

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

Section 22, “Establishment and Administration of the National Trade Skills Standards” of the RA 7796 known as the TESDA Act mandates TESDA to establish national occupational skill standards. The Authority shall develop and implement a certification and accreditation program in which private industry groups 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 Authority.

The Competency Standards (CS) serve as basis for the:

- 3.1 Institutional Competency assessment and training certification;
- 3.2 Registration and delivery of training programs; and
- 3.3 Development of curriculum and assessment instruments.

Each CS has 2 sections:

Section 1 **Definition of Competency Standards** - refers to the group of competencies that describes the different functions of the qualification.

Section 2 **The Competency Standards** - gives the specifications of competencies required for effective work performance.

TABLE OF CONTENTS

MANUFACTURING SECTOR

ADDITIVE MANUFACTURING LEVEL IV

	Page No.
SECTION 1 DEFINITION	1
SECTION 2 COMPETENCY STANDARDS	2 - 67
• Basic Competencies	2 - 42
• Common Competencies	43 - 50
• Core Competencies	51 - 74
GLOSSARY OF TERMS	75 - 78
ACKNOWLEDGEMENTS	79 - 80

COMPETENCY STANDARDS FOR ADDITIVE MANUFACTURING LEVEL IV

SECTION 1 COMPETENCY STANDARDS DESCRIPTION

The **ADDITIVE MANUFACTURING LEVEL IV** consists of competencies that a person must achieve in strip preparing design files, managing additive manufacturing inventory, monitoring additive manufacturing process, performing post-processing, maintaining documentation, conducting quality inspection, and performing machine maintenance.

The Units of Competency comprising this Qualification include the following:

UNIT CODE	BASIC COMPETENCIES
500311404	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

Unit Code	COMMON COMPETENCIES
CS-SOC514203	Apply quality standards
CS-SOC522204	Provide and build quality customer relations

Unit Code	CORE COMPETENCIES
ADM143301	Plan the production workflow
ADM143302	Approve file and setups
ADM143303	Oversee printing and troubleshooting workflow
ADM143304	Validate quality of 3d printed parts
ADM143305	Lead safety and team management
ADM143306	Oversee the status of equipment and materials
ADM143307	Determine the appropriate corrective maintenance procedures

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

- **Additive Manufacturing Supervisor**

SECTION 2 COMPETENCY STANDARDS

This section details the contents of the basic, common and core units of competency required in **ADDITIVE MANUFACTURING LEVEL IV**.

BASIC COMPETENCIES

UNIT OF COMPETENCY : UTILIZE SPECIALIZED COMMUNICATION SKILLS

UNIT CODE : 500311404

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.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> 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

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> 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 2.6 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: 2.2.1 Effective communication process 2.2.2 Active listening 2.2.3 Giving/receiving feedback 2.2.4 Interpretation of information 2.2.5 Role boundaries setting 2.2.6 Negotiation 2.2.7 Establishing empathy 2.2.8 Conduct seminars 2.2.9 Public speaking 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

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
			3.1.8 Openness and flexibility in communication 3.2 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

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> 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	6.1 Communication process 6.2 Dynamics of groups and different styles of group leadership 6.3 Effective questioning techniques 6.4 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

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	required message is communicated		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 Disclosurew
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.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> 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: <ul style="list-style-type: none"> • Types of Decision 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

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
			1.6 Reporting skills to organize information; assess 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

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> 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
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

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED 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: <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> 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

<p>1. Critical Aspects of Competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Identified and 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
<p>2. Resource Implications</p>	<p>The following resources should be provided:</p> <ul style="list-style-type: none"> 2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place 2.2 Materials relevant to the proposed activity or tasks
<p>3. Methods of Assessment</p>	<p>Competency in this unit may be assessed through:</p> <ul style="list-style-type: none"> 3.1 Observation 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
<p>4. Context for Assessment</p>	<ul style="list-style-type: none"> 4.1 Competency may be assessed in workplace or in a simulated workplace setting 4.2 Assessment shall be observed while tasks are

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

UNIT CODE : 500311403

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

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

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> 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 <i>curiosity and critical inquiry</i> 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 a 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 pathways to formulate and ask relevant questions and come up with appropriate answers. 2.4 Performing assimilation and accommodation skills to interpret and distill 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.

