TRAINING REGULATIONS

MANUAL METAL ARC WELDING (MMAW) NC IV

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.

TABLE OF CONTENTS

MANUAL METAL ARC WELDING (MMAW) NC IV

TRAINING REGULATIONS FOR
MANUAL METAL ARC WELDING (MMAW) NC IV

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

The Manual Metal Arc Welding (**MMAW**) NC IV Qualification consists of competencies that a person must achieve to weld austenitic stainless steel plates and pipes 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
500311401	Utilize specialized communication skills
500311402	Develop and lead teams
500311403	Perform higher-order thinking processes and apply techniques in the workplace
500311404	Contribute to the practice of social justice in the workplace
500311405	Manage innovative work instructions
500311406	Manage and evaluate usage of information
500311407	Lead in improvement of Occupational Safety and Health (OSH) programs, policies and procedures
500311408	Lead towards improvement of environment work programs, policies and procedures
500311409	Sustain entrepreneurial skills

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
MEE721326	Weld Austenitic Stainless Steel Plates and Pipes using MMAW

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

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

BASIC COMPETENCIES

UNIT OF COMPETENCY : UTILIZE SPECIALIZED COMMUNICATION SKILLS

UNIT CODE : 500311401

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to use specialized communication skills to meet specific needs of internal and internal clients, conduct interviews, facilitate discussion with groups, and contribute to the development of communication strategies.

ELEMENTS	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Meet common and specific communication needs of clients and colleagues	1.1 Specific communication needs of clients and colleagues are identified and met 1.2 Different approaches are used to meet communication needs of clients and colleagues 1.3 Conflict is addressed promptly in a manner which does not compromise the organization	1.1 Communication processes 1.2 Dynamics of groups and different styles of group leadership 1.3 Communication skills relevant to client groups 1.4 Flexibility in communication	1.1 Full range of communication techniques including: 1.1.1 Effective communication process 1.1.2 Active listening 1.1.3 Giving/ receiving feedback 1.1.4 Interpretation of information 1.1.5 Role boundaries setting 1.1.6 Negotiation 1.1.7 Establishing empathy 1.1.8 Conduct seminars 1.1.9 Public speaking 1.2 Communication skills required to fulfill job roles as specified by the organization

ELEMENTS	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Contribute to the development of communication strategies	2.1 ***Strategies*** for internal and external dissemination of information are developed, promoted, implemented and reviewed as required 2.2 Channels of communication are established and reviewed regularly 2.3 Coaching in effective communication is provided 2.4 Work related network and relationship are maintained 2.5 Negotiation and conflict resolution strategies are used where required 2.5 Communication with clients and colleagues is performed appropriate to individual needs and organizational objectives	2.1 Communication process 2.2 Dynamics of groups and different styles of group leadership 2.3 Openness and flexibility in communication 2.4 Communication skills relevant to client groups	2.1 Full range of communication techniques including: 2.1.1 Effective communication process 2.1.2 Active listening 2.1.3 Giving/ receiving Feedback 2.1.4 Interpretation of information 2.1.5 Role boundaries setting 2.1.6 Negotiation 2.1.7 Establishing empathy 2.1.8 Openness and flexibility in communication 2.2 Communication skills required to fulfill job roles as specified by the organization
3. Deliver a technical presentation	3.1 Presentation is delivered clearly, sequential and delivered within allotted time 3.2 Utilize appropriate media to enhance presentation 3.3 Differences in views/opinions are respected 3.4 Questions during fora are responded in a manner consistent with organizational standard	3.1 Communication process 3.2 Dynamics of groups and different styles of group leadership 3.3 Openness and flexibility in communication 3.4 Communication skills relevant to client groups	3.1 Full range of communication techniques including: 3.1.1 Effective communication process 3.1.2 Active listening 3.1.3 Giving/receiving feedback 3.1.4 Interpretation of information 3.1.5 Role boundaries setting 3.1.6 Negotiation 3.1.7 Establishing empathy

ELEMENTS	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
			3.1.8 Openness and flexibility in communication 3.19 Communication skills required to fulfill job roles as specified by the organization
4. Represent the organization	4.1 When participating in internal or external forums, presentation is relevant, appropriately researched and presented in a manner to promote the organization 4.2 Presentation is clear and sequential and delivered within a predetermined time 4.3 Utilize appropriate media to enhance presentation 4.4 Differences in views are respected 4.5 Written communication is consistent with organizational standards 4.6 Inquiries are responded in a manner consistent with organizational standard 4.7 Consolidate ideas and suggestions 4.8 Generalize and summarize all ideas and suggestions	4.1 Communication process 4.2 Dynamics of groups and different styles of group leadership 4.3 Openness and flexibility in communication 4.4 Communication skills relevant to client groups	4.1 Full range of communication techniques including: 4.1.1 Effective communication process 4.1.2 Active listening 4.1.3 Giving/ receiving feedback 4.1.4 Interpretation of information 4.1.5 Role boundaries setting 4.1.6 Negotiation 4.1.7 Establishing empathy 4.1.8 Openness and flexibility in communication 4.2 Communication skills required to fulfill job roles as specified by the organization

ELEMENTS	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
5. Facilitate group discussion	5.1 Mechanisms which enhance ***effective group interaction*** is defined and implemented 5.2 Strategies which encourage all group members to participate are used routinely 5.3 Objectives and agenda for meetings and discussions are routinely set and followed 5.4 Relevant information is provided to group to facilitate outcomes 5.5 Evaluation of group communication strategies is undertaken to promote participation of all parties 5.6 Specific communication needs of individuals are identified and addressed	5.1 Communication process 5.2 Dynamics of groups and different styles of group leadership 5.3 Openness and flexibility in communication 5.4 Communication skills relevant to client groups	5.1 Full range of communication techniques including: 5.1.1 Effective communication process 5.1.2 Active listening 5.1.3 Giving/receiving feedback 5.1.4 Interpretation of information 5.1.5 Role boundaries setting 5.1.6 Negotiation 5.1.7 Establishing empathy 5.1.8 Openness and flexibility in communication 5.2 Communication skills required to fulfill job roles as specified by the organization
6. Conduct interview	6.1 A range of appropriate communication strategies are employed in ***interview situations*** 6.2 Records of interviews are made and maintained in accordance with organizational procedures 6.3 Effective questioning, listening and nonverbal communication techniques are used to ensure that required message is communicated	6.1 Communication process 6.2 Dynamics of groups and different styles of group leadership 6.3 Effective questioning techniques 6.3 Communication skills relevant to client groups	6.1 Full range of communication techniques including: 6.1.1 Effective communication process 6.1.2 Active listening 6.1.3 Giving/ receiving feedback 6.1.4 Interpretation of information 6.1.5 Role boundaries setting 6.1.6 Negotiation 6.1.7 Establishing empathy 6.2 Effective clarifying and probing techniques (questioning skills)

			6.3 Communication skills required to fulfill job roles as specified by the organization

RANGE OF VARIABLES

VARIABLE	RANGE
1. Strategies	May include: 1.1 Recognizing own limitations 1.2 Referral to specialists 1.3 Utilizing techniques and aids 1.4 Providing written drafts 1.5 Verbal and non verbal communication
2. Effective group interaction	May include: 2.1 Identifying and evaluating what is occurring within an interaction in a non judgmental way 2.2 Using active listening 2.3 Making decision about appropriate words, behavior 2.4 Putting together response which is culturally appropriate 2.5 Expressing an individual perspective 2.6 Expressing own philosophy, ideology and background and exploring impact with relevance to communication 2.7 Openness and flexibility in communication
3. Types of Interview	May include: 3.1 Related to staff issues 3.2 Routine 3.3 Confidential 3.4 Evidential 3.5 Non disclosure 3.6 Disclosure
4. Interview situations	May include: 4.1 Establish rapport 4.2 Elicit facts and information 4.3 Facilitate resolution of issues 4.4 Develop action plans 4.5 Diffuse potentially difficult situation

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Demonstrated effective communication skills with clients accessing service and work colleagues 1.2 Adopted relevant communication techniques and strategies to meet client particular needs and difficulties
2. Resource Implications	2.1 Access to appropriate workplace where assessment can take place
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Case Study 3.2 Interview 3.3 Portfolio 3.4 Written Test 3.5 Role Play
4. Context for Assessment	4.1 This unit should be assessed on the job through simulation

UNIT OF COMPETENCY : DEVELOP AND LEAD TEAMS

UNIT CODE : 500311402

UNIT DESCRIPTOR : This unit covers the skills, knowledge and attitudes required to determine individual and team development needs and facilitate the development of the workgroup.

