COMPETENCY : WORK IN A DIVERSE ENVIRONMENT

UNIT CODE : 400311322

UNIT DESCRIPTOR : This unit covers the outcomes required to work effectively in a workplace characterized by diversity in terms of religions, beliefs, races, ethnicities and other differences.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Develop an individual's cultural awareness and sensitivity	1.1 Individual differences with clients, customers and fellow workers are recognized and respected in accordance with enterprise policies and core values. 1.2 Differences are responded to in a sensitive and considerate manner 1.3 **Diversity** is accommodated using appropriate verbal and non-verbal communication.	1.1 Understanding cultural diversity in the workplace 1.2Norms of behavior for interacting and dialogue with specific groups (e. g., Muslims and other non-Christians, non-Catholics, tribes/ethnic groups, foreigners) 1.3Different methods of verbal and non-verbal communication in a multicultural setting	1.1 Applying cross-cultural communication skills (i.e. different business customs, beliefs, communication strategies) 1.2 Showing affective skills – establishing rapport and empathy, understanding, etc. 1.3 Demonstrating openness and flexibility in communication 1.4 Recognizing diverse groups in the workplace and community as defined by divergent culture, religion, traditions and practices

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Work effectively in an environment that acknowledges and values cultural diversity	2.1 Knowledge, skills and experiences of others are recognized and documented in relation to team objectives. 2.2 Fellow workers are encouraged to utilize and share their specific qualities, skills or backgrounds with other team members and clients to enhance work outcomes. 2.3 Relations with customers and clients are maintained to show that diversity is valued by the business.	2.1 Value of diversity in the economy and society in terms of Workforce development 2.2 Importance of inclusiveness in a diverse environment 2.3 Shared vision and understanding of and commitment to team, departmental, and organizational goals and objectives 2.4 Strategies for customer service excellence	2.1 Demonstrating cross-cultural communication skills and active listening 2.2 Recognizing diverse groups in the workplace and community as defined by divergent culture, religion, traditions and practices 2.3 Demonstrating collaboration skills 2.4 Exhibiting customer service excellence

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Identify common issues in a multicultural and diverse environment	3.1 **Diversity-related conflicts** within the workplace are effectively addressed and resolved. 3.2 Discriminatory behaviors towards customers/stakeholders are minimized and addressed accordingly. 3.3 Change management policies are in place within the organization.	3.1 Value, and leverage of cultural diversity 3.2 Inclusivity and conflict resolution 3.3 Workplace harassment 3.4 Change management and ways to overcome resistance to change 3.5 Advanced strategies for customer service excellence	3.1 Addressing diversity-related conflicts in the workplace 3.2 Eliminating discriminatory behavior towards customers and co-workers 3.3 Utilizing change management policies in the workplace

RANGE OF VARIABLES

VARIABLE	RANGE
1. Diversity	This refers to diversity in both the workplace and the community and may include divergence in : 1.1 Religion 1.2 Ethnicity, race or nationality 1.3 Culture 1.4 Gender, age or personality 1.5 Educational background
2. Diversity-related conflicts	May include conflicts that result from: 2.1 Discriminatory behaviors 2.2 Differences of cultural practices 2.3 Differences of belief and value systems 2.4 Gender-based violence 2.5 Workplace bullying 2.6 Corporate jealousy 2.7 Language barriers 2.8 Individuals being differently-abled persons 2.9 Ageism (negative attitude and behavior towards old people)

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate**: 1.1 Adjusted language and behavior as required by interactions with diversity 1.2 Identified and respected individual differences in colleagues, clients and customers 1.3 Applied relevant regulations, standards and codes of practice
2. Resource Implications	**The following resources should be provided:** 2.1 Access to workplace and resources 2.2 Manuals and policies on Workplace Diversity
3. Methods of Assessment	**Competency in this unit may be assessed through**: 3.1 Demonstration or simulation with oral questioning 3.2 Group discussions and interactive activities 3.3 Case studies/problems involving workplace diversity issues 3.4 Third-party report 3.5 Written examination 3.6 Role Plays
4. Context for Assessment	Competency assessment may occur in workplace or any appropriately simulated environment

UNIT OF COMPETENCY : PROPOSE METHODS OF APPLYING LEARNING AND INNOVATION IN THE ORGANIZATION

UNIT CODE : 400311323

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to assess general obstacles in the application of learning and innovation in the organization and to propose practical methods of such in addressing organizational challenges.

ELEMENTS	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Assess work procedures, processes and systems in terms of innovative practices	1.1. R***easons*** for innovation are incorporated to work procedures. 1.2. ***Models of innovation*** are researched. 1.3. ***Gaps or barriers*** to innovation in one's work area are analyzed. 1.4. Staff who can support and foster innovation in the work procedure are identified.	1.1 Seven habits of highly effective people. 1.2 Character strengths that foster innovation and learning (Christopher Peterson and Martin Seligman, 2004) 1.3 Five minds of the future concepts (Gardner, 2007). 1.4 Adaptation concepts in neuroscience (Merzenich, 2013). 1.5 Transtheoretical model of behavior change (Prochaska, DiClemente, & Norcross, 1992).	1.1 Demonstrating collaboration and networking skills. 1.2 Applying basic research and evaluation skills 1.3 Generating insights on how to improve organizational procedures, processes and systems through innovation.

ELEMENTS	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Generate practical action plans for improving work procedures, processes	2.1 Ideas for innovative work procedure to foster innovation using individual and group techniques are conceptualized 2.2 Range of ideas with other team members and colleagues are evaluated and discussed 2.3 Work procedures and processes subject to change are selected based on ***workplace requirements*** (feasible and innovative). 2.4 Practical action plans are proposed to facilitate simple changes in the work procedures, processes and systems. 2.5 ***Critical inquiry*** is applied and used to facilitate discourse on adjustments in the simple work procedures, processes and systems.	2.1 Seven habits of highly effective people. 2.2 Character strengths that foster innovation and learning (Christopher Peterson and Martin Seligman, 2004) 2.3 Five minds of the future concepts (Gardner, 2007). 2.4 Adaptation concepts in neuroscience (Merzenich, 2013). 2.5 Transtheoretical model of behavior change (Prochaska, DiClemente, & Norcross, 1992).	2.1 Assessing readiness for change on simple work procedures, processes and systems. 2.2 Generating insights on how to improve organizational procedures, processes and systems through innovation. 2.3 Facilitating action plans on how to apply innovative procedures in the organization.

ELEMENTS	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Evaluate the effectiveness of the proposed action plans	3.1 Work structure is analyzed to identify the impact of the new work procedures 3.2 Co-workers/key personnel is consulted to know who will be involved with or affected by the work procedure 3.3 Work instruction operational plan of the new work procedure is developed and evaluated. 3.4 Feedback and suggestion are recorded. 3.5 Operational plan is updated. 3.6 Results and impact on the developed work instructions are reviewed 3.7 Results of the new work procedure are evaluated 3.8 Adjustments are recommended based on results gathered	3.1 Five minds of the future concepts (Gardner, 2007). 3.2 Adaptation concepts in neuroscience (Merzenich, 2013). 3.3 Transtheoretical model of behavior change (Prochaska, DiClemente, & Norcross, 1992).	3.1 Generating insights on how to improve organizational procedures, processes and systems through innovation. 3.2 Facilitating action plans on how to apply innovative procedures in the organization. 3.3 Communicating results of the evaluation of the proposed and implemented changes in the workplace procedures and systems. 3.4 Developing action plans for continuous improvement on the basic systems, processes and procedures in the organization.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Reasons	May include: 1.1 Strengths and weaknesses of the current systems, processes and procedures. 1.2 Opportunities and threats of the current systems, processes and procedures.
2. Models of innovation	May include: 2.1 Seven habits of highly effective people. 2.2 Five minds of the future concepts (Gardner, 2007). 2.3 Neuroplasticity and adaptation strategies.
3. Gaps or barriers	May include: 3.1 Machine 3.2 Manpower 3.3 Methods 3.4 Money
4. Critical Inquiry	May include: 4.1 Preparation. 4.2 Discussion. 4.3 Clarification of goals. 4.4 Negotiate towards a Win-Win outcome. 4.5 Agreement. 4.6 Implementation of a course of action. 4.7 Effective verbal communication. See our pages: Verbal Communication and Effective Speaking. 4.8 Listening. 4.9 Reducing misunderstandings is a key part of effective negotiation. 4.10 Rapport Building. 4.11 Problem Solving. 4.12 Decision Making. 4.13 Assertiveness. 4.14 Dealing with Difficult Situations.

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** Established the reasons why innovative systems are required Established the goals of a new innovative system Analyzed current organizational systems to identify gaps and barriers to innovation. Assessed work procedures, processes and systems in terms of innovative practices. Generate practical action plans for improving work procedures, and processes. Reviewed the trial innovative work system and adjusted reflect evaluation feedback, knowledge management systems and future planning. Evaluated the effectiveness of the proposed action plans.
2. Resource Implications	**The following resources should be provided:** 2.1 Pens, papers and writing implements. 2.2 Cartolina. 2.3 Manila papers.
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Psychological and behavioral Interviews. 3.2 Performance Evaluation. 3.3 Life Narrative Inquiry. 3.4 Review of portfolios of evidence and third-party workplace reports of on-the-job performance. 3.5 Sensitivity analysis. 3.6 Organizational analysis. 3.7 Standardized assessment of character strengths and virtues applied.
4. Context for Assessment	4.1 Competency may be assessed individually in the actual workplace or simulation environment in TESDA accredited institutions.

UNIT OF COMPETENCY : USE INFORMATION SYSTEMATICALLY

UNIT CODE : 400311324

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to use technical information systems, apply information technology (IT) systems and edit, format & check information.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Use technical information	1.1. ***Information*** are collated and organized into a suitable form for reference and use 1.2. Stored information are classified so that it can be quickly identified and retrieved when needed 1.3. Guidance are advised and offered to people who need to find and use information	1.1. Application in collating information 1.2. Procedures for inputting, maintaining and archiving information 1.3. Guidance to people who need to find and use information 1.4. Organize information 1.5. classify stored information for identification and retrieval 1.6. Operate the technical information system by using agreed procedures	1.1. Collating information 1.2. Operating appropriate and valid procedures for inputting, maintaining and archiving information 1.3. Advising and offering guidance to people who need to find and use information 1.4. Organizing information into a suitable form for reference and use 1.5. Classifying stored information for identification and retrieval 1.6. Operating the technical information system by using agreed procedures

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Apply information technology (IT)	2.1. ***Technical information*** system is operated using agreed procedures 2.2. Appropriate and valid procedures are operated for inputting, maintaining and archiving information 2.3. ***Software required*** are utilized to execute the project activities 2.4. Information and data obtained are handled, edited, formatted and checked from a range of internal and external ***sources*** 2.5. Information are extracted, entered, and processed to produce the outputs required by ***customers*** 2.6. Own skills and understanding are shared to help others 2.7. Specified ***security measures*** are implemented to protect the confidentiality and integrity of project data held in IT systems	2.1. Attributes and limitations of available software tools 2.2. Procedures and work instructions for the use of IT 2.3. Operational requirements for IT systems 2.4. Sources and flow paths of data 2.5. Security systems and measures that can be used 2.6. Extract data and format reports 2.7. Methods of entering and processing information 2.8. WWW enabled applications	2.1. Identifying attributes and limitations of available software tools 2.2. Using procedures and work instructions for the use of IT 2.3. Describing operational requirements for IT systems 2.4. Identifying sources and flow paths of data 2.5. Determining security systems and measures that can be used 2.6. Extracting data and format reports 2.7. Describing methods of entering and processing information 2.8. Using WWW applications