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

RANGE OF VARIABLES

VARIABLE	RANGE
1. Effectiveness and Efficiency	May include but not limited to: <ul style="list-style-type: none"> 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 but not limited to: <ul style="list-style-type: none"> 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 but not limited to: <ul style="list-style-type: none"> 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

	<ul style="list-style-type: none">3.10 Financial limitations3.11 Procedures determined by laws or other regulations3.12 Safety issues3.13 When others are totally closed to new ideas3.14 Acknowledging shared responsibility3.15 Adopting a positive 'can do' attitude3.16 Following up on practical details3.17 Pro-actively seeking information3.18 Suggesting a new approach3.19 Talking to others about possible answers3.20 Constraints of the broader context and environment3.21 Overall goal - what needs to be achieved3.22 Personal hopes and expectations
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EVIDENCE GUIDE

<p>1. Critical Aspects of Competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 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
<p>2. Resource Implications</p>	<p>2.1 Interactions with specific challenges and situations to demonstrate the application of critical thinking (this would usually involve interactions with others).</p>
<p>3. Methods of Assessment</p>	<p>Competency in this unit may be assessed through:</p> <ul style="list-style-type: none"> 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.
<p>4. Context for Assessment</p>	<p>4.1 In all workplace, it may be appropriate to assess this unit concurrently with relevant teamwork or operation units.</p>

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 <i>Italicized terms</i> 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 <i>Italicized terms</i> 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 but not limited to: 1.1 Print media 1.2 Broadcast media 1.3 Internet and social media
2. Scanning/Monitoring	May include but not limited to: 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 but not limited to: 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 Express emotions appropriately 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.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> 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 Dama	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
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

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
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 Promote 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

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> 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

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
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

RANGE OF VARIABLES

VARIABLE	RANGE
1. Information	May include but not limited to: 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

<p>1. Critical Aspects of Competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 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 <p>These aspects may be best assessed using a range of scenarios 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.</p>
<p>2. Resource Implications</p>	<p>Specific resources for assessment</p> <ul style="list-style-type: none"> 2.1 Evidence of competent performance should be obtained by observing an individual in an information management role within the workplace or operational or simulated environment.
<p>3. Methods of Assessment</p>	<p>Competency in this unit may be assessed through:</p> <ul style="list-style-type: none"> 3.1 Written Test 3.2 Interview <p>The unit will be assessed in a holistic manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations, which will include disruptions to normal, smooth operation. Simulation may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual workplace and will include walk through of the relevant competency components.</p>
<p>4. Context for Assessment</p>	<ul style="list-style-type: none"> 4.1 In all workplaces, 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

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Assess Occupational Safety and Health (OSH) practices and programs	1.1 <i>OSH practices and programs</i> are reviewed based on workplace policies and procedures 1.2 Appropriate personnel or <i>OSH reference guides</i> 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

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> 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 but not limited to: <ul style="list-style-type: none"> 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 but not limited to: <ul style="list-style-type: none"> 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 but not limited to: <ul style="list-style-type: none"> 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

<p>1. Critical Aspects of Competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 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
<p>2. Resource Implications</p>	<p>The following resources should be provided:</p> <ul style="list-style-type: none"> 2.1 Workplace or assessment location 2.2 OSH personal records 2.3 PPE 2.4 Health records
<p>3. Methods of Assessment</p>	<p>Competency in this unit may be assessed through:</p> <ul style="list-style-type: none"> 3.1 Portfolio Assessment 3.2 Interview 3.3 Case Study/Situation 3.4 Observation/Demonstration and oral questioning
<p>4. Context for Assessment</p>	<ul style="list-style-type: none"> 4.1 Competency may be assessed in the workplace 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 required in assessing environmental work practices and standards, recommending environmental work improvement initiatives and implementing recommended environmental improvements

ELEMENTS	PERFORMANCE CRITERIA <i>Italicized terms</i> 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
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

ELEMENTS	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
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	RANGE
1. Environmental Practices and Programs	May include: 1.1 Utilization of Energy, Water 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