ELEMENTS	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Foster Individual growth	1.1 ***Learning and development needs*** of team members are systematically identified in line with ***organizational requirements*** 1.2 Development plan to meet individual needs is collaboratively developed and implemented 1.3 Individuals are encouraged to self - evaluate performance and identify areas for improvement 1.4 ***Feedback on performance*** of team members is collected from relevant sources and compared with established team learning process	1.1 Effective workplace communication, coaching and mentoring principles 1.2 Feedback principles and procedures 1.3 Working interdependently: strategies and techniques 1.4 Leadership Concepts: • Types of Decisions Teams Make • Team Responsibilities • Problems That Affect Teams • Building Strong Team Communication • Expressing Yourself on a Team • Team Problem Solving	1.1 Ability to read and understand a variety of texts, prepare general information and documents according to target audience; spell with accuracy; use grammar and punctuation effective relationships and conflict management 1.2 Coaching and mentoring skills to provide support to colleagues 1.3 Communication skills including receiving feedback and reporting, maintaining effective relationships and conflict management 1.4 Ability to relate to people from a range of social, cultural, physical and mental backgrounds 1.5 Planning skills to organize required resources and equipment to meet learning needs 1.6 Reporting skills to organize information; assess

ELEMENTS	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
			information for relevance and accuracy; identify and elaborate on learning outcomes 1.7 Facilitation skills to conduct small group training sessions
2. Foster individual and team growth	2.1. Learning and development program goals and objectives are identified to match the specific knowledge and skills requirements of competency standards 2.2. ***Learning delivery methods*** are appropriate to the learning goals, the learning style of participants and availability of equipment and resources 2.3. Workplace learning opportunities and coaching/ mentoring assistance are provided to facilitate individual and team achievement of competencies 2.4. Resources and timelines required for learning activities are identified and approved in accordance with organizational requirements	2.1 Advanced coaching and mentoring techniques 2.2 Performance evaluation concepts 2.3 Training and development techniques	2.1 Instructional planning and delivery skills 2.2 Monitoring and evaluation skills 2.3 Mentoring and coaching skills

ELEMENTS	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Monitor and evaluate workplace learning	3.1 Feedback from individuals or teams is used to identify and implement improvements in future learning arrangements 3.2 Outcomes and performance of individuals/teams are assessed and recorded to determine the effectiveness of development programs and the extent of additional support 3.3 Modifications to learning plans are negotiated to improve the efficiency and effectiveness of learning 3.4 Records and reports of competency are maintained within organizational requirement	3.1 Types and levels of learning evaluation 3.2 Learning styles and strategies 3.3 Training and development approaches	3.1 Instructional planning and delivery skills 3.2 Monitoring and evaluation skills 3.3 Mentoring and coaching skills

ELEMENTS	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
4. Develop team commitment and cooperation	4.1 Open communication processes to obtain and share information is used by team 4.2 Decisions are reached by the team in accordance with its agreed roles and responsibilities 4.3 Mutual concern and camaraderie are developed in the team 4.4 Career planning for each member are monitored	4.1 Career development for group members 4.2 Principles of team commitment and cooperation 4.3 Team dynamics and performance	4.1 Instructional planning and delivery skills 4.2 Monitoring and evaluation skills 4.3 Mentoring and coaching skills
5. Facilitate accomplishment of team goals	5.1 Team members actively participated in team activities and communication processes 5.2 Teams members developed individual and joint responsibility for their actions 5.3 Collaborative efforts are sustained to attain organizational goals	5.1 Group Development Process and Principles as applied in the workplace 5.2 Principles of organizational development 5.3 Collaboration principles and procedures	5.1 Instructional planning and delivery skills 5.2 Monitoring and evaluation skills 5.3 Mentoring and coaching skills 5.4 Organizational leadership

RANGE OF VARIABLES

VARIABLE	RANGE
1. Learning and development needs	May include: 1.1 Coaching, mentoring and/or supervision 1.2 Formal/informal learning program 1.3 Internal/external training provision 1.4 Work experience/exchange/opportunities 1.5 Personal study 1.6 Career planning/development 1.7 Performance appraisals 1.8 Workplace skills assessment 1.9 Recognition of prior learning 1.10 Job design and enrichment
2. Organizational requirements	May include: 2.1 Quality assurance and/or procedures manuals 2.2 Goals, objectives, plans, systems and processes 2.3 Legal and organizational policy/guidelines and requirements 2.4 Safety policies, procedures and programs 2.5 Confidentiality and security requirements 2.6 Business and performance plans 2.7 Ethical standards 2.8 Quality and continuous improvement processes and standards
3. Feedback on performance	May include: 3.1 Formal/informal performance appraisals 3.2 Obtaining feedback from supervisors and colleagues 3.3 Obtaining feedback from clients 3.4 Personal and reflective behavior strategies 3.5 Routine and organizational methods for monitoring service delivery
4. Learning delivery methods	May include: 4.1 On the job coaching or mentoring 4.2 Problem solving 4.3 Presentation/demonstration 4.4 Formal course participation 4.5 Work experience 4.6 Involvement in professional networks 4.7 Conference and seminar attendance 4.8 Induction

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1. Identified and implemented learning opportunities for others 1.2. Gave and received feedback constructively 1.3. Facilitated participation of individuals in the work of the team 1.4. Negotiated learning plans to improve the effectiveness of learning 1.5. Prepared learning plans to match skill needs 1.6. Accessed and designated learning opportunities
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 tasks
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1. Observation of work activities of the individual member in relation to the work activities of the group 3.2. Observation of simulation and or role play involving the participation of individual member to the attainment of organizational goal 3.3. Case studies and scenarios as a basis for discussion of issues and strategies in teamwork
4. Context for 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

UNIT OF COMPETENCY : PERFORM HIGHER-ORDER THINKING PROCESSES AND APPLY TECHNIQUES IN THE WORKPLACE

UNIT CODE : 500311403

UNIT DESCRIPTOR : This unit of covers the knowledge, skills and attitudes required to use fundamental critical thinking skills in the workplace.

ELEMENTS	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Evaluate effectiveness and efficiency of the workplace systems, processes and procedures.	1.1 **Effectiveness and efficiency** of workplace standards and procedures are examined. 1.2. Usage of inquiry and dialogue to communicate evaluation measures and results are implemented. 1.3 Evaluation reports are prepared and communicated to team members.	1.1 Systems, standards, procedures and protocols in the workplace. 1.2 Different methods of critical and appreciative inquiry and their relevance to different situations 1.3 Techniques to assist in forming the habit of asking questions and taking responsibility for answers. 1.4 Why questions are important and the benefits of asking good questions for individuals, businesses and communities (the importance of critical thinking).	1.1 Using range of analytical techniques (e.g., planning, attention, simultaneous and successive processing of information). 1.2 Communicating to actively listen and to ask questions of others in a constructive way. 1.3 Using critical thinking pathway to formulate and ask relevant questions and come up with appropriate answers. 1.4 Performing assimilation and accommodation skills to interpret and distil key information of relevance to a given situation. 1.5 Assessing and measuring the extent of effectiveness and efficiency of the systems, processes and procedures in the workplace.