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Edit, format and check information	3.1 Basic editing techniques are used 3.2 Accuracy of documents are checked 3.3 Editing and formatting tools and techniques are used for more complex documents 3.4 Proof reading techniques is used to check that documents look professional	3.1 Basic file-handling techniques 3.2 Techniques in checking documents 3.3 Techniques in editing and formatting 3.4 Proof reading techniques	3.1 Using basic file-handling techniques is used for the software 3.2 Using different techniques in checking documents 3.3 Applying editing and formatting techniques 3.4 Applying proof reading techniques

RANGE OF VARIABLES

VARIABLE	RANGE
1. Information	May include: 1.1. Property 1.2. Organizational 1.3. Technical reference
2. Technical information	May include: 2.1. paper based 2.2. electronic
3. Software	May include: 3.1. spreadsheets 3.2. databases 3.3. word processing 3.4. presentation
4. Sources	May include: 4.1. other IT systems 4.2. manually created 4.3. within own organization 4.4. outside own organization 4.5. geographically remote
5. Customers	May include: 5.1. colleagues 5.2. company and project management 5.3. clients
6. Security measures	May include: 6.1. access rights to input; 6.2. passwords; 6.3. access rights to outputs; 6.4. data consistency and back-up; 6.5. recovery plans

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1. Used technical information systems and information technology 1.2. Applied information technology (IT) systems 1.3. Edited, formatted and checked information
2. Resource Implications	**The following resources should be provided:** 2.1. Computers 2.2. Software and IT system
3. Methods of Assessment	**Competency in this unit should be assessed through:** 3.1. Direct Observation 3.2. Oral interview and written test
4. Context for Assessment	4.1. Competency may be assessed individually in the actual workplace or through accredited institution

UNIT OF COMPETENCY : **EVALUATE OCCUPATIONAL SAFETY AND HEALTH WORK PRACTICES**

UNIT CODE : **400311325**

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to interpret Occupational Safety and Health practices, set OSH work targets, and evaluate effectiveness of Occupational Safety and Health work instructions

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Interpret Occupational Safety and Health practices	1.1 ***OSH work practices issues*** are identified relevant to work requirements 1.2 OSH work standards and procedures are determined based on applicability to nature of work 1.3 Gaps in work practices are identified related to relevant OSH work standards	1.1. OSH work practices issues 1.2. OSH work standards 1.3. General OSH principles and legislations 1.4. Company/ workplace policies/ guidelines 1.5. Standards and safety requirements of work process and procedures	1.1. Communication skills 1.2. Interpersonal skills 1.3. Critical thinking skills 1.4. Observation skills
2. Set OSH work targets	2.1 Relevant work information are gathered necessary to determine OSH work targets 2.2 ***OSH Indicators*** based on gathered information are agreed upon to measure effectiveness of workplace OSH policies and procedures 2.3 Agreed OSH indicators are endorsed for approval from appropriate personnel 2.4 ***OSH work instructions*** are received in accordance with workplace policies and procedures*	2.1. OSH work targets 2.2. OSH Indicators 2.3. OSH work instructions 2.4. Safety and health requirements of tasks 2.5. Workplace guidelines on providing feedback on OSH and security concerns 2.6. OSH regulations Hazard control procedures 2.7. OSH trainings relevant to work	2.1. Communication skills 2.2. Collaborating skills 2.3. Critical thinking skills 2.4. Observation skills

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Evaluate effectiveness of Occupational Safety and Health work instructions	3.1 OSH Practices are observed based on workplace standards 3.2 Observed OSH practices are measured against approved ***OSH metrics*** 3.3 Findings regarding effectiveness are assessed and gaps identified are implemented based on OSH work standards	3.1. OSH Practices 3.2. OSH metrics 3.3. OSH Evaluation Techniques 3.4. OSH work standards	3.1. Critical thinking skills 3.2. Evaluating skills

RANGE OF VARIABLES

VARIABLE	RANGE
1. OSH Work Practices Issues	May include: 1.1 Workers' experience/observance on presence of work hazards 1.2 Unsafe/unhealthy administrative arrangements (prolonged work hours, no break-time, constant overtime, scheduling of tasks) 1.3 Reasons for compliance/non-compliance to use of PPEs or other OSH procedures/policies/ guidelines
2. OSH Indicators	May include: 2.1 Increased of incidents of accidents, injuries 2.2 Increased occurrence of sickness or health complaints/symptoms 2.3 Common complaints of workers' related to OSH 2.4 High absenteeism for work-related reasons
3. OSH Work Instructions	May include: 3.1 Preventive and control measures**,** and targets 3.2 Eliminate the hazard (i.e., get rid of the dangerous machine 3.3 Isolate the hazard (i.e. keep the machine in a closed room and operate it remotely; barricade an unsafe area off) 3.4 Substitute the hazard with a safer alternative (i.e., replace the machine with a safer one) 3.5 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) 3.6 Use engineering controls to reduce the risk (i.e. use safety guards to machine) 3.7 Use personal protective equipment 3.8 Safety, Health and Work Environment Evaluation 3.9 Periodic and/or special medical examinations of workers
4. OSH metrics	May include: 4.1 Statistics on incidence of accidence and injuries 4.2 Morbidity (Type and Number of Sickness) 4.3 Mortality (Cause and Number of Deaths) 4.4 Accident Rate

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1. Identify OSH work practices issues relevant to work requirements 1.2. Identify gaps in work practices related to relevant OSH work standards 1.3. Agree upon OSH Indicators based on gathered information to measure effectiveness of workplace OSH policies and procedures 1.4. Receive OSH work instructions in accordance with workplace policies and procedures 1.5. Compare Observed OSH practices with against approved OSH work instructions 1.6. Assess findings regarding effectiveness based on OSH work standards
2. Resource Implications	**The following resources should be provided:** 2.1 Facilities, materials, tools and equipment necessary for the activity
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Observation/Demonstration with oral questioning 3.2 Third party report 3.3 Written exam
4. Context for Assessment	4.1 Competency may be assessed in the work place or in a simulated work place setting

UNIT OF COMPETENCY : EVALUATE ENVIRONMENTAL WORK PRACTICES

UNIT CODE : 400311326

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitude to interpret environmental Issues, establish targets to evaluate environmental practices and evaluate effectiveness of environmental practices

ELEMENTS	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Interpret environmental practices, policies and procedures	1.1 ***Environmental work practices*** issues are identified relevant to work requirements 1.2 Environmental Standards and Procedures nature of work are determined based on Applicability to nature of work 1.3 Gaps in work practices related to Environmental Standards and Procedures are identified	1.1 Environmental Issues 1.2 Environmental Work Procedures 1.3 Environmental Laws 1.4 Environmental Hazardous and Non-Hazardous Materials 1.5 Environmental required license, registration or certification	1.1. Analyzing Environmental Issues and Concerns 1.2. Critical thinking 1.3. Problem Solving 1.4. Observation Skills
2. Establish targets to evaluate environmental practices	2.1. Relevant information are gathered necessary to determine environmental work targets 2.2. ***Environmental Indicators*** based on gathered information are set to measure environmental work targets 2.3. Indicators are verified with appropriate personnel	2.1. Environmental Indicators 2.2. Relevant Environment Personnel or expert 2.3. Relevant Environmental Trainings and Seminars	2.1. Investigative Skills 2.2. Critical thinking 2.3. Problem Solving 2.4. Observation Skills

ELEMENTS	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Evaluate effectiveness of environmental practices	3.1. Work environmental practices are recorded based on workplace standards 3.2. Recorded work environmental practices are compared against planned indicators 3.3. Findings regarding effectiveness are assessed and gaps identified are implemented based on environment work standards and procedures 3.4. Results of environmental assessment are conveyed to appropriate personnel	3.1 Environmental Practices 3.2 Environmental Standards and Procedures	3.1 Documentation and Record Keeping Skills 3.2 Critical thinking 3.3 Problem Solving 3.4 Observation Skills

RANGE OF VARIABLES

VARIABLE	R A N G E
1. Environmental Practices Issues	May include: 1.1 Water Quality 1.2 National and Local Government Issues 1.3 Safety 1.4 Endangered Species 1.5 Noise 1.6 Air Quality 1.7 Historic 1.8 Waste 1.9 Cultural
2. Environmental Indicators	May include: 2.1 Noise level 2.2 Lighting (Lumens) 2.3 Air Quality - Toxicity 2.4 Thermal Comfort 2.5 Vibration 2.6 Radiation 2.7 Quantity of the Resources 2.8 Volume

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1. Identified environmental issues relevant to work requirements 1.2. Identified gaps in work practices related to Environmental Standards and Procedures 1.3. Gathered relevant information necessary to determine environmental work targets 1.4. Set environmental indicators based on gathered information to measure environmental work targets 1.5. Recorded work environmental practices are recorded based on workplace standards 1.6. Conveyed results of environmental assessment to appropriate personnel
2. Resource Implications	**The following resources should be provided:** 2.1 Workplace/Assessment location 2.2 Legislation, policies, procedures, protocols and local ordinances relating to environmental protection 2.3 Case studies/scenarios relating to environmental protection
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Written/ Oral Examination 3.2 Interview/Third Party Reports 3.3 Portfolio (citations/awards from GOs and NGOs, certificate of training – local and abroad) 3.4 Simulations and role-plays
4. Context for Assessment	4.1 Competency may be assessed in actual workplace or at the designated TESDA center.

UNIT OF COMPETENCY : **FACILITATE ENTREPRENEURIAL SKILLS FOR MICRO-SMALL-MEDIUM ENTERPRISES (MSMEs)**

UNIT CODE : **400311327**

UNIT DESCRIPTOR : This unit covers the outcomes required to build, operate and grow a micro/small-scale enterprise.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Develop and maintain micro-small-medium enterprise (MSMEs) skills in the organization	1.1 Appropriate ***business strategies*** are determined and set for the enterprise based on current and emerging business environment. 1.2 ***Business operations*** are monitored and controlled following established procedures. 1.3 Quality assurance measures are implemented consistently. 1.4 Good relations are maintained with staff/workers. 1.5 Policies and procedures on occupational safety and health and environmental concerns are constantly observed.	1.1 Business models and strategies 1.2 Types and categories of businesses 1.3 Business operation 1.4 Basic Bookkeeping 1.5 Business internal controls 1.6 Basic quality control and assurance concepts 1.7 Government and regulatory processes	1.1 Basic bookkeeping/ accounting skills 1.2 Communication skills 1.3 Building relations with customer and employees 1.4 Building competitive advantage of the enterprise
2. Establish and maintain client-base/market	2.1 Good customer relations are maintained 2.2 New customers and markets are identified, explored and reached out to. 2.3 Promotions/Incentives are offered to loyal customers 2.4 Additional products and services are evaluated and tried where feasible. 2.5 ***Promotional/advertising initiatives*** are carried out where necessary and feasible.	2.1 Public relations concepts 2.2 Basic product promotion strategies 2.3 Basic market and feasibility studies 2.4 Basic business ethics	2.1 Building customer relations 2.2 Individual marketing skills 2.3 Using basic advertising (posters/ tarpaulins, flyers, social media, etc.)