<p>1. Critical Aspects of Competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 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
<p>2. Resource Implications</p>	<p>The following resources should be provided:</p> <ul style="list-style-type: none"> 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
<p>3. Methods of Assessment</p>	<p>Competency in this unit may be assessed through:</p> <ul style="list-style-type: none"> 3.1 Written/ 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
<p>4. Context for Assessment</p>	<ul style="list-style-type: none"> 4.1 Competency may be assessed in the 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.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> 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

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> 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 <i>continuous improvement</i> 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 through 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 : **APPLY QUALITY STANDARDS**

UNIT CODE : **CS-SOC514203**

UNIT DESCRIPTOR : This unit covers the knowledge, skill, attitudes and values needed to apply quality standards in the workplace. The unit also includes the application of relevant safety procedures and regulations, organization procedures and customer requirements.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Inspect quality of received products	1.1 Work instruction is obtained and work is carried out in accordance with standard operating procedures. 1.2 Received products are checked against workplace standards and specifications. 1.3 Faulty materials related to work are identified and isolated. 1.4 Faults and any identified causes are recorded and/or reported to the supervisor concerned in accordance with workplace procedures. 1.5 Faulty materials are replaced in accordance with workplace procedures.	1.1 Relevant production processes, materials and products 1.2 Characteristics of materials, software and hardware used in production 1.3 Quality checking procedures 1.4 Quality workplace procedures 1.5 Identification of faulty products related to work	1.1 Reading skills required to interpret work instruction 1.2 Critical thinking 1.3 Interpreting work instructions

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Assess own work	2.1 Documentation relative to quality within the company is identified and used in accordance with established procedures. 2.2 Completed work is checked against workplace standards relevant to the task undertaken. 2.3 Errors are identified and isolated in accordance with established procedures. 2.4 Information on the quality and other indicators or work performance are recorded in accordance with workplace procedures. 2.5 In case of deviations from specific quality standards , causes are documented and reported in accordance with the workplace's standard operating procedures.	2.1 Safety and environmental aspects of work processes 2.2 Fault identification and reporting 2.3 Workplace procedure in documenting completed work 2.4 Workplace quality indicators	2.1 Carrying out work in accordance with Occupational Health and Safety (OHS) policies and procedures 2.2 Reading skills required to interpret work instruction 2.3 Critical thinking 2.4 Interpret work instructions
3. Engage in quality improvement	3.1 Process improvement procedures are participated relative to the workplace. 3.2 Work is carried out in accordance with process improvement procedures. 3.3 Performance of operation or quality of product to ensure customer satisfaction is monitored in accordance with established procedures.	3.1 Quality improvement processes 3.2 Company customers defined	3.1 Providing solution and decision-making 3.2 Practicing company process improvement procedure

RANGE OF VARIABLES

VARIABLE	RANGE
1. Faults	May include: 1.1 Product not to specification 1.2 Products contain incorrect/outdated information 1.3 Hardware defects 1.4 Materials that do not conform with any regulatory agencies
2. Documentation	May include: 2.1 Organization work procedures 2.2 Manufacturer's instruction manual 2.3 Customer requirements 2.4 Forms
3. Errors	May include: 3.1 Deviation from the requirements of the customer 3.2 Deviation from the requirements of the organization
4. Quality Standards	May include: 4.1 Product 4.2 Materials 4.3 Hardware 4.4 Software 4.5 Customer service

EVIDENCE GUIDE

<p>1. Critical Aspects of Competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Carried out work in accordance with the company's standard operating procedures 1.2 Performed task according to specification 1.3 Reported defects detected in accordance with standards operating procedures 1.4 Carried out work in accordance with the process improvement procedures
<p>2. Resource Implication</p>	<p>The following resources should be provided:</p> <ul style="list-style-type: none"> 2.1 Materials, software and/or hardware to be used in a real or simulated situation 2.2 Tools, materials, and equipment appropriate for the unit of competency 2.3 Workplace environment appropriate for the unit of competency
<p>3. Method of Assessment</p>	<p>Competency in this unit may be assessed through:</p> <ul style="list-style-type: none"> 3.1 Observation with questioning 3.2 Interview 3.3 Demonstration with questioning 3.4 Written test
<p>4. Context of Assessment</p>	<p>4.1 Competency may be assessed in the actual workplace, in a simulated environment or at the designated TESDA Accredited Assessment Center.</p>