ELEMENTS	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Foster the habit of critical inquiry and curiosity in the workplace.	2.1 Issues and situations are reflected on and wondered about. 2.2 Issues and problems in the workplace particularly in the policies, procedures and protocols are discussed and evaluated between and among teams. 2.3 Evaluation of efficiency and effectiveness of workplace policies, procedures and protocols are documented, communicated and agreed upon between and among teams. 2.4 Growth mindset and positive relationship and communication is applied in the context of ***curiosity and critical inquiry*** in the workplace.	2.1 Different methods of critical and appreciative inquiry and their relevance to different situations. 2.2 Techniques to assist in forming the habit of asking questions and taking responsibility for answers. 2.3 Why questions are important and the benefits of asking good questions for individuals, businesses and communities (the importance of critical thinking). 2.4 Growth mindset and positive communication and relationship strategies and techniques.	2.1 Using range of analytical techniques (e.g., planning, attention, simultaneous and successive processing of information). 2.2 Communicating to actively listen and to ask questions of others in a constructive way. 2.3 Using critical thinking pathway to formulate and ask relevant questions and come up with appropriate answers. 2.4 Performing assimilation and accommodation skills to interpret and distil key information of relevance to a given situation. 2.5 Assessing and measuring the extent of effectiveness and efficiency of the systems, processes and procedures in the workplace. 2.6 Communicating insights on workplace effectiveness and efficiency.

ELEMENTS	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Develop practical action plans for improving workplace conditions.	3.1 Evaluation of efficiency and effectiveness of workplace policies, procedures and protocols are documented, communicated to stakeholders. 3.2 ***Practical action plans*** in improving workplace conditions are formulated, presented and negotiated with stakeholders. 3.3 Proposed changes and directions are inquired, processed and negotiated between and among teams, and stakeholders as well of the organization. 3.4 Commitment to continuous improvement and change is highlighted. 3.5 Passion and dedication for changing and adapting to the demands of the 21st century workplace are considered.	3.1 Different methods of critical and appreciative inquiry and their relevance to different situations. 3.2 Techniques to assist in forming the habit of asking questions and taking responsibility for answers. 3.3 Why questions are important and the benefits of asking good questions for individuals, businesses and communities (the importance of critical thinking). 3.4 Growth mindset and positive communication and relationship strategies and techniques. 3.5 Creative negotiation skills. 3.6 Change management and continuous improvement concepts.	3.1 Using range of analytical techniques (e.g., planning, attention, simultaneous and successive processing of information). 3.2 Communicating to actively listen and to ask questions of others in a constructive way. 3.3 Using critical thinking pathway to formulate and ask relevant questions and come up with appropriate answers. 3.4 Performing assimilation and accommodation skills to interpret and distil key information of relevance to a given situation. 3.5 Assessing and measuring the extent of effectiveness and efficiency of the systems, processes and procedures in the workplace. 3.6 Communicating practical insightson improving workplace conditions.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Effectiveness and efficiency	May include; 1.1 Developing a more efficient way of doing something 1.2 Developing a new idea 1.3 Developing and improving products and services 1.4 Enhancing skills and career opportunities 1.5 Enhancing the physical environment 1.6 Financial benefit 1.7 Greater personal satisfaction 1.8 Improving interpersonal relationships 1.9 Evaluating overall workplace conditions
2. Curiosity and critical inquiry	May include: 2.1 Accuracy 2.2 Breadth 2.3 Clarity 2.4 Depth 2.5 Emotion 2.6 Fairness 2.7 Logic 2.8 Meaning 2.9 Planning 2.10 Attention 2.11 Precision 2.12 Relevance 2.13 Significance 2.14 Social engagement 2.15 Society 2.16 Style 2.17 Growth mindset 2.18 Positive communication 2.19 Positive negotiation 2.20 Workplace conditions 2.21 Appreciative inquiry methods

3. Practical action plans	May include: 3.1 Insights on continuous improvement 3.2 Creative strategies and techniques for becoming better at work and real life 3.3 Career plans 3.4 Challenging workplace policies, procedures and protocols 3.5 Specifying plans for change and adapting to the demands of the contemporary workforce 3.6 Challenges in negotiating with stakeholders and teams 3.7 Change management, innovation and knowledge creation 3.8 Contractual agreements 3.9 Extreme time pressure or non-negotiable deadlines 3.10 Financial limitations 3.11 Procedures determined by laws or other regulations 3.12 Safety issues 3.13 When others are totally closed to new ideas 3.14 acknowledging shared responsibility 3.15 adopting a positive 'can do' attitude 3.16 following up on practical details 3.17 pro-actively seeking information 3.18 suggesting a new approach 3.19 talking to others about possible answers 3.20 constraints of the broader context and environment 3.21 overall goal - what needs to be achieved 3.22 personal hopes and expectations

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Evaluated the effectiveness and efficiency of workplace systems, processes and procedures. 1.2 Modelled the conscious process of critical inquiry to get new insights that s/he can get in formulating action plans on continuous improvement in the workplace and real-life 1.3 Practiced the habit of critical inquiry and curiosity in the workplace 1.4 Shown a thorough knowledge and understanding of how critical thinking impacts on individual lives, the broader community and work situations. 1.5 Developed practical action plans for improving workplace conditions.
2. Resource Implications	2.1. Interactions with specific challenges and situations to demonstrate the application of critical thinking (this would usually involve interactions with others).
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Direct questioning combined with review of portfolios of evidence and third-party workplace reports of on-the-job performance by the candidate 3.2 Evaluation of a candidate blog exploring different ideas and questions 3.3 Review of candidate response to scenarios that allow the candidate to apply critical thinking techniques to a life or work situation, and to demonstrate ability to portray curiosity and exploration of new concepts 3.4 Evaluation of candidate response to the challenge of adopting different perspectives on a situation, and ability to both develop and respond to questions from those perspectives 3.5 Observation of the candidate participating in a group problem-solving session 3.6 Oral or written questioning to assess knowledge of typical blockers to the critical thinking process. 3.7 Life Narrative Inquiry to reflect life stories that reflect how critical thinking and problem solving is applied in the lives.
4. Context for Assessment	4.1. In all workplace, it may be appropriate to assess this unit concurrently with relevant teamwork or operation units.

UNIT OF COMPETENCY : CONTRIBUTE TO THE PRACTICE OF SOCIAL JUSTICE IN THE WORKPLACE

UNIT CODE : 500311404

UNIT DESCRIPTOR : This unit covers ways and means to assume active roles in resolving local and global challenges and to become proactive contributors to a more peaceful and sustainable world.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Update self on local, national and global trends/ issues in the workplace	1.1 ***Media*** are regularly ***scanned/ monitored*** for trends and issues relevant to human rights, gender equality, promotion of culture of peace and non-violence, global citizenship and appreciation of cultural diversity. 1.2 Knowledge and understanding of ***local, national and global issues*** and their interconnectedness and interdependency are acquired. 1.3 Notable issues and trends are critically examined and discussed with peers, colleagues, or family members.	1.1 Local, national and global systems and structures 1.2 Issues affecting interaction and connectedness of communities at local, national and global levels 1.3 Underlying assumptions and power dynamics (politics, understanding political system, social structures, labor laws, labor relations, human right)	1.1 Monitoring trends and issues relevant to human rights, gender equality, culture of peace, global citizenship, and cultural diversity using different media platforms 1.2 Analyzing trends and issues relevant to human rights, gender equality, culture of peace, global citizenship, and cultural diversity 1.3 Engaging in discourse about the local, national and global issues