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Apply budgeting and financial management skills	3.1 Enterprise is built up and sustained through judicious control of cash flows. 3.2 Profitability of enterprise is ensured though appropriate ***internal controls***. 3.3 Unnecessary or lower-priority expenses and purchases are avoided.	3.1 Cash flow management 3.1 Basic financial management 3.2 Basic financial accounting 3.3 Business internal controls	3.1 Setting business priorities and strategies 3.2 Interpreting basic financial statements 3.3 Preparing business plans

RANGE OF VARIABLES

VARIABLE	RANGE
1. Business strategies	May include: 1.1. Developing/Maintaining niche market 1.2. Use of organic/healthy ingredients 1.3. Environment-friendly and sustainable practices 1.4. Offering both affordable and high-quality products and services 1.5. Promotion and marketing strategies (e. g., on-line marketing)
2. Business operations	May include: 2.1 Purchasing 2.2 Accounting/Administrative work 2.3 Production/Operations/Sales
3. Internal controls	May include: 3.1 Accounting systems 3.2 Financial statements/reports 3.3 Cash management
4. Promotional/Advertising initiatives	May include: 4.1 Use of tarpaulins, brochures, and/or flyers 4.2 Sales, discounts and easy payment terms 4.3 Use of social media/Internet 4.4 “Service with a smile” 4.5 Extra attention to regular customers

EVIDENCE GUIDE

1. Critical aspects of competency	**Assessment requires evidence that the candidate:** 1.1 Demonstrated basic entrepreneurial skills 1.2 Demonstrated ability to conceptualize and plan a micro/small enterprise 1.3 Demonstrated ability to manage/operate a micro/small-scale business
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 Portfolio assessment with interview 3.4 Case problems
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 : INTERPRET DRAWINGS AND SKETCHES

UNIT CODE : MEE721202

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

ELEMENT	PERFORMANCE CRITERIA *Italicized* terms are elaborated in the Range of Variable	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Interpret technical drawing	1.1 Dimensions identified as appropriate. 1.2 Instructions identified and followed as required. 1.3 Material requirements identified as required. 1.4 Symbols recognized as appropriate in the ***drawing/ sketch*.** 1.5 ***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 1.8 AWF-CWCS/ ISO 9606-1 / AWS D1.1 / ASME IX.	1.1 Identifying dimension 1.2 Identifying instruction 1.3 Identifying material 1.4 Recognizing symbols in the drawing 1.5 Identifying tolerance, limits and fits
2. Interpret details from freehand sketch	2.1 Dimensions identified as appropriate. 2.2 Instructions identified and followed as required. 2.3 Material requirements identified as required. 2.4 Symbols recognized as appropriate in the drawing.	2.1 Alphabet of lines 2.2 Projections 2.3 Drawing symbols 2.4 Dimensioning techniques 2.5 Tolerance, limits and fits 2.6 Engineering materials 2.7 Drawing tools and supplies 2.8 AWF-CWCS/ ISO 9606-1 / AWS D1.1 / ASME IX.	2.1 Identifying dimensions 2.2 Identifying instruction 2.3 Identifying material requirements 2.4 Recognizing symbols

RANGE OF VARIABLES

VARIABLE	RANGE
1. Drawing/sketch	May include: 1.1 Perspective 1.2 Joint design 1.3 Welding symbols
2. Tolerance	May include: 2.1 General tolerance 2.2 Groove Angle 2.3 Root Face 2.4 Root Opening

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate interpreted: 1.1 Drawings 1.2 Sketches.
2. Resource implications	The following resources must be provided: 2.1 Drawings or plans 2.2 Sketches 2.3 Measuring tools
3. Method of assessment	Competency must be assessed through: 3.1 Direct observation 3.2Written or oral short answer questions 3.3 Demonstration
4. Context for assessment	4.1 Competency may be assessed in the workplace or in simulated workplace environment or at the designated TESDA Accredited Assessment Center.

UNIT OF COMPETENCY : PERFORM BASIC WORKSHOP MEASUREMENTS & COMPUTATIONS

UNIT CODE : MEE721210

UNIT DESCRIPTOR : This unit covers the competencies required to perform proper measurement and simple calculations using the four fundamental operations.

ELEMENTS	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Select and use measuring tools	1.1 ***Measuring tools*** are selected according to the requirement. 1.2 Measuring tools are used according to the requirement 1.3 Measuring technique used is correct and appropriate to the device used.	1.1 Types, purposes and accuracy of measuring instruments 1.2 Capability of measuring instruments 1.3 Part dimensions and tolerances 1.4 Techniques for measuring dimensions	1.1 Selecting measuring tools 1.2 Obtaining accurate measurements 1.3 Determining measuring technique
2. Clean and store measuring tools	2.1 Cleaning of devices undertaken according to standard operating procedures. 2.2 Care of devices undertaken according to manufacturer's specifications. 2.3 Storage of devices undertaken according to standard operating procedures.	2.1 Types, purposes and accuracy of measuring instruments 2.2 Capability of measuring instruments 2.3 Part dimensions and tolerances 2.4 Techniques for measuring dimensions 2.5 Care and storage procedure of measuring tools	2.1 Determining proper care and storage of measuring tools.
3. Perform four fundamental operations.	3.1 Simple calculations are performed using ***four fundamental operations***. 3.2 Correct formula are applied to isolate the variable required. 3.3 Simple transposition of variables in the formulae is carried out. 3.4 Unknown variables are solved correctly.	3.1 Linear measurement 3.2 Geometrical measurement 3.3 Ratio and proportion 3.4 Area	3.1 Performing Calculation

4. Perform conversion of units	4.1 Familiarity to English system of measurement is required 4.2 Understanding to the metric system is necessary. 4.3 ***Units*** are converted to the required figure using the given formulae	4.1 English Systems of Measurement 4.2 Metric System of Measurement 4.3 Conversion of units from English to metric and/or vice versa	4.1 Performing Calculation

RANGE OF VARIABLES

VARIABLE	RANGE
1. Measuring tools	May include: 1.1 Try square 1.2 Steel rule 1.3 Welding gauges
2. Four fundamental operations	May include: 2.1 Addition 2.2 Subtraction 2.3 Multiplication 2.4 Division
3 Units	May include: 3.1 English System 3.2 Metric System

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Selected and used measuring tools. 1.2 Cleaned and stored using measuring tools 1.3 Used four fundamental operations 1.4 Performed conversion of units
2. Resource implications	The following resources must be provided 2.1 Tools and facilities appropriate to processes or activity 2.2 Materials relevant to the proposed activity
3. Method of assessment	Competency must be assessed through: 3.1 Written or oral short answer questions 3.2 Practical exercises
4. Context for assessment	4.1 Competency may be assessed in the workplace or in simulated workplace environment or at the designated TESDA Accredited Assessment Center.

UNIT OF COMPETENCY : CONTRIBUTE TO QUALITY MANAGEMENT SYSTEM (QMS)

UNIT CODE : MEE721211

UNIT DESCRIPTOR : This unit involves competence required to contribute to quality management system towards work

ELEMENTS	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Apply quality management system (QMS)	1.1 Appropriate ***quality systems and procedures*** are applied throughout the production/fabrication process. 1.2 Documented information are properly controlled 1.3 QMS are properly implemented and maintained	1.1 Awareness on applicable quality management system / standards	1.1Conforming to QMS
2.Apply quality standards to work	2.1 Inspections are conducted throughout the production processes to ensure quality standards are maintained. 2.2 Appropriate quality standards are applied throughout the production/fabrication processes. 2.3 All activities are coordinated throughout the workplace to ensure efficient quality work outcomes. 2.4 Records of work quality are maintained according to the company requirements.	2.1 Awareness on applicable quality management system / standards	2.1 Conforming to QMS
3.Protect company property and customer interests	3.1 Possible damage to ***company property*** is avoided by adherence to company quality procedures. 3.2 Quality of work is reviewed to ensure customer requirements and company	3.1 Awareness on applicable quality management system / standards	3.1 Conforming to QMS

	standards are met. 3.3 Customer feedback system is established.		

RANGE OF VARIABLES

VARIABLE	RANGE
1. Quality system and procedures	Quality system and procedures may be contained in: 1.1 Work instructions 1.2 Procedures manual 1.3 Safe work procedures 1.4 Equipment maintenance schedules 1.5 Product technical procedures adopted or specifically prepared standards 1.6 Company/industry rules
2. Company property	Company property includes: 2.1 production and/or fabrication equipment 2.2 hand and power tools 2.3 OH&S paraphernalia 2.4 facilities

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Contributed to QMS towards work 1.2 Applied quality standards to work 1.3 Protected company property and customer interests
2 Resource implications	The following resources should be provided 2.1 Quality manuals / procedures 2.2 Applicable Codes, Standards and Specifications 2.3 Company / Industry rules
3. Method of assessment	Competency should be assessed through: 3.1 Demonstration 3.2 Written or oral short answer questions
4. Context for assessment	4.1 Competency may be assessed in the workplace or in simulated workplace environment or at the designated TESDA Accredited Assessment Center.

UNIT OF COMPETENCY : USE HAND TOOLS

UNIT CODE : MEE721205

UNIT DESCRIPTOR : This unit covers the competencies required to use hand tools.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms are elaborated* in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1.Identify and use of Personal Protective Equipment (PPE)	1.1 ***Personal protective equipment (PPE)*** is used in accordance with Rule 1080 of Occupational Safety and Health Standards 1.2 Proper Care and Maintenance of PPEs are performed in accordance with OSHS 1.3 Storage and Disposal of PPE are followed according to OSHS	1.1 OSH rule 1080 work standard 1.2 Company/ workplace policies/ guidelines 1.3 Standards and safety requirements of work process and procedures	1.1 Applying safety procedures 1.2 Communication skill 3.3 Observation skills
2. Select and use of tools and equipment	2.1 ***Hand tools*** selected are appropriate to the requirements of the *task*. 2.2 Tools and equipment are inspected according to manufacturer's recommendation 2.3 Tools and equipment are used as per operation manual instructions.	2.1 Tools and equipment Instruction manual 2.2 Adherence to work requirements	2.1 Communication skills 2.2 Handling of tools and equipment
3.Perform simple maintenance of tools and equipment	3.1Tools and equipment are cleaned and lubricated ***(routine maintenance)*** according to manufacturer's recommendation. 3.2 Unsafe or defective tools are identified and marked for repair/ decommission according to procedure. 3.3 Minor tools and equipment repair are performed according	3.1 Proper cleaning and oiling. 3.2 Equipment inspection and maintenance. 3.3 Simple repairs of hand tools	3.1Cleaning and lubricating. 3.2 Conducting simple check –up and remedies 3.3 Performing minor repairs

	to manufacturer's instruction or worksite procedure.		

RANGE OF VARIABLES

VARIABLE	RANGE
1. Personal protective Equipment (PPE)	May include: 1.1 Welding Mask 1.2 Welding apron/jacket 1.3 Welding gloves (long) 1.4 Safety goggles 1.5 Respirator (as per NIOSH) 1.6 Safety shoes 1.7 Oxy-acetylene Goggles
2. Hand tools	May include: 2.1 Chipping Hammer 2.2 Steel brush 2.3 Pliers/ tongs 2.4 Files-bastard cut 2.5 Portable disc grinder 2.6 Try square 2.7 Steel rule 2.8 Files-half round 2.9 Welding gauges 2.10 Adjustable wrench 2.11 C- Clamps
3. Task	May include: 3.1 Testing / Inspection 3.2 Adjusting 3.3 Dismantling 3.4 Assembling
4. Routine maintenance	May include: 4.1 Cleaning 4.2 Lubricating 4.3 Adjusting 4.4 Simple tool repair

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Selected and used hand tools appropriate to the job 1.2 Performed routine maintenance and storage of hand tools
2 Resource implications	The following resources should be provided 2.1 Tools, equipment and facilities appropriate to the process or activity 2.2 Materials relevant to the proposed activity
3. Method of assessment	Competency should be assessed through: 3.1 Demonstration 3.2 Written or oral short answer questions 3.3 Practical exercises
4. Context for assessment	4.1 Competency may be assessed in the workplace or in simulated workplace environment or at the designated TESDA Accredited Assessment Center.