UNIT OF COMPETENCY : PROVIDE AND BUILD QUALITY CUSTOMER RELATIONS

UNIT CODE : CS-SOC522204

UNIT DESCRIPTOR : This unit of competency deals with the knowledge, skills and attitudes in providing effective and efficient service to customers. It includes personal presentation, knowledge of updated product information, addressing customer needs and building customer relations.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Maintain a professional image	1.1 Personal presence is maintained according to employer standards or venue requirements. 1.2 Interpersonal skills are used to ensure that customer needs are accurately identified. 1.3 Visible work area is kept tidy and uncluttered. 1.4 Equipment and other resources are stored according to assignment requirements.	1.1 Interactive communication with others 1.2 Interpersonal skills/social graces with sincerity 1.3 Eye-to-Eye contact 1.4 Maintain teamwork and cooperation 1.5 Safe work practices 1.6 Personal hygiene 1.7 Housekeeping 1.8 Time Management	1.1 Applying effective communication skills 1.2 Applying non-verbal communication 1.2.1 Body language 1.3 Practicing good time management 1.4 Ability to work calmly and unobtrusively effectively 1.5 Ability to be attentive, patient and cordial
2. Update knowledge of products and services	2.1 Products to be marketed are identified, familiarized with and fully understood in accordance with established procedures. 2.2 Information on programs is accessed in accordance with established procedures. 2.3 Additional information on products, services and programs are identified in accordance with established procedures.	2.1 Customer's nature, motivation, expectations, and needs 2.2 Customer needs and expectations related to the product and programs 2.3 Appropriate marketing and promotional strategies 2.4 Company standards on how to interact with customers 2.5 Organization's vision, mission	2.1 Applying effective oral communication skills 2.2 Listening skills 2.3 Motivational skills 2.4 Interpersonal skills 2.5 Presentation skills 2.6 Computer literacy 2.7 Understanding customer's nature, motivation, expectations, and needs 2.8 Determining customer needs and expectations related to the product and programs.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Assess needs of new and existing customers	3.1 Active listening is used to gather information from customers in accordance with established procedures. 3.2 Orientation on products, programs and policies are conducted in accordance with established procedures. 3.3 Provide customers with courteous and professional treatment throughout the interaction using interactive communication . 3.4 Inquiries, concerns and comments are responded to promptly and accurately in accordance with organization's policies. 3.5 Identified related or applicable needs of clients based on the products being offered.	3.1 Customer's nature, motivation, expectations and needs 3.2 Customer needs and expectations related to the products 3.3 Appropriate marketing and promotional strategies 3.4 Company standards on how to interact with customer 3.5 Organization's vision, mission, and values	3.1 Applying effective oral communication skills 3.2 Listening skills 3.3 Motivational skills 3.4 Interpersonal skills 3.5 Presentation skills 3.6 Understanding customer's nature, motivation, expectations and needs 3.7 Determining customer needs and expectations related to the products 3.8 Applying commitment/dedication, love of work, competence, courtesy, honesty, sincerity, sensitivity to others, sense of responsibility, caring attitude/compassion, and charity
4. Build relations with customers	4.1 Customer expectations on quality, efficiency, punctuality and appearance are met in accordance with established procedures. 4.2 Possible causes of customer dissatisfaction are identified, addressed and recorded according to employer policy. 4.3 Customers are fully informed of any relevant concerns in a timely manner and according to agreed reporting procedures.	4.1 Interactive communication with others 4.2 Interpersonal skills/social graces with sincerity 4.3 Attitude 4.3.1 Attentive, patient and cordial 4.3.2 Eye-to-eye contact 4.3.3 Maintain teamwork and cooperation 4.4 Communication devices 4.5 Safety practices 4.6 Safe work practices 4.7 Personal hygiene	4.1 Applying effective communication skills 4.2 Applying non-verbal communication 4.2.1 Body language 4.3 Practicing good time management 4.4 Ability to work calmly and unobtrusively effectively