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Relate local and global trends to workplace context	2.1 Local events are reflected on for implications in one's own situation and in the external global environment. 2.2 Sense of belonging to a common humanity, sharing values and responsibilities are developed. 2.3 Attitudes of empathy, solidarity and respect for differences and diversity are strengthened.	2.1 Different levels of human identity according to Amber Mayer (2015) 2.2 Different communities people belong to and how these are connected 2.3 Difference and respect for cultural diversity	2.1 Recognizing differences and commonalities among people 2.2 Strengthening attitudes of empathy, solidarity and respect for diversity 2.3 Connecting local issues to global trends, and vice versa.
3. Engage and take actions on workplace issues and concerns	3.1 Effective and responsible actions at local, national and global levels are identified. 3.2 Motivation and willingness to take necessary actions are developed. 3.3 Attitude of "thinking globally and acting locally" is practiced.	3.1 Actions that can be taken individually and collectively 3.2 Ethically responsible behaviour 3.3 Importance and benefits of civic engagement 3.4 Strategies and techniques of "thinking globally and acting locally	3.1 Employing appropriate actions to address workplace issues involving national and global trends 3.2 Showing concern and willingness to take part in the development efforts to discuss workplace issues and concerns 3.3 Applying the attitude of "thinking globally and acting locally" in the workplace

RANGE OF VARIABLES

VARIABLE	RANGE
1. Media	May include: 1.1 Print media 1.2 Broadcast media 1.3 Internet and social media
2. Scanning/Monitoring	May include: 2.1 Sourcing from key informants 2.2 Conversation with clients 2.3 Man-on-the-street conversation 2.4 Scanning print and broadcast media
3. Local, national and global issues	May include: 3.1 Poverty 3.2 Unemployment 3.3 Global warming 3.4 Safety, security, and well-being

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Demonstrated ability and attitude to keep oneself updated of relevant issues/trends 1.2 Demonstrated ability to think and act based on one's principles and values 1.3 Demonstrated a holistic/global outlook on internal and external events in the workplace
2. Resource Implications	**The following resources should be provided:** 2.1 Access to workplace and resources 2.2 Case studies
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Demonstration or simulation with oral questioning 3.2 Case problems involving global and local issues 3.3 Third-party report
4. Context for Assessment	4.1 Competency assessment may occur in workplace or any appropriately simulated environment

UNIT OF COMPETENCY : MANAGE INNOVATIVE WORK INSTRUCTIONS

UNIT CODE : 500311405

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to sustain and develop a workplace environment in which improvement, innovation and learning are promoted and reinforced.

ELEMENTS	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Review and analyze existing workplace practices	1.1 Current instructions and strategies to perform tasks in the workplace are reviewed 1.2 Climate for innovation at the organizational level is defined 1.3 Innovation drivers in the workplace are identified	1.1. Four drivers of innovation according to Gallup Management Journal (2007) 1.2. Contextual variables related to innovative practices in the organization 1.3. The nine dimensions of innovation climate (Isaksen & Isaksen, 2018) 1.4. Types of Innovation identified by Gopalakrishnan and Damanpour (1997)	1.1 Investigating the organizational needs in the innovation process 1.2 Defining current organizational innovative practices 1.3 Linking innovation to contextual variables in the organization

ELEMENTS	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Examine opportunities for continuous improvement and innovation of practices in the workplace	2.1. Effectiveness of innovative practices in the workplace is determined 2.2. ***Innovative behaviors*** of leaders or managers in the organization are assessed 2.3. Driving principles of innovation are discussed	2.1 Determinants of innovative behavior by Scott and Bruce (1992) 2.2 Four principles of innovation according to Gallup Management Journal (2007)	2.1 Evaluating organizational innovative practices 2.2 Gauging innovative behaviors of the leaders and managers in the organization 2.3 Deliberating opportunities and challenges in implementing innovation
3. Implement innovative ways in the conduct of usual workplace practices	3.1. Innovative behaviors in the workplace are performed 3.2. Innovative climate in the workplace is maintained 3.3. Adoption or modification of new ideas relevant to the organizational needs is achieved	3.1 Determinants of innovative behavior by Scott and Bruce (1992) 3.2 The nine dimensions of innovation climate (Isaksen & Isaksen, 2018) 3.3 Techniques in implementing innovative change in the workplace	3.1 Developing risk management techniques and control systems 3.2 Evaluating impact of changes and developing action plans 3.3 Demonstrating strategies and techniques in managing changes in the workplace

RANGE OF VARIABLES

VARIABLE	RANGE
1. Innovation	May include: 1.1 Products versus processes 1.2 Radical versus incremental 1.3. Technical versus administrative
2. Innovative behaviors	May include: 2.1 Always generate creative ideas or new solutions 2.2 Exploring and secure funds or resources required for implementing new ideas 2.3 Establishing adequate plans and schedules for implementing new ideas 2.4 Contributing suggestions or approaches for others' creative ideas

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Analyzed and evaluated systems and performance in key areas of the organization and identify opportunities for improvement, seeking advice from experts as appropriate 1.2 Promoted the value of creativity, innovation and sustainability and recognize successes 1.3 Supported the testing and trialing of new ideas and undertake risk management and cost-benefit analysis for options 1.4 Planned for and implemented improvements using organization's processes for approvals, project management and change management 1.5 Facilitated effective contributions to and communications about continuous improvement and innovation 1.6 Captured insights, experiences and ideas for improvements and incorporate them into the organization's knowledge management systems and future planning.
2. Resource Implications	**The following resources should be provided:** 2.1 Impact evaluation materials (guide and form)
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Interview 3.2 Written Evaluation 3.3 Case analysis
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 : MANAGE AND EVALUATE USAGE OF INFORMATION

UNIT CODE : 500311406

UNIT DESCRIPTOR : This unit of competency covers the knowledge, skills and attitudes required to support

ELEMENTS	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Review information needs and sources	1.1. The ***information*** needs of individuals/teams are determined and the sources are identified. 1.2. Information held by the organisation is reviewed to determine suitability and accessibility. 1.3. Plans are prepared to obtain information that is not available or accessible within the organization.	1.1. Analysis and display techniques 1.2. Information evaluation issues 1.3. Information storage requirements and methods 1.4. Reporting procedures of the organisation	1.1. Analysing record information 1.2. Communicating effectively 1.3. Disseminating information 1.4. Presenting information
2. Collect and analyze information	2.1. ***Collection*** of information is interpreted timely and relevant to the needs of individuals/teams. 2.2. Information is collected in formal suitable for analysis, interpretation and dissemination. 2.3. Information is analyzed to identify relevant trends and developments in terms of the needs for which is acquired.	2.1. Information collection, collation 2.2. Analysis and display techniques 2.3. Information evaluation issues 2.4. Information storage requirements and methods 2.5. Reporting procedures of the organisation	2.1. Collecting and collating information 2.2. Analysing record information 2.3. Communicating effectively 2.4. Disseminating information 2.5. Presenting information
3. Use management information systems	3.1. ***Management information systems*** are used to store and retrieve data for decision making. 3.2. Technology available in the work area/ organisation is used to manage information. 3.3. Recommendations for improving the information system are submitted to designated persons/ groups.	3.1. Analysis and display techniques 3.2. Information collection, collation 3.3. Information evaluation issues 3.4. Information storage requirements and methods 3.5. Reporting procedures of the organisation	3.1. Analysing record information 3.2. Collecting and collating information 3.3. Communicating effectively 3.4. Disseminating information 3.5. Presenting information 3.6. Using management information systems to store and retrieve data

ELEMENTS	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
4. Report and disseminate analyzed information	4.1. The results of information gathering, ***analysis*** and synthesis are reported within specified time frames and to the standard defined by the organisation. 4.2. The results of information gathering, analysis and synthesis are reported so they can be inputs to policy development and organisation decision making. 4.3. Information which is gathered is disseminated to appropriate personnel within the specified timeframe	4.1. Analysis and display techniques 4.2. Information collection, collation 4.3. Information evaluation issues 4.4. Information storage requirements and methods 4.5. Reporting procedures of the organisation	4.1. Analysing record information 4.2. Collecting and collating information 4.3. Communicating effectively 4.4. Disseminating information 4.5. Presenting information 4.6. Using management information systems to store and retrieve data