UNIT TITLE : PREPARE MATERIALS AND CONSUMABLES

UNIT CODE : MEE721212

DESCRIPTOR : This unit covers the skills, knowledge and attitudes in preparing welding materials.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** *are elaborated* in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify and use of Personal Protective Equipment (PPE)	1.1 *Personal protective equipment (PPE)* is used in accordance with Rule 1080 of Occupational Safety and Health Standards 1.2 Proper Care and Maintenance of PPEs are performed in accordance with OSHS 1.3 Storage and Disposal of PPE are followed according to OSHS	1.1 OSH rule 1080 work standard 1.2 Company/ workplace policies/ guidelines 1.3 Standards and safety requirements of work process and procedures	1.1 Applying safety procedures 1.2 Communication skill 1.3 Observation skills
2. Set up cutting equipment and materials	2.1 ***Cutting equipment*** should be operational and conformed to acceptable standards 2.2 Setting-up of equipment and ***materials*** are performed according to standard operating procedure 2.3 Task performed in accordance with company or industry requirements and ***safety practices.***	2.1 ANSI Z49.1 or equivalent safety standards 2.2 Work instructions (written and verbal). 2.3 Noise Pollution 2.4 Air pollution	2.1 Identifying Material requirements 2.2 Conducting equipment and material set-ups 2.3Applying safety procedures
3.Cut and prepare edge of materials	3.1 Materials are cut to specified dimension/ specifications. 3.2 Edges are prepared in accordance to specified shapes and configurations. 3.3 Task performed in accordance with company or industry	3.1 ANSI Z49.1 or equivalent safety standards 3.2Work instructions (written and verbal). 3.3Noise Pollution 3.4 Air pollution 3.5 5S and Proper Housekeeping	3.1 Obtaining accurate measurement 3.2 Applying safety procedures 3.3 Communication skill

	requirements and safety procedure.	3.6 Waste Segregation/ 3R 3.7AWF-CWCS/ ISO 9606-1 / AWS D1.1 / ASME IX.	3.4 Observation skills
4.Clean surfaces and edges	4.1 ***Cleaning methods*** of the surfaces are required as per specifications. 4.2 Surfaces and edges are properly cleaned and free from contaminants. 4.3 Task performed in accordance with company or industry requirements and safety practices.	4.1 Cutting Methods 4.2 OSH Standards 4.3 Work instructions (written and verbal). 4.4Types / purposes and accuracy of edge preparation 4.5 5S and Proper Housekeeping 4.6 Waste Segregation/ 3R 4.7 AWF-CWCS/ ISO 9606-1 / AWS D1.1 / ASME IX.	4.1Determining proper care and cleanliness of the material. 4.2 Applying safety procedures 4.3 Communication skill 4.4 Observation skills
5.Prepare welding consumables	5.1***Consumable***s are prepared in accordance with required specifications 5.2 Recommended manufacturer's instructions are observe 5.3Task performed in accordance with company or industry requirements and safety practices.	5.1 Selection of proper welding consumables 5.2 Work instructions (written and verbal). 5.3 OSH rule 1080-Personal Protective equipment and device. 5.4 OSH rule no. 1150-Materials Handling Storage. 5.5 RA 6969-Toxic substances and hazardous and nuclear wastes control act of 1990. 5.6 Material Safety Data Sheet (MSDS)/ Safety Data Sheet (SDS) 5.7 5S and Proper Housekeeping 5.8 Waste Segregation/ 3R 5.9 AWF-CWCS/ ISO 9606-1 / AWS D1.1 / ASME IX.	5.1 Selecting of appropriate welding consumables 5.2 Applying safety procedures 5.3 Communication skill 5.4 Observation skills

RANGE OF VARIABLE

VARIABLE	RANGE
1. Cutting Equipment	May include: 1.1 Oxy-fuel gas cutting equipment (manual and /or automatic) 1.2 Plasma cutting equipment 1.3 Shearing machine 1.5 Cut-off Wheel
2. Materials	May include: 2.1 Mild steel / Carbon Steel Plates 2.2 Run on/run off tabs
3. Safety practices:	May be include: 3.1 Wearing of required PPE 3.2 Handling and storage of materials and equipment 3.3 Safety Data Sheet (SDS) 3.4 Safety standards and procedures 3.5 Checking electrical equipment and devices 3.6 House keeping
4. Cleaning Methods	Surfaces and edges may be cleaned by 4.1 Grinding 4.2 Filing 4.3 Steel Brushing
5 Consumables	May include: 5.1 Cutting gases 5.2 Welding Electrodes 5.3 Grinding/cutting discs

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Perform edge preparation in accordance with WPS and safety procedures 1.2 Use edge preparation equipment and tools in accordance with the requirements or manufacturer's instructions
2.Resource implications	The following resources must be provided: 2.1 Relevant documentation such as WPS and working drawing 2.2 Materials and consumables 2.3 Cutting equipment and accessories 2.4 Cleaning tools and equipment 2.2 Measuring tools 2.3 PPE 2.4 Firefighting equipment
3. Method of assessment	Competency may be assessed through: 3.1 Observation/evaluation 3.2 Oral questioning 3.3 Practical exercises
4 Context of assessment	4.1 Competency to be assessed while a task is being undertaken in the workplace or in a simulated workplace setting or at the designated TESDA Accredited Assessment Center.

CORE COMPETENCIES

UNIT TITLE : SET UP WELDING EQUIPMENT

UNIT CODE : MEE721321

DESCRIPTOR : This unit covers the skills, knowledge and attitudes in preparing equipment for welding.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms are elaborated* in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1.1 Set up welding machine	1.1 Selected ***welding machine*** is prepared in accordance with job requirements, welding procedures and specifications, drawings, sketches and manufacturer's instructions. 1.2 Welding machine is connected to an independent power supply and set to the ***polarity***-required in the welding procedures / specifications. 1.3 Current is adjusted consistent with job requirements to produce acceptable weld. 1.4 Task is completed without causing damage to the equipment, tools and materials and injury to self and others. 1.5 Task is performed in accordance with company or industry requirements and safety procedure. 1.6 Required output is completed as per WPS and verified by immediate supervisor 1.7 Safety requirements are complied as per welding machine manufacturers recommendations	1.1 Basic electricity 1.2 Welding machine Instruction manual (including maintenance, validation, calibration) 1.3 Arc welding Processes 1.4 Welding Procedure Specification 1.5 OSH Standards 1.6 Work Instructions (written and verbal). 1.7 Productivity work measurements 1.8 Adherence to work requirements 1.10 5S and Proper Housekeeping 1.11 Waste Segregation/ 3R 1.12 AWF-CWCS/ ISO 9606-1 / AWS D1.6 / ASME IX. 1.13 DOLE DO 198s2018 policies on OSH as applicable 1.14 DOH guidelines on safety and health as applicable	1.1 Setting-up of welding machines 1.2Understanding and applying welding procedure 1.3 Applying safety procedures

2. Set up welding accessories	2.1 Welding accessories are identified in accordance with job requirements, welding procedure specifications, drawings, sketches and manufacturer's instructions. 2.2 Welding ***accessories*** are set up in accordance with job requirements, welding procedure specifications and manufacturer's instructions and safety requirements. 2.3 Task is performed in accordance with company or industry requirements and safety procedure 2.4 Required output is verified correct by immediate supervisor	2.1 Identification of Welding Accessories 2.2 Understanding Welding machine Instruction manual 2.3 OSH Standards 2.4 Work instructions (written and verbal). 2.5 Productivity work measurements 2.6 Adherence to work requirements 2.7 5S and Proper Housekeeping 2.8 Waste Segregation/ 3R 2.9 AWF-CWCS/ ISO 9606-1 / AWS D1.6 / ASME IX. 2.10 DOLE DO 198s2018 policies on OSH as applicable 2.11 DOH guidelines on safety and health as applicable	2.1Setting-up welding accessories 2.2 Applying safety procedures
3. Set up welding positioner, jigs and fixtures	3.1 Braces, stiffeners, and other jigs are provided and in conformity with job requirements. 3.2 Task is performed in accordance with company or industry requirements and safety procedure 3.3 Required output is verified correct by immediate supervisor	3.1 Understanding drawing and sketches 3.2 Familiarity in different positioners, jigs and fixtures 3.3 OSH Standards 3.4 Work instructions (written and verbal). 3.5 Productivity work measurements 3.6 Adherence to work requirements 3.7 5S and Proper Housekeeping 3.8 Waste Segregation/ 3R 3.9 AWF-CWCS/ ISO 9606-1 / AWS D1.6 / ASME IX. 3.10 DOLE DO 198s2018 policies on OSH as applicable 3.11 DOH guidelines	3.1 Installation of positioners, jigs and fixtures 3.2 Applying safety procedures

		on safety and health as applicable	

RANGE OF VARIABLE

VARIABLE	RANGE
1. Welding machine	Different types of power sources used in MMAW/SMAW process: 1.1 Rectifier 1.2 Transformer 1.3 Transformer – Rectifier 1.4 Generator 1.5 Inverter
2. Welding Polarity	Different types of polarity may be used: 2.1 Direct Current ⁄Electrode DCEN) 2.2 Direct Current ⁄ Electrode DCEP) 2.3 Alternating Current (AC)
3. Accessories	3.1 Welding cables 3.2 Electrode holders 3.3 Return clamps 3.4 Male and female connectors

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Set up and install welding machine, accessories, welding positioners, jigs and fixtures within allotted time and in accordance with OH&S rules and accessible and convenient location. 1.2 Observed safety measures applicable to worksite operation 1.3 Communicated effectively with others to ensure effective work 1.4 Observed and complied with the productivity requirements 1.5 Complied with attitudinal work requirements
2.Resource implications	The following resources must be provided: 2.1 Well ventilated work area/shop with appropriate welding, machines, accessories, positioners, jigs and fixtures 2.2 PPE
3.Method of assessment	Competency must be assessed through: 3.1 Observation/evaluation 3.2 Oral questioning
4.Context of assessment	4.1 Competency to be assessed while a task is being undertaken in the workplace or in a simulated workplace setting or at the designated TESDA Accredited Assessment Center.

UNIT TITLE : PREPARE / FIT UP WELDING JOINTS

UNIT CODE : MEE721322

DESCRIPTOR : This unit covers the skills, knowledge and attitudes in preparing/ fitting up welding joints.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** *are elaborated* in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1.Set up root opening and alignment	1.1 ***Root opening*** and alignment is set up 1.2 Root opening is set up in accordance with the requirements of WPS. 1.3 Welding joint is aligned within the range of acceptability of code and standard. 1.4 Task is performed in accordance with company or industry requirements and safety procedure 1.5 Required output is completed as per WPS and verified by immediate supervisor	1.1 Basic welding joints 1.2 Parts of welding joint 1.3 Welding joint design 1.4 Dimensional Measurement 1.5 OSH Standards 1.6 Work Instructions (written and verbal). 1.7 Productivity work measurements 1.8 Adherence to work requirements. 1.9 5S and Proper Housekeeping 1.9 Waste Segregation/ 3R 1.10 AWF-CWCS/ ISO 9606-1 / AWS D1.6 / ASME IX. 1.11 DOLE DO 198s2018 policies on OSH as applicable 1.12 DOH guidelines on safety and health as applicable	1.1 Setting up root opening and alignment 1.2 Performing measurements 1.3 Applying safety procedures 1.4 Applying productive methods and techniques in setting up root opening and alignment
2. Perform tack welding	2.1 ***Tack welds*** are performed on the welding joints in accordance with the requirements of WPS or jobs requirement. 2.2 Backing plate, stiffeners, running plates are installed as	2.1 Basic welding joints 2.2 Parts of welding joint 2.3 Welding joint design 2.4 Dimensional Measurement 2.5 Tack welding	2.1 Performing Tack Welding 2.2Performing measurements 2.3Applying safety procedures 2.4Applying productive methods and

	required. 2.3 Fitted welding joints are freed from rust, paints, slags and other contaminants. 2.4 Fitted welding joints are ***visually and dimensionally acceptable*.** 2.5 Task is performed in accordance with company or industry requirements and safety procedure 2.6 Required output is completed as per WPS and verified by immediate supervisor	2.6 OSH Standards 2.7 Work instructions (written and verbal). 2.8 Productivity work measurements 2.9 Adherence to work requirements 2.10 5S and Proper Housekeeping 2.11 Waste Segregation/ 3R 2.12 AWF-CWCS/ ISO 9606-1 / AWS D1.6 / ASME IX. 2.13 DOLE DO 198s2018 policies on OSH as applicable 2.14 DOH guidelines on safety and health as applicable	techniques in performing tack welding
3.Set up fitted welding joints	3.1 Fitted welding joints are positioned and secured according to the requirements. 3.2 Task is performed in accordance with company or industry requirements and safety procedure 3.3 Required output is completed as per WPS and verified by immediate supervisor	3.1 Different Welding Position 3.2 OSH Standards 3.3 work instructions (written and verbal). 3.3 Productivity work measurements 3.4 Adherence to work requirements 3.5 5S and Proper Housekeeping 3.6 Waste Segregation/ 3R 3.7 AWF-CWCS/ ISO 9606-1 / AWS D1.6 / ASME IX. 3.8 DOLE DO 198s2018 policies on OSH as applicable 3.9 DOH guidelines on safety and health as applicable	3.1 Positioning of fitted welding joints 3.2 Applying safety procedures 3.3 Applying productive methods and techniques in setting up fitted welding joints