RANGE OF VARIABLES

VARIABLE	RANGE
1. Personal Presence	May include: 1.1 Stance 1.2 Posture 1.3 Body language 1.4 Demeanor 1.5 Grooming 1.6 Dress code/attire
2. Employer Standards	May include: 2.1 Organizational policy and procedures 2.2 Common and accepted practices in the industry
3. Interpersonal Skills	May include: 3.1 Interactive communication 3.2 Public relations 3.3 Good working attitude 3.4 Sincerity 3.5 Pleasant disposition 3.6 Effective communication skills 3.7 Team player
4. Interactive Communication	May include: 4.1 Information is gathered in courteous and professional manner 4.2 Probing skills 4.3 Skills in effective questioning 4.4 Consistent service quality for all types of customers 4.5 Avoiding controversial issues like politics and religion

EVIDENCE GUIDE

<p>1. Critical Aspects of Competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Complied with industry practices and procedures 1.2 Used interactive communication with others 1.3 Promoted public relations 1.4 Complied with service manual standards 1.5 Demonstrated familiarity with company facilities, products and services 1.6 Received, assessed and respondent to customer needs 1.7 Applied organizational quality
<p>2. Resources Implications</p>	<p>The following resources should be provided:</p> <ul style="list-style-type: none"> 2.1 Communication devices 2.2 Tools, materials and equipment appropriate for the unit of competency 2.3 Complete information on products 2.4 Product brochures 2.5 Workplace environment appropriate for the unit of competency
<p>3. Methods of Assessment</p>	<p>Competency in this unit may be assessed through:</p> <ul style="list-style-type: none"> 3.1 Observation with questioning 3.2 Interview 3.3 Demonstration with questioning 3.4 Written test
<p>4. Context of Assessment</p>	<p>4.1 Competency maybe assessed in actual workplace, in a simulated environment or at the designated TESDA Accredited Assessment Center.</p>

CORE COMPETENCIES

UNIT OF COMPETENCY : PLAN THE PRODUCTION WORKFLOW

UNIT CODE : ADM143301

UNIT DESCRIPTOR : This unit covers the knowledge, skills, and attitudes required to maintain quality control, facilitate additive manufacturing coordination, resolve advanced printing problems, and promote continuous improvement within an additive manufacturing production environment.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Schedule tasks based on project timeline and resource availability.*	1.1 Tasks are distributed according to the <i>job order requirements.</i> 1.2 <i>Resources</i> are allocated efficiently based on project schedules.	TECHNOLOGY 1.1 Project management software/tools. 1.2 Scheduling software/tools. ENGINEERING 1.1 Workflow planning 1.2 Resource allocation MATHEMATICS 1.1 Lead time estimation 1.2 Material estimation 1.3 Manpower requirements COMMUNICATION 1.1 Roles, responsibilities, clarification, and output expectation	1.1 Creating production schedules 1.2 Allocating resources effectively 1.3 Prioritizing tasks based on deadlines 1.4 Using project management tools 1.5 Coordinating with cross-functional team members 1.6 Adapting schedules to handle unforeseen changes

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Coordinate with production staff .*	2.1 Communication with operator and technician is maintained based on <i>workflow requirements.</i> 2.2 Coordination with the <i>production team</i> is conducted in accordance with <i>project timelines.</i>	TECHNOLOGY 2.1 Digital communication tools 2.2 Production tracking systems. ENGINEERING 2.1 Interdependencies between design, printing, and post-processing COMMUNICATION 2.1 Cross-functional coordination 2.2 Clear reporting ENVIRONMENT 2.1 Workflow organization	2.1 Communicating effectively with additive manufacturing members 2.2 Facilitating cross-department coordination 2.3 Resolving conflicts 2.4 Maintaining additive manufacturing work 2.5 Maintaining a smooth workflow under pressure 2.6 Giving clear instructions and feedback 2.7 Documenting and reporting production status