RANGE OF VARIABLES

VARIABLE	RANGE
1. Information	May include: 1.1 Routine and complex reports and submissions 1.2 Briefing notes 1.3 Ministerial 1.4 Proposals 1.5 Project plans 1.6 Articles and promotional material
2. Collection techniques or methods	2.1 Collection techniques may include: 2.1.1 Research 2.1.2 Surveys 2.1.3 Literature search 2.1.4 Interviews 2.1.5 Data bases 2.1.6 Observation 2.2 Collection methods may include: 2.2.1 Indexing 2.2.2 linking 2.2.3 Sorting 2.2.4 Comparing 2.2.5 Categorizing 2.2.6 Integrating
3. Analysis	May include: 3.1. application of statistical methods 3.2. mathematical calculations 3.3. critical analysis 3.4. problem solving
4. Management information systems	May include: 4.1. Computers 4.2. Communication channels 4.3. Records management 4.4. Procedures 4.5. Manuals 4.6. Protocol 4.7. Legislation 4.8. Guidelines and awards 4.9. Organizational 4.10. Legal and policy materials

EVIDENCE GUIDE

1 Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Identified information needs and sources 1.2 Collected and analyzed information 1.3 Determined the correct / preventive action 1.4 Used management information systems 1.5 Record and support information These aspects may be best assessed using a range of scenarios what ifs as a stimulus with a walk through forming part of the response. These assessment activities should include a range of problems, including new, unusual and improbable situations that may have happened.
2 Resource Implications	**Specific resources for assessment** 2.1 Evidence of competent performance should be obtained by observing an individual in an information management role within the workplace or operational or simulated environment.
3 Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Written Test 3.2 Interview 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.
4 Context for Assessment	4.1 In all workplace, it may be appropriate to assess this unit concurrently with relevant teamwork or operation units.

UNIT OF COMPETENCY : LEAD IN IMPROVEMENT OF OCCUPATIONAL SAFETY AND HEALTH (OSH) PROGRAMS, POLICIES AND PROCEDURES

UNIT CODE : 500311407

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to assess Occupational Safety and Health (OSH) practices and programs, recommend OSH program improvement initiatives, and implement recommended improvements on Occupational Safety and Health (OSH) Programs, Procedures and Policies

ELEMENTS	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Assess Occupational Safety and Health (OSH) practices and programs	1.1 ***OSH practices and programs*** are reviewed based on workplace policies and procedures 1.2 Appropriate personnel or ***OSH reference guides*** are consulted for proper guidance based on workplace policies and procedures 1.3 Current practices and programs are evaluated based on acceptable level of OSH work standards	1.1. OSH practices and programs workplace policies and procedures 1.2. OSH reference guides 1.3. OSH work standards	1.1. Critical thinking skills 1.2. Evaluating skills
2. Recommend OSH program improvement initiatives	2.1 OSH work improvement initiatives are identified that are relevant with the workplace scenario 2.2 OSH program improvement plans are organized based on workplace policies and procedures 2.3 OSH program improvement plans are presented based on workplace policies and procedures	2.1. OSH Programs 2.2. OSH work improvement initiatives	2.1. Presentation Skills 2.2. Communication skills 2.3. Collaborating skills 2.4. Critical thinking skills 2.5. Observation skills

ELEMENTS	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Implement recommended improvements on Occupational Safety and Health (OSH) Programs, Procedures and Policies	3.1 Approved improvements on OSH work improvement initiatives are communicated based on workplace policies and procedures 3.2 Concern personnel are guided in accordance with workplace policies and procedures 3.3 Implementation of the approved OSH initiatives are monitored in accordance with workplace policies and procedures 3.4 Implementation of approved OSH initiatives are evaluated based on workplace policies and procedures	3.1. Coaching Concepts 3.2. OSH work improvement initiatives 3.3. Supervisory Concepts	3.1. Monitoring Skills 3.2. Evaluation Skills 3.3. Auditing Skills 3.4. Coaching Skills 3.5. Supervisory Skills

RANGE OF VARIABLES

VARIABLE	RANGE
1. OSH Practices and Programs	May include: 1.1 Planning, implementation and maintenance of manufacturing plants 1.2 Work-physiological, psychological, ergonomic and hygienic practices and programs 1.3 First aid within the workplace 1.4 Safety inspection practices
2. OSH Reference Guides	May include: 2.1 Occupational Safety and Health Standards Book 2.2 OSHA Safety Bulletins and Magazines 2.3 Equipment Safety Operating Instructions 2.4 Established National Safety Management Books 2.5 Credible OSH Web-sites 2.6 Safety Solution Guide Books and Handbooks
3. OSH Work Improvement Initiatives	May include: 3.1 Eliminate the hazard altogether (i.e., get rid of the dangerous machine) 3.2 Isolate the hazard from anyone who could be harmed (i.e., keep the machine in a closed room and operate it remotely; barricade an unsafe area off) 3.3 Substitute the hazard with a safer alternative (i.e., replace the machine with a safer one) 3.4 Use administrative controls to reduce the risk (i.e., train workers how to use equipment safely; train workers about the risks of harassment; issue signage) 3.5 Use engineering controls to reduce the risk (i.e., attach guards to the machine to protect users) 3.6 Use personal protective equipment (i.e., wear gloves and goggles when using the machine)

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1. Consult appropriate personnel or OSH reference guides for proper guidance based on workplace policies and procedures 1.2. Evaluate current practices and programs based on acceptable level of OSH work standards 1.3. Identify OSH work improvement initiatives that are relevant with the workplace scenario 1.4. Present OSH program improvement plans based on workplace policies and procedures 1.5. Communicate approved improvements on OSH work program initiatives based on workplace policies and procedures 1.6. Monitor implementation of the approved OSH initiatives in accordance with workplace policies and procedures 1.7. Evaluate implementation of approved OSH initiatives based on workplace policies and procedures
2. Resource Implications	**The following resources should be provided:** 2.1 Workplace or assessment location 2.2 OSH personal records 2.3 PPE 2.4 Health records
3. Methods of Assessment	Competency may be assessed through: 3.1 Portfolio Assessment 3.2 Interview 3.3 Case Study/Situation 3.4 Observation/Demonstration and oral questioning
4. Context for Assessment	4.1 Competency may be assessed in the work place or in a simulated work place setting

UNIT OF COMPETENCY : LEAD TOWARDS IMPROVEMENT OF ENVIRONMENTAL WORK PROGRAMS, POLICIES AND PROCEDURES

UNIT CODE : 500311408

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes require in assessing environmental work practices and standards, recommending environmental work improvement initiatives and implementing recommended environmental improvements

ELEMENTS	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Assess environmental work practices and programs	1.1. ***Environmental practices and programs*** are reviewed based on workplace policies 1.2 Appropriate personnel or ***environmental reference guides*** are consulted for proper guidance based on workplace policies* 1.3 Current practices and programs are evaluated based on acceptable level of environmental work standards*	1.1 Environmental Practices 1.2 Environmental Reference Guides 1.3 Corrective Action and Follow-up 1.4 Relevant environmental experts 1.5 Re-Training Needs 1.6 Energy and Healthy Habits	1.1 Critical thinking 1.2 Problem solving 1.3 Observation Skills 1.4 Training Delivery Skills