RANGE OF VARIABLE

VARIABLE	RANGE
1. Root opening	Specification is based on: 1.1 WPS requirements 1.2 Client requirements
2.Tack welds	Kinds of tack welds 2.1 Bridge 2.2 Permanent 2.3 Temporary
3. Visually and dimensionally acceptable	May include: 3.1 Fully fused to the base metal 3.2 Free from defects 3.3 Evenly distributed

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Performed tack welding 1.2 Checked root opening and alignment 1.3 Positioned fitted weld joint 1.4 Observed safety measures applicable to worksite operation 1.5 Communicated effectively with others to ensure effective work 1.6 Observed and complied with the productivity requirements 1.7 Complied with attitudinal work requirements
2. Resource implications	The following resources must be provided: 2.1 Drawing and 2.2 Well ventilated work area/shop with appropriate welding machines, accessories, positioners, jigs and fixtures. 2.3 PPE
3. Method of assessment	Competency must be assessed through: 3.1 Observation/evaluation 3.2 Oral questioning
4. Context of assessment	4. 1 Competency to be assessed while a task is being undertaken in the workplace or in a simulated workplace setting or at the designated TESDA Accredited Assessment Center.

UNIT OF COMPETENCY : WELD AUSTENITIC STAINLESS STEEL PLATES USING MMAW

UNIT CODE : MEE721325

DESCRIPTOR : This unit covers the skills, knowledge and attitudes in welding austenitic stainless steel plates using MMAW process.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms are elaborated* in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Perform single pass fillet weld	1.1 Single pass fillet weld is performed in accordance with ***WPS*** or job requirement. 1.2 Task is performed in accordance with company or industry requirement and safety procedure. 1.3 Weld is cleaned free from slag and other impurities 1.4 Weld is visually checked for ***defects*** and repaired, as required 1.5 Weld is visually acceptable in accordance with applicable codes and standards. 1.6 Required output is completed as per WPS and verified by immediate supervisor	1.1 OSH Standards 1.2 Work instructions (written and verbal). 1.3 Welding techniques 1.4 Hand tools and Power tools 1.5 Welding defects, causes and remedies 1.6 Visual Inspection 1.7 Productivity work measurements 1.8 Adherence to work requirements 1.9 5S and Proper Housekeeping 1.10 Waste Segregation/ 3R 1.11 AWF-CWCS/ ISO 9606-1 / AWS D1.6 / ASME IX. 1.12 DOLE DO 198s2018 policies on OSH as applicable 1.13 DOH guidelines on safety and health as applicable	1.1 Communication skill 1.2 Applying Welding techniques 1.3 Applying Welding repair Techniques 1.4 Performing Welding Inspection 1.5Applying safety procedures 1.6 Applying productive methods and techniques in performing root pass
2. Perform multiple pass fillet welds	2.1 Multiple pass fillet welds are performed in accordance with ***WPS*** or job requirement. 2.2 Task is performed in accordance with company or industry requirement and safety procedure. 2.3 Welds are cleaned free from slag and	2.1 OSH Standards 2.2 work instructions (written and verbal). 2.3 Welding techniques 2.4 Had tools and Power tools 2.5 Welding defects, causes and remedies 2.6 Visual Inspection 2.7 Productivity work	2.1 Communication skill 2.2 Applying Welding techniques 2.3 Applying Welding repair Techniques 2.4 Performing Welding Inspection 2.5 Applying safety procedures 2.6 Applying

	other impurities. 2.4 Welds are visually checked for ***defects*** and repaired, as Required 2.5 Welds are visually acceptable in accordance with applicable codes and standards. 2.6 Required output is completed as per WPS and verified by immediate supervisor	measurements 2.8 Adherence to work requirements 2.9 5S and Proper Housekeeping 2.10 Waste Segregation/ 3R 2.11 AWF-CWCS/ ISO 9606-1 / AWS D1.6 / ASME IX. 2.12 DOLE DO 198s2018 policies on OSH as applicable 2.13 DOH guidelines on safety and health as applicable	productive methods and techniques in performing root pass
3. Perform root pass on groove / butt joint	3.1 Root pass is performed in accordance with ***WPS*** or job requirement. 3.2 Task is performed in accordance with company or industry requirement and safety procedure. 3.3 Weld is cleaned free from slag and other impurities 3.4 Weld is visually checked for ***defects*** and repaired, as required 3.5 Weld is visually acceptable in accordance with applicable codes and standards. 3.6 Required output is completed as per WPS and verified by immediate supervisor	3.1 OSH Standards 3.2 work instructions (written and verbal). 3.3 Welding techniques 3.4 Hand tools and Power tools 3.5 Welding defects, causes and remedies 3.6 Visual Inspection 3.7 Productivity work measurements 3.8 Adherence to work requirements 3.9 5S and Proper Housekeeping 3.10 Waste Segregation/ 3R 3.11 AWF-CWCS/ ISO 9606-1 / AWS D1.6 / ASME IX. 3.12 DOLE DO 198s2018 policies on OSH as applicable 3.13 DOH guidelines on safety and health as applicable	3.1 Communication skill 3.2 Applying Welding techniques 3.3 Applying welding repair Techniques 3.4 Performing Welding Inspection 3.5 Applying safety procedures 3.6 Applying productive methods and techniques in performing root pass
4. Weld subsequent/ fill passes on groove / butt joint	4.1 Subsequent/ fill passes are performed in accordance with approved WPS and/or client specifications 4.2 Welds are cleaned free from slag and other impurities	4.1 OSH Standards 4.2 work instructions (written and verbal). 4.3 Welding techniques 4.4 Hand tools and Powertools 4.5 Welding defects, causes and	4.1 Communication skill 4.2 Applying Welding techniques 4.3 Applying Welding repair Techniques 4.4 Performing Welding

	4.3 Welds are visually checked for defects and repaired, as required 4.4 Welds are visually acceptable in accordance with applicable codes and standards 4.5 Task is performed in accordance with company or industry requirement and safety procedure. 5. Required output is completed as per WPS and verified by immediate supervisor	remedies 4.6 Visual Inspection 4.7 Productivity work measurements 4.8 Adherence to work requirements 4.9 5S and Proper Housekeeping 4.10 Waste Segregation/ 3R 4.11 AWF-CWCS/ ISO 9606-1 / AWS D1.6 / ASME IX. 4.12 DOLE DO 198s2018 policies on OSH as applicable 4.13 DOH guidelines on safety and health as applicable	Inspection 4.5 Applying safety procedures 4.6 Applying productive methods and techniques in performing capping
5. Perform capping on groove / butt joint	5.1 Capping is performed in accordance with approved WPS and/or client specifications 5.2 Weld is cleaned free from slag and other impurities 5.3 Weld is visually checked for defects and repaired, as required 5.4 Weld is visually acceptable in accordance with applicable codes and standards 5.5 Task is performed in accordance with company or industry requirement and safety procedure. 5.6 Required output is completed as per WPS and verified by immediate supervisor	5.1 OSH Standards 5.2 Work instructions (written and verbal). 5.3 Welding techniques 5.4 Handtools and Powertools 5.5 Welding defects, causes and remedies 5.6 Visual Inspection 5.7 Productivity work measurements 5.8 Adherence to work requirements 5.9 5S and Proper Housekeeping 5.10 Waste Segregation/ 3R 5.11 AWF-CWCS/ ISO 9606-1 / AWS D1.6 / ASME IX. 5.1 DOLE DO 198s2018 policies on OSH as applicable 5.2 DOH guidelines on safety and health as applicable	5.1 Communication skill 5.2 Applying Welding techniques 5.3 Applying Welding repair Techniques 5.4 Performing Welding Inspection 5.5 Applying safety procedures 5.6 Applying productive methods and techniques in performing capping
6. Perform final visual Inspection	6.1 Weld is visually acceptable in accordance with applicable codes and standard.	6.1 Visual Inspection (e.g bead profile, weld size, reinforcement) 6.2 Dimensional	6.1 Communication skill 6.2 Performing Welding Inspection

	6.2 Task is performed in accordance with company or industry requirement and safety procedure. 6.3 Required output is completed as per WPS and verified by immediate supervisor	Measurement 6.3 Productivity work measurements 6.4 Adherence to work requirements 6.5 5S and Proper Housekeeping 6.6 Waste Segregation/ 3R 6.7 AWF-CWCS/ ISO 9606-1 / AWS D1.6 / ASME IX. 6.8 DOLE DO 198s2018 policies on OSH as applicable 6.9 DOH guidelines on safety and health as applicable	6.3 Applying safety procedures 6.4 Applying productive methods and techniques in performing final visual inspection

RANGE OF VARIABLE

VARIABLE	RANGE
1. WPS	WPS Requirements are the following: 1.1 Welding positions 1.1.1 PA(1F), PC(2F), PF(3F), PE(4F) 1.1.2 PA(1G), PC (2G), PF(3G) 1.2 Material thickness(s) 1.2.1 3≤s ‹12mm (plate) 1.3 Type of material 1.3.1 Austenitic Stainless Steel 1.4 Welding Electrodes (Type and Size) 1.5 Welding Parameters (Amperage, Polarity, Travel speed) 1.6 Joint preparation
2. Defects	May include: 2.1 Porosity/Pinholes/Blowholes 2.2 Undercut 2.3 Arc Strike 2.4 Spatters 2.5 Slag inclusion 2.6 Concavity/convexity 2.7 Excessive reinforcement 2.8 Burn Through/ Melt Through 2.9 Crater cracks 2.10 Cracks 2.11 Lack of Fusion 2.12 Under Fill 2.13 Overlap 2.14 Misalignment 2.15 Distortion

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Welded austenitic stainless steel plates in PC (2G) and PF (3G) positions to acceptable standard following the approved WPS. 1.2 Observed safety measures applicable to worksite operation 1.3 Communicated effectively with others to ensure effective work 1.4 Observed and complied with the productivity requirements 1.5 Complied with attitudinal work requirements
2. Resource implications	The following resources must be provided: 2.1 Well ventilated work area/shop with appropriate welding machines, accessories, oven, tools, positioners, jigs and fixtures 2.2 Supplies and materials 2.3 PPE, 2.4 Relevant documentation such as WPS and working drawing 2.5 Fire Extinguishers
3. Method of assessment	Competency must be assessed through: 3.1 Observation and interview 3.2 Demonstration and interview 3.3 Written test 3.4 Portfolio 3.5 Nondestructive (NDT) and/or Destructive testing(DT) of test coupon
4. Context of assessment	4.1 Competency to be assessed while a task is being undertaken in the workplace or in a simulated workplace setting or at the designated TESDA Accredited Assessment Center.

SECTION 3 TRAINING ARRANGEMENTS

These standards are set to provide technical and vocational education and training (TVET) providers with information and other important requirements to consider when designing training programs for **MANUAL METAL ARC WELDING (MMAW) NC III.**

3.1 CURRICULUM DESIGN

TESDA shall provide the training on the development of competency-based curricula to enable training providers develop their own curricula with the components mentioned below.