RANGE OF VARIABLES

VARIABLE	RANGE
1. Job Order requirements	May include: 1.1 Assigned personnel 1.2 Type of Material 1.3 Material Quantity 1.4 Machine 1.5 Cost-Estimation Form (CEF) 1.5.1 Costing 1.6 Routing Sheet 1.7 Job order form 1.8 Reference Image
2. Resources	May include: 2.1 Fused Filament Fabrication (FFF) 2.2 Stereolithography (SLA) 2.3 Masked Stereolithography (MSLA) 2.4 Auxiliary tools and equipment 2.5 Filaments 2.6 Photosensitive Resin 2.7 Operator 2.8 Technician
3. Workflow Requirements	May include: 3.1 Job Order 3.2 Materials 3.3 Machine 3.4 Operator 3.5 Technician
4. Production Team	May include: 4.1 Supervisor 4.2 Technician 4.3 Operator
5. Project timelines	May include: 5.1 Workflow duration 5.2 Project Deadline

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Scheduled tasks based on project timeline and resource availability. 1.2 Coordinated with production staff
2. Resource Implications	The following resources should be provided: 2.1 Tools, materials, and equipment appropriate for the unit of competency. 2.2 Workplace environment appropriate for the unit of competency.
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Interview 3.2 Demonstration with Questioning 3.3 Observation with Questioning 3.4 Written Examination
4. Context of Assessment	4.1 Competency may be assessed in the actual workplace or at the designated TESDA Accredited Assessment Center

UNIT OF COMPETENCY : APPROVE FILE AND SETUPS

UNIT CODE : ADM143302

UNIT DESCRIPTOR : This unit covers the knowledge, skills, and attitudes required for maintaining standardized and quality-controlled 3D printing parameters. It includes the review of CAD models and slicing parameters before the printing process.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Validate 3D model files for printability*	1.1 Files are checked for errors and compliance with additive manufacturing process requirements. 1.2 Printability is validated based on design specifications .	SCIENCE 1.1 Material constraints 1.2 Process constraints TECHNOLOGY 1.1 Computer-Aided Design (CAD) 1.2 Slicing software ENGINEERING 1.1 Design for Additive Manufacturing (DfAM) principles. MATHEMATICS 1.1 Confirms dimensions, tolerances, and scaling.	1.1 Validating 3D model files for accuracy and printability. 1.2 Identifying and correcting design flaws 1.3 Evaluating support structure needs 1.4 Optimizing models for accuracy and efficiency 1.5 Preparing validated files for machine setup.
2. Approve printing parameters prior to job execution*	2.1 The setup for additive manufacturing is reviewed based on the job order . 2.2 Parameters and slicing parameters are confirmed according to the additive manufacturing process requirements.	SCIENCE 2.1 Material behavior under selected parameters. TECHNOLOGY 2.1 Machine interfaces 2.2 Slicing software ENGINEERING 2.1 Machine settings 2.2 Impact on print quality. COMMUNICATION 2.1 Document approvals 2.2 Communicate setup requirements.	2.1 Verifying machine calibration 2.2 Confirming optimal slicing settings 2.3 Approving job readiness 2.4 Troubleshooting setup issues if any arise 2.5 Documenting setup approvals 2.6 Ensuring alignment with job requirements

RANGE OF VARIABLES

VARIABLE	RANGE
1. Files	May include: 1.1 Standard tessellation language (.stl) 1.2 3D Manufacturing Format (.3mf) 1.3 Standard for the Exchange of Product model data (.stp)
2. Errors	May include: 2.1 Failed mesh 2.2 Corrupted file
3. Design specifications	May include: 3.1 Material 3.2 Print texture 3.3 Tolerance 3.4 External model dimension 3.5 Color
4. Job Order	May include: 4.1 Workflow duration 4.2 Project Deadline 4.3 Material selection 4.4 Machine selection 4.5 Dimensional requirements
5. Parameters	May include: 5.1 Printing temperature 5.2 Printing speed 5.3 Print build volume 5.4 Layer height 5.5 Line width 5.6 Print Speed 5.7 Fan speed 5.8 Bed temperature 5.9 Chamber temperature 5.10 Vat temperature 5.11 Exposure time
6. Slicing parameters	May include: 6.1 Layer height 6.2 Print Speed 6.3 Infill density 6.4 Infill Pattern 6.5 Nozzle Temperature 6.6 Bed Temperature