ELEMENTS	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Recommend environmental program improvements initiatives	2.1 Environment practices opportunities are Identified that are relevant with the workplace scenario 2.2 Environmental program improvement plans are organized based on workplace policies and procedures* 2.3 Environmental program improvement plans are presented based on workplace policies and procedures*	2.1 Environmental Practices and Standards 2.2. Mitigation Requirements	2.1. Presentation Skills 2.2 Critical thinking 2.3. Problem Solving 2.4 Observation Skills 2.5 Training Delivery Skills 2.6 Cost-Benefit Analysis
3. Implement recommended improvements on environmental programs, policies and procedures	3.1. Approved improvements on ***environmental work program initiatives*** are promoted based on workplace policies and procedures 3.2 Implementation of the approved environmental initiatives are monitored in accordance with workplace policies and procedures 3.3. Implementation of approved environmental initiatives are evaluated based on workplace policies and procedures	3.1. Environmental Work Initiatives 3.2. Communication Strategies 3.3. Environmental inspection and Monitoring Techniques 3.4. Notification Requirements	3.1. Inspection 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 and Programs	May include: 1.1 Utilization of Energy, Water, Fuel 1.2 Segregation Practices 1.3 Waste Disposal and Reuse 1.4 Saving Resources 1.5 Waste Collection 1.6 Usage of Hazardous Materials 1.7 Chemical Application 1.8 Equipment Operation 1.9 Dewatering and Discharging 1.10 Surface Disturbance 1.11 Periodic Inspection 1.12 Resource Storage and Handling
2. Environmental Reference Guides	May include: 2.1 Air Emission and Ambient Air Quality Guidelines 2.2 Energy Conservation Guidelines 2.3 Wastewater and Ambient Water Quality Guidelines 2.4 Water Conservation Guidelines 2.5 Hazardous Materials Management 2.6 Waste Management 2.7 Noise 2.8 Contaminated Land 2.9 Cultural Conservation Guides
3. Environmental Work Program Initiatives	May include: 3.1 Low Energy Lighting 3.2 Water Reduction initiatives 3.3 Holding Employee Awareness event 3.4 Recycling Waste Materials 3.5 Unplugging power converters overnight 3.6 Tree-Planting 3.7 Wild-life conservation

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1. Consulted appropriate personnel or environmental reference guides for proper guidance based on workplace policies* 1.2. Evaluated current practices and standards based acceptable level of environmental work standards 1.3. Organized environmental standard improvement plans based on workplace policies and procedures 1.4. Presented environmental standard improvement plans based on workplace policies and procedures* 1.5. Promoted approved environmental work initiatives based on workplace policies and procedures 1.6. Evaluated the implementation of approved environmental improvements based on workplace policies and procedures
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 : SUSTAIN ENTREPRENEURIAL SKILLS

UNIT CODE : 500311409

UNIT DESCRIPTOR : This unit covers the outcomes required to update and continue one's professional development along entrepreneurship, including applying such growth in skills toward expanding the enterprise and developing its work force.

ELEMENTS	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Enhance one's business skills	1.1 ***Entrepreneurial skills*** development needs are identified and responded to promptly. 1.2 Market trends are monitored, anticipated and taken advantage of where feasible. 1.3 New technologies, products and processes are included/utilized where advantageous to the enterprise. 1.4 Constant dialog/linkages with other entrepreneurs/peers and stakeholders are maintained 1.5 Circulation and participation in business fora, meetings, conventions and exhibits are maintained.	1.1 Business models and strategies 1.2 Types and categories of businesses 1.3 Business internal controls 1.4 Market Trends 1.5 Relevant national and local legislation and regulations 1.6 Basic quality control and assurance concepts	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 1.5 Networking and Linkaging skills

ELEMENTS	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Manage entrepreneurial practices	2.1 Ideas and comments for improvements are sought from workers and clients. 2.2 Staff/workers are encouraged and supported in their skills development and enhancement. 2.3 A culture of ***continuous improvement*** *is* fostered within the enterprise. 2.4 Innovations on the existing lines of products and services are encouraged	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.)
3. Expand markets and clientele	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. 3.4 New markets and clients are identified based on current market trends	3.1 Basic cost-benefit analysis 3.2 Basic financial management 3.3 Basic financial accounting 3.4 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. Entrepreneurial skills	May include: 1.1. Financial management skills 1.2. People management skills 1.3. Operations management skills 1.4. Business acumen
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 3.4 Managing property, plant and equipment
4. Continuous improvement	May include: 4.1 Quality management systems (PDCA, ISO 9001, TQM, Six-Sigma, etc.) 4.2 Client feedback systems 4.3 Quality assurance/Quality control systems

EVIDENCE GUIDE

1. Critical aspects of competency	**Assessment requires evidence that the candidate:** 1.1 Demonstrated enhancement of one's entrepreneurial skills through performance of business, supervisor evaluation, worker and client testimony
2. Resource Implications	The following resources should be provided: 2.1 Interview guide for entrepreneurs, enterprise workers and third parties 2.2 Materials and location relevant to the proposed activity and tasks
3 Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Written report 3.2 Written examination 3.3 Demonstration/observation with oral questioning 3.4 Portfolio assessment with interview 3.5 Third-party report
4 Context of Assessment	4.1 Competency may be assessed in workplace or in a simulated workplace setting 4.2 Assessment shall be observed while tasks are being undertaken whether individually or in-group

COMMON COMPETENCIES

UNIT OF COMPETENCY : 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 requirements and safety procedure.	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 3.6 Waste Segregation/ 3R	3.1 Obtaining accurate measurement 3.2 Applying safety procedures 3.3 Communication skill 3.4 Observation skills

		3.7AWF-CWCS/ ISO 9606-1 / AWS D1.1 / ASME IX.	
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

ELEMENT	PERFORMANCE CRITERIA *Italicized terms are elaborated* in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
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.	3.1 Installation of positioners, jigs and fixtures 3.2 Applying safety procedures

ELEMENT	PERFORMANCE CRITERIA *Italicized terms are elaborated* in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		3.10 DOLE DO 198s2018 policies on OSH as applicable 3.11 DOH guidelines 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	May include: 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	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

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** *are elaborated* in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	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 AND PIPES USING MMAW**

UNIT CODE : **MEE721326**

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

ELEMENT	PERFORMANCE CRITERIA *Italicized terms are elaborated* in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Perform root pass	1.1 Root pass 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	1.1Communication 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. Weld subsequent/ filling passes	2.1 Subsequent/ filling passes is performed in accordance with approved WPS 2.2 Weld is cleaned free from slag and other impurities 2.3 Weld is visually checked for defects and repaired, as required	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	2.1 Communication skill 2.2 Applying Welding techniques 2.3 Applying Welding repair Techniques 2.4 Performing Welding Inspection 2.5 Applying safety procedures

	2.4 Weld is visually acceptable in accordance with applicable codes and standards 2.5 Task is performed in accordance with company or industry requirement and safety procedure. 2.6 Required output is completed as per WPS and verified by immediate supervisor	2.7 Productivity work 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	2.6 Applying productive methods and techniques in welding subsequent/ filling passes
3. Perform capping	3.1 Capping is performed in accordance with approved WPS and/or client specifications 3.2 Weld is cleaned free from slag and other impurities 3.3 Weld is visually checked for defects and repaired, as required 3.4 Weld is visually acceptable in accordance with applicable codes and standards 3.5 Task is performed in accordance with company or industry requirement and safety procedure. 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	3.1Communication skill 3.2Applying Welding techniques 3.3Applying Welding repair Techniques 3.4 Performing Welding Inspection 3.5 Applying safety procedures 3.6 Applying productive methods and techniques in performing capping
4. Perform final visual Inspection	4.1 Weld is visually acceptable in accordance with applicable codes and standards 4.2 Task is performed in accordance with	4.1 Visual Inspection (e.g bead profile, weld size, reinforcement…) 4.2 Dimensional Measurement 4.3 Productivity work	4.1Communication skill 4.2 Performing Welding Inspection 4.3 Applying safety procedures 4.4 Applying

	company or industry requirement and safety procedure. 4.3 Required output is completed as per WPS and verified by immediate supervisor	measurements 4.4 Adherence to work requirements 4.5 5S and Proper Housekeeping 4.6 Waste Segregation/ 3R 4.7 AWF-CWCS/ ISO 9606-1 / AWS D1.6 / ASME IX. 4.8 DOLE DO 198s2018 policies on OSH as applicable 4.9 DOH guidelines on safety and health as applicable	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 PF(3G), PE(4G)-Plate 1.1.2 PA(1G), PC(2G),PH(5G),H-LO45(6G) - Pipe 1.2 Material thickness 1.2.1 6-12mm (plate) 1.2.2 Sch. 40/80 x 125mm 1.3 Pipe diameter 1.3.1 100-150mm 1.4 Type of material 1.4.1 Austenitic stainless steel 1.5 Welding Electrodes (Type and Size) 1.6 Welding Parameters (Amperage, Polarity,Travel speed, voltage) 1.7 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 pipes in H-LO45(6G) 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 IV.**