Delivery of knowledge requirements for the basic, common and core units of competency specifically in the areas of mathematics, science/technology, communication/language and other academic subjects shall be contextualized. To this end, TVET providers shall develop a Contextual Learning Matrix (CLM) to accompany their curricula.

Course Title: **MANUAL METAL ARC WELDING (MMAW)** **NC Level** **NC III**

Nominal Training Duration:

40 Hours (Basic Competencies)
40 Hours (Common Competencies)
56 Hours (Core Competencies)
136 Hours
80 Supervised Industry Learning (SIL)
216 TOTAL HOURS

Course Description:

This course is designed to provide the learner with knowledge, practical skills and attitude, applicable in performing work activities involved in applying safety practices, interpreting drawings and sketches, performing basic workshop measurements and computing industry calculations, contributing to Quality System, using hand tools, preparing weld materials and consumables, setting up welding equipment, preparing/fit up welding joints fit up weld materials, repairing welds and welding austenitic stainless steel plates using MMAW. This includes 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 achieved.

BASIC COMPETENCIES
(40 HOURS)

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
1. Lead workplace communication	1.1 Communicate information about workplace processes	• Read ○ Effective verbal communication methods ○ Sources of information • Practice organizing information • Identify organization requirements for written and electronic communication methods • Follow organization requirements for the use of written and electronic communication methods • Perform exercises on understanding and conveying intended meaning scenario	• Lecture • Demonstration • Practical exercises • Role Play	• Written Test • Observation	2 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	1.2 Lead workplace discussions	• Describe: ○ Organizational policy on production, quality and safety ○ Goals/ objectives and action plan setting • Read ○ Effective verbal communication methods • Prepare/set action plans based on organizational goals and objectives	• Group discussion • Lecture • Demonstration	• Oral evaluation • Written Test • Observation	2 Hours
	1.3 Identify and communicate issues arising in the workplace	• Describe: ○ Organizational policy in dealing with issues and problems • Read • Effective verbal communication methods	• Group discussion • Lecture	• Oral evaluation • Written Test	2 Hours
2. Lead small teams	2.1 Provide team leadership	• Discussion of Company policies and procedures • Read web pages on situational leadership • Role play on situational leadership	• Group work • Role Play • Lecture/ Discussion • Individual Work	• Role Play • Written Test	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	2.2 Assign responsibilities	• Read web pages on performance management • Case study on allocating roles and responsibilities based on competencies of current staff	• Individual Work • Case Study	• Role Play • Written Test	1 Hour
	2.3 Set performance expectations for team members	• Role play to communicate performance expectations with staff • Discussion on performance issues	• Lecture/ Discussion • Role Play	• Role Play • Written Test	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	2.4 Supervise team performance	• Discussion on performance monitoring • Role play on providing feedback on performance • Role play on performance coaching • Discussion on keeping the team informed of team performance • Case study on Team performance monitoring and feedback	• Lecture/ Discussion • Role Play • Case Study	• Role Play • Written Test	1 Hour
3. Apply critical thinking and problem-solving techniques in the workplace	3.1 Examine specific workplace strategies	• Show thorough knowledge and understanding of the process, normal operating parameters, and product quality to recognize non-standard situations • Show mastery of the current industry hardware and software products and services • Discuss process of identification of fundamental	• Group discussion • Lecture • Demonstration • Role playing	• Case Formulation • Life Narrative Inquiry (Interview) • Standardized test	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		causes of specific workplace challenges • 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			

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	3.2 Analyze the causes of specific workplace challenges	• Show thorough knowledge and understanding of the process, normal operating parameters, and product quality to recognize non-standard situations • Show mastery of the current industry hardware and software products and services • Discuss process of identification of fundamental causes of specific workplace challenges • 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 • Identify extent and causes of specific challenges in the workplace • Use of range of analytical problem-solving techniques • Formulate clear-cut findings on the nature of each identified workplace challenges	• Group discussion • Lecture • Demonstration • Role playing	• Case Formulation • Life Narrative Inquiry (Interview) • Standardized test	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	3.3 Formulate resolutions to specific workplace challenges	• Show thorough knowledge and understanding of the process, normal operating parameters, and product quality to recognize non-standard situations • Show mastery of the current industry hardware and software products and services • Discuss process of identification of fundamental causes of specific workplace challenges • 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	• Group discussion • Lecture • Demonstration • Role playing	• Case Formulation • Life Narrative Inquiry (Interview) • Standardized test	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		- Enterprise quality OHS and environmental requirement - Enterprise information systems and data collation - Industry codes and standards • Identify extent and causes of specific challenges in the workplace • Use of range of analytical problem-solving techniques • Formulate clear-cut findings on the nature of each identified workplace challenges • Discus strategies on devising, communicating, implementing and evaluating strategies and techniques in addressing specific workplace challenges			
	3.4 Implement action plans and communicate results	• Identify extent and causes of specific challenges in the	• Group discussion • Lecture • Demonstration	• Case Formulation • Life Narrative	

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		workplace • Use of range of analytical problem-solving techniques • Formulate clear-cut findings on the nature of each identified workplace challenges • Discus strategies on devising, communicating, implementing and evaluating strategies and techniques in addressing specific workplace challenges	• Role playing	Inquiry (Interview) • Standardized test	1 Hour
4. Work in a diverse environment	4.1 Develop an individual's cultural awareness and sensitivity	• Show understanding of cultural diversity in the workplace • Recognize norms of behavior for interacting and dialogue with specific groups (e. g., Muslims and other non-Christians, non-Catholics, tribes/ethnic groups,	• Small Group Discussion • Interactive Lecture • Brainstorming • Demonstration • Role-playing	• Demonstration or simulation with oral questioning • Group discussions and interactive activities • Case studies/ problems involving workplace diversity issues • Written examination • Role Playing	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		foreigners) • Demonstrate different methods of verbal and non-verbal communication in a multicultural setting • Apply cross-cultural communication skills (i.e. different business customs, beliefs, communication strategies) • Show affective skills – establishing rapport and empathy, understanding, etc. • Demonstrate openness and flexibility in communication • Recognize diverse groups in the workplace and community as defined by divergent culture, religion, traditions and practices			

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	4.2 Work effectively in an environment that acknowledges and values cultural diversity	• Explain the value of diversity in the economy and society in terms of Workforce development • Discuss the importance of inclusiveness in a diverse environment • Discuss the importance of shared vision and understanding of and commitment to team, departmental, and organizational goals and objectives • Identify and exhibit strategies for customer service excellence • Demonstrate cross-cultural communication skills and active listening • Recognize diverse groups in the workplace and	• Small Group Discussion • Interactive Lecture • Brainstorming • Demonstration • Role-playing	• Demonstration or simulation with oral questioning • Group discussions and interactive activities • Case studies/ problems involving workplace diversity issues • Written examination • Role Playing	• 1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		community as defined by divergent culture, religion, traditions and practices • Demonstrate collaboration skills			
	4.3 Identify common issues in a multicultural and diverse environment	• Explain the value, and leverage of cultural diversity • Discuss the inclusivity and conflict resolution • Describe the workplace harassment • Explain the change management and cite ways to overcome resistance to change • Demonstrate advanced strategies for customer service excellence • Address diversity-related conflicts in the workplace • Eliminate discriminatory	• Small Group Discussion • Interactive Lecture • Brainstorming • Demonstration • Role-playing	• Demonstration or simulation with oral questioning • Group discussions and interactive activities • Case studies/ problems involving workplace diversity issues • Written examination • Role Playing	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		behavior towards customers and co-workers • Utilize change management policies in the workplace			
5. Propose methods of applying learning and innovation in the organization	5.1 Assess work procedures, processes and systems in terms of innovative practices	• Show mastery of the following practical concepts (e.g., 7 habits of highly effective people, character strengths that foster learning and innovation, five minds of the future, adaptation concepts and transtheoretical model of behavior change) • Demonstrate collaboration and networking skills • Show basic skills in research • Generate practical insights on how to improve organizational procedures, processes and systems	• Interactive Lecture • Appreciative Inquiry • Demonstration • Group work	• 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

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	5.2 Generate practical action plans for improving work procedures, processes	• Show mastery of the following practical concepts (e.g., 7 habits of highly effective people, character strengths that foster learning and innovation, five minds of the future, adaptation concepts and transtheoretical model of behavior change) • Demonstrate collaboration and networking skills • Show basic skills in research • Generate practical insights on how to improve organizational procedures, processes and systems • Set up action plans on how to apply innovative procedures in the organization • Set up action plans on how to apply innovative procedures in the	• Interactive Lecture • Appreciative Inquiry • Demonstration • Group work	• 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

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		organization • Generate practical insights on how to improve organizational procedures, processes and systems			
	5.3 Evaluate the effectiveness of the proposed action plans	• Show mastery of the following practical concepts (e.g., 7 habits of highly effective people, character strengths that foster learning and innovation, five minds of the future, adaptation concepts and transtheoretical model of behavior change) • Demonstrate collaboration and networking skills • Show basic skills in research • Generate practical insights on continuous improvement	• Interactive Lecture • Appreciative Inquiry • Demonstration • Group work	• 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

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
6. Use information systematically	6.1 Use technical information	• Lecture and discussion on: - Application in collating information - Procedures for inputting, maintaining and archiving information - Guidance to people who need to find and use information • Organizing information into a suitable form for reference and use • Classify stored information for identification and retrieval • Operate the technical information system by using agreed procedures	• Lecture • Group Discussion • Hands on • Demonstration	• Oral evaluation • Written Test • Observation • Presentation	4 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	6.2 Apply information technology (IT)	• Lecture and discussion on: - Attributes and limitations of available software tool - Procedures and work instructions for the use of IT - Operational requirements for IT systems - Sources and flow paths of data - Security systems and measures that can be used - Methods of entering and processing information • Use procedures and work instructions for the use of IT • Extract data and format reports • Use WWW applications	• Lecture • Group Discussion • Self-paced handout/ module • Hands on • Demonstration	• Oral evaluation • Written Test • Observation • Presentation	2 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	6.3 Edit, format and check information	• Lecture and discussion on: - Basic file-handling techniques - Techniques in checking documents - Techniques in editing and formatting - Proof reading techniques • Use different techniques in checking documents • Edit and format information applying different techniques • Proof read information applying different techniques	• Lecture • Group Discussion • Self-paced handout/ module • Hands on • Demonstration	• Oral evaluation • Written Test • Observation • Presentation	2 Hours
7. Evaluate Occupational Safety And Health Work Practices	7.1 Interpret Occupational Safety and Health practices	• Discuss the OSH standards, principles and legislations • Identify OSH work practices issues • Discuss standard safety requirements	• Lecture • Group Discussion	• Written Exam • Demonstration • Observation • Interviews / Questioning	2.5 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	7.2 Set OSH work targets	• Discussion in actions plans that are necessary in achieving the OSH target	• Lecture • Group Discussion	• Written Exam • Demonstration • Observation • Interviews / Questioning	1 Hour
	7.3 Evaluate effectiveness of Occupational Safety and Health work instructions	• Practice evaluating safety data (Historical or Simulated)	• Lecture • Group Discussion	• Written Exam • Demonstration • Observation • Interviews / Questioning	1.5 ours
8. Evaluate Environmental Work Practices	8.1 Interpret environmental practices, policies and procedures	• Discussion Environmental Issues regarding - Water Quality - National and Local Government Issues - Safety - Endangered Species - Noise - Air Quality - Historic - Waste - Cultural • Updating of existing occupation praces	• Lecture • Group Discussion • Demonstration	• Written Exam • Demonstration • Observation • Interviews / Questioning	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	8.2 Establish targets to evaluate environmental practices	• Discussion on - lower production costs and energy consumption - Environmentally Sound Processes - Resource Efficient - Recycling and Waste Management • Simple case study regarding energy efficiency	• Lecture • Group Discussion • Demonstration	• Written Exam • Demonstration • Observation • Interviews / Questioning	1 Hour
	8.3 Evaluate effectiveness of environmental practices	• Identifying effective environmental practices relevant to the industry/occupation - Implementation of energy efficiency	• Lecture • Group Discussion • Demonstration • Case Study	• Written Exam • Demonstration • Observation • Interviews / Questioning Third Party Reports	
9. Facilitate Entrepreneurial Skills For Micro-Small-Medium Enterprises (MSMEs)	9.1 Develop and maintain micro-small-medium enterprise (MSMEs) skills in the organization	• Discussions on business models and strategies • Discussion on Types and categories of businesses and business internal control • Discussion on Relevant National and local legislations affecting businesses	• Lecture/ Discussion • Case Study • Demonstration	• Written Test • Portfolio • Work Related Project	2 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• Prepare promotional materials • Practice basic bookkeeping			
	9.2 Establish and maintain client-base/market	• Role play on customer and employee relations • Discussion on Basic product promotion strategies • Preparation of Basic Feasibility study • Case studies on Basic Business ethics • Prepare basic advertising materials	• Role Play • Lecture Discussion • Case study	• Case problem • Written Test	2 Hours
	9.3 Apply budgeting and financial management skills	• Discussion on: - Basic cost-benefit analysis - Basic financial management - Basic financial accounting - Business internal controls	• Role Play • Lecture Discussion • Group work	• Written Test • Case problem	1 Hour