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Reviewed and validated 3D model files for correctness and printability 1.2 Approved machine setup and slicing parameters prior to job execution 1.3 Used proficiently Computer-Aided Design (CAD) and Slicing Software
2. Resource Implications	The following resources should be provided: 2.1 Tools, materials, and equipment appropriate for the unit of competency. 2.2 Workplace environment appropriate for the unit of competency.
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Interview 3.2 Demonstration with Questioning 3.3 Observation with Questioning 3.4 Written Examination
4. Context of Assessment	4.1 Competency may be assessed in the actual workplace or at the designated TESDA Accredited Assessment Center

UNIT OF COMPETENCY : OVERSEE PRINTING AND TROUBLESHOOTING WORKFLOW

UNIT CODE : ADM143303

UNIT DESCRIPTOR : This unit covers the knowledge, skills, and attitudes necessary for monitoring the 3D printing workflow and supervising machine repair and maintenance. It also involves implementing corrective actions for any issues that may arise.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Supervise ongoing print jobs to ensure adherence to specifications*	1.1 Printing operations are monitored in accordance with job order requirements . 1.2 Deviations from specifications are identified based on the requirements of the additive manufacturing process.	SCIENCE 1.1 Material behavior during printing (e.g., shrinkage, thermal stress). TECHNOLOGY 1.1 Machine dashboards and sensors ENGINEERING 1.1 Machine process parameters 1.2 3d printed part requirements COMMUNICATION 1.1 Document approvals 1.2 Communicate setup requirements.	1.1 Monitoring machine performance during printing. 1.2 Identifying deviations from specified parameters 1.3 Interpreting process data in real-time. 1.4 Providing corrective actions when issues arise. 1.5 Maintaining detailed print records. 1.6 Ensuring outputs remain aligned with project requirements.
2. Resolve common print failures	2.1 Print failures are diagnosed in accordance with the job order requirements. 2.2 Troubleshooting steps are applied according to the additive manufacturing process requirements .	SCIENCE 2.1 Root causes linked to material-process interactions. TECHNOLOGY 2.2 Corrective software settings. ENGINEERING 2.1 Typical failure modes (layer shifting, warping, under-extrusion).	2.1 Identifying root causes of print defects. 2.2 Advising corrective adjustments. 2.3 Mentoring operators on troubleshooting methods. 2.4 Recommending preventive measures for recurring issues.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	2.3 Corrective actions are guided based on equipment and material conditions.	COMMUNICATION 2.1 Mentoring operators 2.2 Documenting troubleshooting steps.	2.5 Applying technical knowledge to solve production challenges. 2.6 Communicating solutions clearly to team members.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Job order requirements	May include: 1.1 Workflow duration 1.2 Project deadline 1.3 Dimensional requirements 1.4 Material selection 1.5 Machine selection
2. Deviations	May include: 2.1 Tolerance 2.2 Changes in actual dimensions
3. Specifications	May include: 3.1 Model dimensions 3.2 Material selection 3.3 Surface finish
4. Troubleshooting Steps	May include: 4.1 May vary depending on the part to be repaired/replaced 4.2 Adjust printing parameters
5. Process requirements	May include: 5.1 Printing technology 5.2 Method of post-processing
6. Corrective actions	May include: 6.1 Part repair 6.2 Part replacements 6.3 Machine replacement

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Supervised ongoing print jobs to ensure adherence to specifications 1.2 Resolved common print failures
2. Resource Implications	The following resources should be provided: 2.1 Tools, materials, and equipment appropriate for the unit of competency 2.2 Workplace environment appropriate for the unit of competency
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Demonstration with Questioning 3.2 Observation with Questioning 3.3 Written Examination
4. Context of Assessment	4.1 Competency may be assessed in the actual workplace or at the designated TESDA Accredited Assessment Center