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 IV**

Nominal Training Duration:

47 Hours (Basic Competencies)
40 Hours (Common Competencies)
56 Hours (Core Competencies)
143 Hours
80 Supervised Industry Learning (SIL)
223 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 plates and pipes 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
(47 HOURS)

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Method	Nominal Duration
1. Utilize specialized communication skills	1.1 Meet common and specific communication needs of clients and colleagues	• Read ➢ Communication process ➢ Dynamics of groups and different styles of group leadership • Identify different approaches to meet the needs of clients and colleagues	• Lecture	• Written examination	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Method	Nominal Duration
	1.2. Contribute to the development of communication strategies	• Apply communication skills to fulfill job roles as specified by the organization • Apply communication techniques in communicating with clients and colleagues ➢ Active listening ➢ Feedback ➢ Interpretation ➢ Role boundaries setting ➢ Negotiation ➢ Establishing empathy • Describe strategies for internal and external dissemination of information	• Demonstration • Group discussion	• Observation • Oral evaluation	1 Hour
	1.3. Deliver a technical presentation	• Enhance the presentation using appropriate media • Deliver a clear and sequential presentation within given time	• Demonstration	• Observation	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Method	Nominal Duration
	1.4 Represent the organization	• Describe criteria for a good presentation • Prepare presentation material for internal or external forums to promote the organization	• Demonstration	• Observation	1 Hour
	1.5 Facilitate group discussion	• Gather relevant information • Apply values in facilitating differences in views	• Demonstration	• Observation	1 Hour
	1.6 Conduct interview	• Describe communication strategies employed in interview situations • Conduct interview • Apply organizations procedure in maintaining records of interviews • Use questioning, listening and nonverbal communication techniques to client groups	• Group discussion • Demonstration	• Oral evaluation • Observation	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Method	Nominal Duration
2. Develop and lead teams	2.1 Foster individual growth	• Discussion on Team Leadership and expectation from team leaders • Case study on learning and development needs of team members • Discussion on organizational requirements from team members • Role play on coaching and mentoring • Discussion on preparation of team members development plan • Role Play on providing feedback on performance	• Observation Lecture/ Discussion • Case Study • Role Play • Role Play • Case Study • Written Test	• Observation • Role Play • Case Study ▪ Written Test	2 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Method	Nominal Duration
	2.2 Foster individual and team growth	• Discussion on learning and development program goal setting • Preparation of learning and development program goals • Discussion on learning delivery methods • Role play on the different learning delivery methods • Discussion on workplace learning opportunities • Role play on coaching and mentoring	• Lecture/ Discussion • Case Study • Role Play	• Observation • Role Play • Case Study • Written Test	2 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Method	Nominal Duration
	2.3 Monitor and evaluate workplace learning	• Discussion on the different levels of learning evaluation. • Discussion on the different methods used to evaluate learning • Develop reporting system for monitoring of performance attributed to learning programs • Gathering of information to evaluate individual performance attributed to learning programs • Case study on modification of learning plan based on performance	• Lecture/ Discussion • Case Study • Role Play	• Observation • Role Play • Case Study • Written Test	2 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Method	Nominal Duration
	2.4 Develop team commitment and cooperation	• Discussion on team commitment and cooperation and its impact to attainment of goals • Play games on team commitment and cooperation • Discussion on team dynamics and its relation to team performance • Play games on team dynamics and performance • Development of career plans	• Lecture/ Discussion • Case Study • Role Play	• Observation • Role Play • Case Study • Written Test	1 Hour
	2.5 Facilitate accomplishment of team goals	• Perform team building activities towards improving communication among team members, goal setting and improving performance • Case studies involving collaborative activities to improve attainment of group goals	• Group Activity • Case Study	• Role Play • Case Study • Observation	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Method	Nominal Duration
3. Perform higher-order thinking processes and apply techniques in the workplace	3.1 Evaluate effectiveness and efficiency of the workplace systems, processes and procedures	• Examine current systems, standards, procedures and protocols in the workplace • Discuss different methods of critical and appreciative inquiry and their relevance to different situations • Form habit of asking questions and taking responsibility for answers • Appreciate importance of why questions for individuals, businesses and communities • Use range of analytical techniques • Examine different strategies and techniques in communicating results, applying critical thinking pathway, assessing effectiveness and efficiency of systems, processes and procedures	• 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 Method	Nominal Duration
	3.2 Foster the habit of critical inquiry and curiosity in the workplace	• Discuss different methods of critical and appreciative inquiry and their relevance to different situations • Form habit of asking questions and taking responsibility for answers • Appreciate importance of why questions for individuals, businesses and communities • Use range of analytical techniques, growth mindset and positive communication strategies • Examine different strategies and techniques in communicating results, applying critical thinking pathway, assessing effectiveness and efficiency of systems, processes and procedures • Discuss insights on workplace effectiveness and efficiency	• 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 Method	Nominal Duration
	3.3 Develop practical action plans for improving workplace conditions	• Use range of analytical techniques, growth mindset and positive communication strategies in developing action plans for efficiency and effectiveness • Examine different strategies and techniques in communicating results, applying critical thinking pathway, assessing effectiveness and efficiency of systems, processes and procedures • Discuss concepts creative negotiation skills, change management and improvement strategies	• Group discussion • Lecture • Demonstration • Role playing	• Case Formulation • Life Narrative Inquiry (Interview) • Standardized test • Project-based learning	2 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Method	Nominal Duration
4. Contribute to the practice of social justice in the workplace	4.1 Update self on local, national and global trends/ issues in the workplace	• Explain the local, national and global systems and structures • Discuss issues affecting interaction and connectedness of communities at local, national and global levels • Explain underlying assumptions and power dynamics (politics, understanding political system, social structures, labor laws, labor relations, human right) • Monitor trends and issues relevant to human rights, gender equality, culture of peace, global citizenship, and cultural diversity using different media platforms • Analyze trends and issues relevant to human rights, gender equality, culture of peace, global citizenship, and cultural diversity • Engage in discourse about the local, national and global issues	• Interactive Lecture • Small Group Discussion • Brainstorming • Role-playing	• Demonstration or simulation with oral questioning • Group discussions and interactive activities • Case studies/ problems involving workplace diversity issues • Written examination (Essay) • Role Playing	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Method	Nominal Duration
	4.2 Relate local and global trends to workplace context	• Discuss the different levels of human identity according to Amber Mayer (2015) • Explain different communities people belong to and how these are connected • Recognize cultural differences and respect for cultural diversity • Recognize differences and commonalities among people • Demonstrate attitudes of empathy, solidarity and respect for diversity • Connect local issues to global trends, and vice versa.	• Interactive Lecture • Small Group Discussion • Brainstorming • Role-playing	• Demonstration or simulation with oral questioning • Group discussions and interactive activities • Case studies/ problems involving workplace diversity issues • Written examination (Essay)	1 Hour
	4.3 Engage and take actions on workplace issues and concerns	• Identify the actions that can be taken individually and collectively • Describe ethically responsible behaviour • Explain the importance and benefits of civic	• Interactive Lecture • Small Group Discussion • Brainstorming • Role-playing	• Demonstration or simulation with oral questioning • Group discussions and interactive activities • Case studies/ problems	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Method	Nominal Duration
		engagement • Employ appropriate actions to address workplace issues involving national and global trends • Show concern and willingness to take part in the development efforts to discuss workplace issues and concerns • Apply the attitude of "thinking globally and acting locally" in the workplace		involving workplace diversity issues • Written examination (Essay) • Role Playing	
5. Manage innovative work instructions	5.1 Review and analyze existing workplace practices	• Show mastery of basic management concepts according to Gallup, nine dimensions of innovative practices and climate; and different types of innovation • Contextualize innovation to different variables in the organization • Review current organizational practices where innovation is contextualized	• 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	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Method	Nominal Duration
				virtues applied	
	5.2 Examine opportunities for continuous improvement and innovation of practices in the workplace	• Show mastery of the determinants of innovative behaviors and principles of innovation • Review current organizational practices where innovation is contextualized • Evaluate innovative practices in the organization • Assess innovative behaviors for promoting innovation and learning in the workplace	• 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
	5.3 Implement innovative ways in the conduct of usual workplace practices	• Show mastery of the determinants of innovative behaviors, principles of innovation; and dimensions of innovation climate and strategies and techniques for implementing innovation in the workplace • Evaluate impact of	• 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	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Method	Nominal Duration
		innovative practices in the organization • Demonstrate skills in managing changes in the workplace		performance. • Standardized assessment of character strengths and virtues applied	
6. Manage and evaluate usage of information	6.1 Review information needs and sources	• Lecture and discussion on: - Kinds of information - Information evaluation issues - Information storage requirements and methods • Analysing record information • Identification of information sources	• Lecture • Group Discussion • Hands on • Demonstration • Practical exercises	• Oral evaluation • Written Test • Observation • Presentation	2 Hours
	6.2 Collect and analyze information	• Lecture and discussion on: - Information collection and collation - Relevant trends and developments • Collection of information • Analyzation of information	• Lecture • Group Discussion • Hands on • Demonstration • Practical exercises	• Oral evaluation • Written Test • Observation • Presentation	2 Hours
	6.3 Use management information systems	• Lecture and discussion on:	• Lecture • Group	• Oral evaluation	2 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Method	Nominal Duration
		- Management information systems - Available technology in information management - Advance strategies for customer service excellence • Use of available technology in information management	Discussion • Hands on • Demonstration • Practical exercises	• Written Test • Observation • Presentation	
	6.4 Report and disseminate analyzed information	• Lecture and discussion on: - Reporting procedures of the organisation - Analysis and display techniques • Using management information systems to store and retrieve data	• Lecture • Group Discussion • Hands on • Demonstration • Practical exercises	• Oral evaluation • Written Test • Observation • Presentation	2 Hours
7. Lead in improvement of Occupational Safety and Health (OSH) programs, policies and procedures	7.1 Assess Occupational Safety and Health (OSH) practices and programs	• Case Study in evaluating current OSH programs effectiveness • Practice auditing the workplace	• Lecture • Group Discussion • Case Study • Group Project	• Written Exam • Demonstration • Observation • Interviews / Questioning Portfolio	2 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Method	Nominal Duration
	7.2 Recommend OSH program improvement initiatives	• Writing and Presenting Action Plans to improve OSH compliance in the workplace and/or increase effectiveness of OSH Programs	• Lecture • Group Discussion • Case Study • Group Project	• Written Exam • Demonstration • Observation • Interviews / Questioning Portfolio	4 Hours
	7.3 Implement recommended improvements on Occupational Safety and Health (OSH) Programs, Procedures and Policies	• Role play in increasing the OSH awareness • Measuring the impact of the new OHS program or initiative	• Lecture • Group Discussion • Case Study • Group Project	• Written Exam • Demonstration • Observation • Interviews / Questioning Portfolio	2 Hours
8. Lead towards improvement of environmental work programs, policies and procedures	8.1 Assess environmental work practices and programs	• Discussion of Green structural change and retraining needs - What is green structural change and where is it happening - Workforce restructuring and adjustment - Employment effects of Environment - Sectors most affected by green restructuring	• Lecture • Group Discussion • Demonstration • Case Study • Reporting	• Written Exam • Demonstration • Observation • Interviews / Questioning • Third Party Reports	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Method	Nominal Duration
		- Retraining and skills upgrading - Effective and equitable restructuring: Good practices and programs by public and private sector actors • Perform Impact Assessment • Discussions of Gender Implications			
	8.2 Recommend environmental program improvement initiatives	• Practicing Leadership skills: The biggest challenge in transition to a low-carbon economy or environment friendly activities • Practicing Basic Business planning • Opportunities Management - Identification of low-carbon and Resource scarcity risks • Perform Cost–benefit Analysis	• Lecture • Group Discussion • Demonstration • Case Study • Reporting	• Written Exam • Demonstration • Observation • Interviews / Questioning • Third Party Reports	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Method	Nominal Duration
	8.3 Implement recommended improvements on environmental programs, policies and procedures	• Practicing Environmental Awareness Raising (Communication/ Implementation campaigns) • Teaching and training personnel - necessary skills and methods to impart environmental knowledge, to create awareness and to react flexibly to ever-changing labor market needs.	• Lecture • Group Discussion • Demonstration • Case Study • Reporting	• Written Exam • Demonstration • Observation • Interviews / Questioning • Third Party Reports	1 Hour
9. Sustain entrepreneurial skills	9.1 Enhance one's business skills	• Discussion on entrepreneurial skills • Identifying market trends • Case studies on new technologies, products and processes • Practice gathering information on new trends	• Lecture/ Discussion • Case study • Group work	• Written Report • Case problem	2 Hours
	9.2 Manage entrepreneurial practices	• Discussion on continuous improvement • Presentation of	• Lecture discussion • Group work	• Written Report • Case problem	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Method	Nominal Duration
		plans for continuous improvement • Evaluation of new products and services			
	9.3 Expand markets and clientele	• Prepare business plan and proposal	• Lecture discussion • Group work	• Portfolio	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