COMMON COMPETENCIES
(40 HOURS)

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
1. Interpret drawings and sketches	1.1 Identify standard alphabet of lines	• Determine dimensions of weld preparation • Determine critical dimension	• Lecture-Discussion • Demonstration • Practical application	• Oral questioning • Written Exam	• 1 Hour
	1.2 Identify orthographic/ isometric views	• Determine dimensions of weld preparation • Determine critical dimension • Explain standard welding and NDT symbols in the drawings / sketches	• Lecture-Discussion • Demonstration • Practical application	• Oral questioning • Written Exam	• 1 Hour
	1.3 Interpret standard drawing/ sketches and symbols.	• Determine dimensions of weld preparation • Determine critical dimension • Explain standard and NDT welding symbols in the drawings / sketches	• Lecture-Discussion • Demonstration • Practical application	• Oral questioning • Written Exam	• 2 Hours

2.Perform Basic Workshop Measurements and Computations	2.1 Use of appropriate measuring tools	• Determine Appropriate Measuring technique • Know and Obtain measurement according to specification.	• Lecture-Discussion • Demonstration	• Oral questioning • Written Examination	• 2 Hours
	2.2 Perform four fundamental operations	• Know and Obtain measurement according to specification. • Know how to calculate four fundamental operations • Perform basic simple calculation	• Lecture-Discussion • Demonstration • Practical application	• Oral questioning • Written Examination	• 2 Hours
	2.3 Perform conversion of units	• Know how to calculate four fundamental operations • Know how to calculate conversion of units • Perform basic simple calculation	• Lecture-Discussion • Demonstration • Practical application	• Oral questioning • Written Examination	• 3 Hours

3 Contribute to Quality Management System (QMS)	3.1 Inspect work done	• Comply to QMS standards, welding codes and standards	• Lecture-Discussion • Demonstration • Practical application	• Oral questioning • Written Examination	• 2 Hours
	3.2 Apply quality standards to work	• Describe organizational policy on quality and safety • Comply to QMS standards, welding codes and standards	• Lecture-Discussion • Demonstration • Practical application	• Oral questioning • Written Examination	• 1 Hour
	3.3 Protect company property and customer interest	• Describe organizational policy on quality and safety • Comply to QMS standards, welding codes and standards	• Lecture-Discussion • Demonstration • Practical application	• Oral questioning • Written Examination	• 1 Hour

4.Use hand tools	4.1 Identify and use of personal protective equipment (PPE)	• Determine proper usage of personal protective equipment (PPE) • Proper usage of personal protective equipment (PPE)	• Lecture-Discussion • Demonstration • Practical application	• Oral questioning • Written • Demonstration	• 2 Hours
	4.2 Select and use of tools and equipment	• Determine proper usage of hand tools and equipment • Proper usage of tools and equipment	• Lecture-Discussion • Demonstration • Practical application	• Oral questioning • Written • Demonstration	• 3 Hours
	4.3 Perform simple maintenance of tools and equipment	• Determine proper usage of hand tools and equipment • Proper usage of tools and equipment • Simple preventive maintenance of tools and equipment	• Lecture-Discussion • Demonstration • Practical application	• Oral questioning • Written • Demonstration	• 2 Hours
5. Prepare Materials and Consumables	5.1 Prepare welding safety and protective equipment	• Determine proper PPE in accordance with safety standards • Know and Identify welding safety hazards	• Lecture-Discussion • Demonstration • Practical application	• Observation • Demonstration and oral questioning • Written test	• 3 Hours
	5.2 Set up cutting equipment and materials	• Determine proper PPE in accordance with safety standards • Know and Identify welding safety hazards • Determine Proper set-up of	• Lecture-Discussion • Demonstration • Practical application	• Observation • Demonstration and oral questioning • Written test	• 3 Hours

		equipment and materials			
	5.3 Cut and prepare edge of materials	• Determine proper PPE in accordance with safety standards • Know and Identify welding safety hazards • Know how to cut materials according to specifications.	• Lecture-Discussion • Demonstration • Practical application	• Observation • Demonstration and oral questioning • Written test	• 8 Hours
	5.4 Clean surfaces and edges	• Determine proper PPE in accordance with safety standards • Know and Identify welding safety hazards • Know how to clean materials according to specifications.	• Lecture-Discussion • Demonstration • Practical application	• Observation • Demonstration and oral questioning • Written test	• 2 Hours
	5.5 Prepare welding consumables	• Determine proper PPE in accordance with safety standards • Know and Identify welding safety hazards • Know how to select and prepare proper welding consumables.	• Lecture-Discussion • Demonstration • Practical application	• Observation • Demonstration and oral questioning • Written test	• 2 Hours

CORE COMPETENCIES
(56 HOURS)

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
1. Set-up Welding Equipment	1.1 Set up welding machine	• Explain and demonstrate how to set-up welding equipment. • Explain and demonstrate how to set-up welding accessories. • Explain and demonstrate how to set-up welding positioners, jigs and fixtures.	• Lecture Discussion • Demonstration • Practical application	• Observation and oral questioning • Demonstration and oral questioning • Written test	• 0.5 Hour
	1.2 Set up welding accessories	• Explain and demonstrate how to set-up welding equipment. • Explain and demonstrate how to set-up welding accessories. • Explain and demonstrate how to set-up welding positioners, jigs and fixtures.	• Lecture Discussion • Demonstration • Practical application	• Observation and oral questioning • Demonstration and oral questioning • Written test	• 0.5 Hour
	1.3 Set up welding positioners, jigs and fixtures	• Explain and demonstrate how to set-up welding equipment. • Explain and demonstrate how to set-up welding	• Lecture Discussion • Demonstration • Practical application	• Observation and oral questioning • Demonstration and oral questioning	• 0.5 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		accessories. • Explain and demonstrate how to set-up welding positioners, jigs and fixtures.		• Written test	
2. Prepare / Fit up Welding Joints	2.1 Set-up root opening and alignment	• Explain and demonstrate how to set-up root opening and alignment. • Obtain tack welds. • Explain and obtain correct fitted welding joints	• Lecture-Discussion • Demonstration • Practical application	• Observation and oral questioning • Demonstration and oral questioning • Written test	• 1 Hour
	2.2 Perform tack welding	• Explain and demonstrate how to set-up root opening and alignment. • Obtain tack welds. • Explain and obtain correct fitted welding joints	• Lecture-Discussion • Demonstration • Practical application	• Observation and oral questioning • Demonstration and oral questioning • Written test	• 1 Hour
	2.3 Set-up fitted welding joints	• Explain and demonstrate how to set-up root opening and alignment. • Obtain tack welds. • Explain and obtain correct fitted welding joints	• Lecture-Discussion • Demonstration • Practical application	• Observation and oral questioning • Demonstration and oral questioning • Written test	• 0.5 Hour
3. Weld Austenitic Stainless Steel Plates Using MMAW	3.1 Perform single pass fillet welds in different positions- PA (1F), PC(2F), PF(3F), PE(4F)	• Explain and obtain single pass fillet welds in different positions in accordance to welding codes and	• Lecture-Discussion • Demonstration • Practical application	• Observation and oral questioning/ Interview • Demonstration and oral	• 4 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		standards.		questioning/ Interview • Written test • Nondestructive Testing (NDT) and/or Destructive testing (DT) of test coupon	
	3.2 Perform multiple pass fillet welds in different positions- PA(1F), PC(2F), PF(3F), PE(4F)	• Explain and obtain multiple pass fillet welds in different positions in accordance to welding codes and standards	• Lecture-Discussion • Demonstration • Practical application	• Observation and oral questioning/ Interview • Demonstration and oral questioning/ Interview • Written test • Nondestructive Testing (NDT) and/or Destructive testing (DT) of test coupon	• 8 Hours
	3.3 Perform root passes on groove/butt joints in different Positions - PA(1G), PC (2G), PF (3G)	• Explain and obtain root passes weld in different positions in accordance to welding codes and standards.	• Lecture-Discussion • Demonstration • Practical application	• Observation and oral questioning/ Interview • Demonstration and oral questioning/ Interview • Written test • Nondestructive Testing (NDT) of test coupon	• 8 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	3.4 Perform subsequent fill passes on groove/butt joint in different positions- PA(1G), PC (2G), PF (3G)	• Explain and obtain subsequent fill passes in different positions in accordance to welding codes and standards.	• Lecture-Discussion • Demonstration • Practical application	• Observation and oral questioning/ Interview • Demonstration and oral questioning/ Interview • Written test • Nondestructive Testing (NDT) of test coupon	• 20 Hours
	3.5 Perform capping on groove/ butt joint in different positions- PA(1G), PC (2G), PF (3G)	• Explain and obtain capping in different positions in accordance to welding codes and standards.	• Lecture-Discussion • Demonstration • Practical application	• Observation and oral questioning/ Interview • Demonstration and oral questioning/ Interview • Written test • Nondestructive Testing (NDT) of test coupon	• 10 Hours
4. Perform final visual Inspection	4.1 Perform final visual Inspection in all test coupon in different positions	• Explain and obtain final visual Inspection in different positions in accordance to welding codes and standards.	• Lecture-Discussion • Demonstration • Practical application	• Observation and oral questioning/ Interview • Demonstration and oral questioning/ Interview • Written test • Nondestructive Testing	• 2 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
				(NDT) of test coupon	

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 completion of all specified competencies not on the specified nominal duration of learning.

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:

    - 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 Learning (SIL) 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 classroom-based or in-center instruction uses 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

- Community-Based – short term programs conducted by non-government organizations (NGOs), LGUs, training centers and other TVET providers which are intended to address the specific needs of a community. Such programs can be conducted in informal settings such as barangay hall, basketball courts, etc. These programs can also be mobile training program (MTP).

3. Republic Act. No. 11551, "An Act Integrating Labor Education in the Tertiary Education Curriculum" seeks to integrate labor education in the Technical Vocational Education and Training (TVET) curriculum. As provided in Section 3.b., "Labor education refers to the teaching of basic knowledge on labor rights and other skills relating to negotiation, fostering smooth interpersonal relations in the workplace, and mechanisms for redress of grievances and other concerns."

   The Implementing Rules and Regulations for RA 11551 is still being drafted by the TWG as of the date when this proposed TR is being presented to the TESDA Board for approval and promulgation. In the meantime, that TESDA is finalizing the labor education framework that will serve as a basis in developing the labor education curriculum for TVET, the process of integration shall be done by integrating labor education concepts in the Competency Based Curriculum (CBC) that will be developed by the TVIs that intends to register the TVET program. The labor education concepts to be integrated in the CBC shall be derived from the definition of labor education provided in Republic Act. No. 11551.

3.3 TRAINEE ENTRY REQUIREMENTS

Trainees or students wishing to enroll in this program must possess the following requirements:

- Must have completed training in Manual Metal Arc Welding (MMAW) NC II or a holder of MMAW NC II
- Must possess good communication skills
- Physically fit (including differently-abled person)
- Can perform basic mathematical computation

3.4 TOOLS, MATERIALS AND EQUIPMENT

Recommended list of tools, materials and equipment for the training of 20 trainees for Manual Metal Arc Welding NC III.

Up-to-date tools, materials, and equipment of equivalent functions can be used as alternatives. This also applies in consideration of community practices and their availability in the local market.

A. (Full Qualification)

TOOLS	
QTY	**Description**
20 pcs.	Stainless Chipping Hammer
40 pcs.	Stainless Steel brush
20 pcs.	Stainless / chrome or nickel plated Pliers/ tongs
20 pcs.	Files-bastard cut
20 pcs.	Welding Mask
20 pcs	Welding apron/jacket
40 prs.	Welding gloves (long)
20 prs.	Safety goggles, wide vision, clear
5 prs.	Safety Goggles (shade 3-5)
20 pcs.	Tri square 300 mm. Long
20 pcs.	Steel rule300mm. long
20 pcs.	Files-half round
20 pcs.	Welding gauges
60 pcs	Respirator (as per NIOSH)
20 prs	Safety Shoes (High-cut)
10 pcs	Adjustable wrench 12 inch

10 pcs	C- Clamps (8inch)
1 unit	Clamp Ammeter (Optional)
5 unit	Spirit Level

MATERIALS (Per Participant)	
QTY	**Description**
2 kgs.	Electrodes 2.4mm E308L (ISO = E308L)
7 kgs.	Electrodes 3.2mm E308L (ISO = E308L)
3 pcs	Dark glass lens
9 pcs	Clear glass lens
20 pcs.	Stainless Cutting disc 3/32” X 5/8” X 4”
5 pcs	Stainless Grinding disc 1/4” X 5/8” X 4”
16 pcs.	Austenitic Stainless steel plate 10mm X 150mm X 200mm
10 pcs.	Austenitic Stainless 6mm X 100mm X 200mm

EQUIPMENT	
QTY	**Description**
10 units	MMAW/SMAW machine AC/DC 250-300 Amps. and accessories
10pcs.	Welding table with welding positioners
1 unit	Electrode oven (Big)
10 units	Portable disc grinder
1 set	Ventilation System
2 units	Work bench w/ bench vise on 4 corners
2 sets	Plasma cutting machine with complete accessories
2 units	Pedestal /bench grinding machine
2 units	Industrial fan
5 units	Portable Oven (quiver)
4 Units	Fire Extinguishers
3 units	Waste Bins
1 Unit	Scrap Bin
2 sets	Liquid Penetrant Test (PT) kit
1 Unit	Mechanical Press (break/bend test)
1 unit	Plate and pipe beveling cutting equipment (Mechanical or Automatic)

3.5 TRAINING FACILITIES

The welding workshop must be of concrete structure. Based on class size of 20 students/trainees the space requirements for the teaching/learning and circulation areas are as follows:

SPACE REQUIREMENT	SIZE IN METERS	AREA IN SQ. METERS	QTY.	TOTAL AREA IN SQ. METERS
Contextual Learning Area (Lecture Room)	3 x 4	12	1	**12**
Distance Learning (Laboratory/Workshop/ Activity area)		56		**56**
- Welding Booth*	2 X 1.5 = 3 3 x 10 booths	30	10	30
- Grinding Booth*	2 X 1.5	3	2	6
- Materials/Preparation Area*	2 X 2.5	5	2	10
- Bench work Area*	2 X 2.5	5	2	10
Storage Area (Tool room & S/M storage area)	4 X 5	20	1	**20**
Learning Resource Area*	5 X 7	35	1	**35**
Wash Area /Comfort Room *(male & female)*	2.5 X 4	10	1	**10**
Circulation Area**				**(27.3)**
Total Workshop Area				**(160.3~160)**

NOTE: Access to and use of equipment /facilities can be provided through cooperative arrangements or MOA with other partner companies

3.6 TRAINER'S QUALIFICATIONS FOR MANUAL METAL ARC WELDING (MMAW) NC III

- Holder of National TVET Trainer Certificate Level I (NTTC Level I) in Manual Metal Arc Welding (MMAW) NC III or higher
- Must be physically fit (including differently-abled person)
- Must have at least 2 years welding job/ industry/ teaching experience with at least 16 hours training in supervisory development course

3.7 INSTITUTIONAL ASSESSMENT

Institutional Assessment is gathering of evidences to determine the achievements of the requirements of the qualification to enable the trainer make judgement whether the trainee is competent or not competent.

SECTION 4 ASSESSSMENT AND CERTIFICATION ARRANGEMENT

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 an employable unit(s) of competency in partial fulfillment of the requirements of the national qualification.

4.1 NATIONAL ASSESSMENTAND CERTIFICATION ARRANGEMENTS

4.1.1 A National Certificate (NC) is issued when a candidate has demonstrated competence on all unit/s of competency in a qualification with a promulgated Training Regulations.

4.1.2 Individuals wanting to be certified will have to be assessed in accordance with the requirements identified in the evidence guide of the relevant unit/s of competency.

4.1.3 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

4.1.4 Recognition of Prior Learning (RPL). Candidates who have gained competencies through informal training, previous work and/or life experiences may apply for recognition in a particular qualification through competency assessment:

4.1.5 For all Shielded Metal Arc Welding NC III holder, the individual/holder will have to undergo assessment in the amended TR for Manual Metal Arc Welding (MMAW) NC III.

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 –
METALS AND ENGINEERING SECTOR SECTOR
MANUAL METAL ARC WELDING (MMAW) NC III

BASIC COMPETENCIES

Receive and respond to workplace communication	Work with others	Solve/address routine problems	Enhance self-management skills	Support Innovation	Access and maintain information	Follow occupational safety and health policies and procedures	Apply environmental work standards	Adopt entrepreneurial mindset in the workplace
Participate in workplace communication	Work in Team Environment	Solve/address general workplace problems	Develop career and life decisions	Contribute to workplace innovation	Present relevant information	Practice occupational safety and health policies and procedures	Exercise efficient and effective sustainable practices in the workplace	Practice entrepreneurial skills in the workplace
Lead workplace communication	**Lead small teams**	**Apply critical thinking and problem-solving techniques in the workplace**	**Work in a diverse environment**	**Propose methods of applying learning and innovation in the organization**	**Use information systematically**	**Evaluate occupational safety and health work practices**	**Evaluate environmental work practices**	**Facilitate entrepreneurial skills for micro-small-medium enterprises (MSMEs)**

N COMPETENCIES

Interpret drawings and sketches	Perform basic workshop measurements & computations	Contributes to quality management system	Use hand tools	Prepare materials and consumables

CORE COMPETENCIES

Weld carbon steel plates using MMAW	Weld carbon steel plates using GMAW	Weld carbon steel pipes using GMAW	Weld carbon steel plates using GTAW	Weld carbon steel pipes using GTAW	Weld carbon steel plates using FCAW	Weld carbon steel pipes using FCAW
Prepare/ fit up welding joints	Weld alloy steel plates using GMAW	Weld alloy steel pipes using GMAW	Weld alloy steel plates using GTAW	Weld alloy steel pipes using GTAW	Weld alloy steel plates using FCAW	Weld alloy steel pipes using FCAW
Set up welding equipment	Weld carbon steel plates and pipes using MMAW	Weld alloy steel plates using MMAW	Weld alloy steel pipes using MMAW	Perform gas welding in carbon steel plates and tubes	Perform gas welding in alloy steel plates and tubes	Weld plates using SAW
Weld austenitic stainless steel plates using MMAW						

GLOSSARY OF TERMS

Austenitic Stainless	Are classified in 200 and 300 series, with 16%-30% chromium and 2 % to 20% nickel for enhanced surfaced quality, formability, increased corrosion and wear resistance. Austenitic stainless steels are non hardenable and non magnetic.
base metal	(aka: parent metal) the metal that is to be worked, cut or welded
bead	a weld deposit resulting from a single welding pass
bend test	A destructive testing method that calls for a test specimen taken from a test coupon to be bent to a specified bend radius. This test is used to evaluate the soundness and ductility of the welded joint
break test	A destructive testing method in which a fillet weld test is loaded so that the weld root is in tension until it breaks. Once broken, soundness of the welded joint is evaluated by examining the fractured surface for incomplete fusion, porosity, and other internal discontinuities. This test is primarily used for welders qualification.
discontinuity	An interruption of the typical structure of a material, such as lack of homogeneity in its mechanical, metallurgical or physical characteristics. A discontinuity is not necessarily a defect.
destructive testing (DT)	is undertaken in order to understand a specimen's performance or material behavior. These procedures are carried out to the test specimen's failure. DT methods are commonly used for materials characterization, fabrication validation, failure investigation, and can form a key part of engineering critical assessments.
fillet weld	A weld of approximately triangular cross section joining two surfaces approximately at right angles to each other in a lap joint, T-joint, or corner joint.
jig	(aka: Fixture) A device designed to hold and maintain parts in proper relation to each other. Jig and fixture have essentially the same meaning. They both function to facilitate assembly of parts and to hold a work piece assembly in proper alignment and position during handling and welding.
joint	The junction of members or the edges of the base metal that are to be joined or have been joined by welding

liquid penetrant testing (PT)	A non-destructive testing method in which a penetrating agent is used to detect weld defects and other possible flaws in non-magnetic and non-porous material
MMAW	(A.k.a SMAW) An arc welding process with an arc between a covered electrode and the weld pool. The process is used with shielding from the decomposition of the electrode covering, without the application of pressure, and with filler metal from the electrode.
non-destructive testing (NDT)	is a testing and analysis technique used by the industry to evaluate the properties of a material, component, structure or system for characteristic differences or welding defects and discontinuities without causing damage to the original part.
Occupational Safety and Health (OSH)	refers to a set of rules issued by DOLE which mandates the adoption and use of appropriate practices, means, methods, reasonably standards operations or processes, and working conditions necessary to ensure safe and healthful employment.
quiver	(Aka:portable oven, hotbox) . A temperature controlled electrode container used during welding in order to maintain the required holding temperature after baking. This ensures electrode drynessbefore use and prevents moisture absorption in the flux covering due to humidity conditions
shearing machine	are multipurpose devices used in the cutting of alloys and other sheet metal. Some shearing machines use a scissor-like, angular shear action to cut metal into sheets or strips. Other, larger machines use a straight shear action with the blade fixed at an angle as opposed to the angular movement.
visual inspection	when an object is inspected by the eye directly.
weld defects	A discontinuity or discontinuities accumulated effect that render a welded part or product unable to meet minimum applicable acceptance standard or specification.
welding	A joining process that causes materials to fuse and merge by heating them to the welding temperature, with or without the application of pressure or by the application of pressure alone, and with or without using filler metal.
welding electrode	A component of the welding circuit through which current is run and that ends at the arc, in a molten conductive slag, or in the base metal. The flux covered consumable filler in MMAW/SMAW

welding torch	a gas mixing and burning tool for the welding of metals
weldment	an assembly or structure whose component parts are joined by welding
Welding Procedure Specification (WPS)	A document providing the required welding variables for a specific application to assure repeatability by properly trained welders and welding operators.

REFERENCES:

1. Training Regulations for Shielded Metal Arc Welding (SMAW) NC III
2. Asian Welding Federation (AWF) - Common Welder Certification Scheme (CWCS); aligned to ISO 9606-1 Standard
3. ISO 9606-1: Qualification testing of welders — Fusion welding — Part 1: Steels
4. AWS D 1.6 Structural Welding Code- Stainless Steel
5. ASME IX (Boiler and Pressure Vessel Code) Welding, Brazing, and Fusing Qualifications

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