		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 and Pipes Using MMAW	3.1 Perform root passes in different positions- PF(3G), PE(4G)-Plate, PA(1G), PC(2G),PH(5G),H-LO45(6G) -Pipe	• Explain and obtain root 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	10 Hours
	3.2 Perform subsequent fill passes in different positions- PF(3G), PE(4G)-Plate, PA(1G), PC(2G),PH(5G), H-LO45(6G) -Pipe	• 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	26 Hours
	3.3 Perform capping in different positions- PF(3G), PE(4G)-Plate, PA(1G), C(2G),PH(5G), H-LO45(6G) -Pipe	• 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	14 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 (NDT) of test coupon	2 Hours

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 III or a holder of MMAW NC III
- 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 IV.

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 prs.	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 rule 300mm. 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**
10 kgs.	Electrodes 3.2mm E308L (ISO = E308L)
3 pcs	Dark glass lens
9 pcs	Clear glass lens
30 pcs.	Stainless Cutting disc 3/32” X 5/8” X 4”
5 pcs	Stainless Grinding disc 1/4” X 5/8” X 4”
18 pcs.	Austenitic Stainless plate 10mm x 150mm x 200mm
20 pcs.	Austenitic Stainless pipe, 100Ø mm. x 125mm (sch. 40)
12 pcs.	Austenitic Stainless pipe, 150Ø mm. x 125mm (sch. 80)

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

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

- Holder of National TVET Trainer Certificate Level I (NTTC Level I) in Manual Metal Arc Welding (MMAW) NC IV
- Must be physically fit **(**including differently-abled person)
- Must have at least 2 years welding job/ industry/ teaching experience with at least 24 hours training in Supervisory 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 IV holder, the individual/holder will have to undergo assessment in the amended TR for Manual Metal Arc Welding (MMAW) NC IV.

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.

ANNEX A

COMPETENCY MAP – METALS AND ENGINEERING SECTOR SECTOR MANUAL METAL ARC WELDING (MMAW) NC IV

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)
Utilize specialized communication skills	**Develop and lead teams**	**Perform higher-order thinking processes and apply techniques in the workplace**	**Contribute to the practice of social justice in the workplace**	**Manage innovative work instructions**	**Manage and evaluate usage of information**	**Lead in improvement of Occupational Safety and Health (OSH) programs, policies and procedures**	**Lead towards improvement of environment work programs, policies and procedures**	**Sustain entrepreneurial skills**

COMMON 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 and pipes 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 IV
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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