UNIT OF COMPETENCY : VALIDATE QUALITY OF 3D PRINTED PARTS

UNIT CODE : ADM143304

UNIT DESCRIPTOR : This unit covers the knowledge, skills, and attitudes required to manage the end-to-end quality assurance process for additive manufacturing parts, from hands-on dimensional and functional inspection to data analysis, reporting, and driving corrective actions to guarantee full compliance with client specifications.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Conduct required inspections of printed parts.*	1.1 Parts are measured against dimensional tolerances in the job order . 1.2 Functional checks are conducted based on additive manufacturing process requirements.	SCIENCE 1.1 3D Printing Material Properties TECHNOLOGY 1.1 Metrology tools (Coordinate Measuring Machine (CMM), scanners, calipers). ENGINEERING 1.1 Inspection methods 1.2 Testing standards MATHEMATICS 1.1 Calculate deviations, tolerances, and compliance to specifications	1.1 Using precision measuring instruments. 1.2 Comparing measured dimensions with the 3D model 1.3 Interpreting inspection data. 1.4 Assessing parts for functional suitability. 1.5 Identifying nonconforming parts. 1.6 Documenting and reporting inspection results.
2. Verify compliance of outputs against client requirements*.	2.1 Outputs are checked according to client requirements . 2.2 Client specifications are validated against the job order.	ENGINEERING 2.1 Tolerance inspection COMMUNICATION 2.1 Interpret client requirements 2.2 Translate requirements into quality checks 2.3 Inspection data documentation	2.1 Benchmarking additive manufacturing-specific quality 2.2 Validating parts against job order requirements. 2.3 Reviewing outputs against client specifications.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
			2.4 Preparing quality compliance reports. 2.5 Identifying quality risks before delivery. 2.6 Ensuring corrective measures are implemented.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Job order	May include: 1.1 Materials 1.2 Design files 1.3 Quantity 1.4 Print Time 1.5 Preliminary Post-Processing 1.6 Cost Estimate
2. Functional checks	May include: 2.1 Tolerance 2.2 Changes in actual dimensions
3. Client requirements	May include: 3.1 Dimensional accuracy 3.2 Conformity to the supplied 3D model 3.3 3D print finish
4. Specifications	May include: 4.1 Printing technology used 4.2 Method of post-processing

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Conducted required inspections of printed parts 1.2 Verified compliance of outputs against client requirements
2. Resource Implications	The following resources should be provided: 2.1 Tools, materials, and equipment appropriate for the unit of competency 2.2 Workplace environment appropriate for the unit of competency
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Demonstration with Questioning 3.2 Observation with Questioning 3.3 Written Examination
4. Context of Assessment	4.1 Competency may be assessed in the actual workplace or at the designated TESDA Accredited Assessment Center

UNIT OF COMPETENCY : LEAD SAFETY AND TEAM MANAGEMENT

UNIT CODE : ADM143305

UNIT DESCRIPTOR : This unit covers the knowledge, skills, and attitudes required to lead teams to achieve peak productivity and full regulatory compliance by enforcing safety protocols, providing hands-on mentorship, and fostering a culture of accountability and continuous improvement.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. *Enforce compliance on workplace safety regulations.	1.1 Safety procedures are implemented according to company regulations . 1.2 Compliance with workplace safety standards is monitored continuously.	ENGINEERING 1.1 Machines Safety 1.2 Equipment Safety 1.3 Hazard Identification 1.4 Material risks COMMUNICATION 1.1 Instructing 1.2 Staff compliance reminder 1.3 Material Safety Data Sheet (MSDS) ENVIRONMENT 1.1 Environmental, health, and safety (EHS) standards.	1.1 Conducting occupational safety and health standards training. 1.2 Enforcing correct use of Personal Protective Equipment (PPE). 1.3 Conducting safety checks during production. 1.4 Instructing and reminding staff about compliance. 1.5 Identifying and mitigating safety hazards. 1.6 Train staff on compliance requirements. 1.7 Documenting safety compliance activities.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Lead team members in efficient and safe work practices.*	2.1 Guidance is provided to ensure adherence to additive manufacturing process requirements. 2.2 Team members are coached based on workplace safety and <i>efficiency standards.</i>	TECHNOLOGY 2.1 Training tools ENGINEERING 2.1 Best practices in additive manufacturing processes for efficiency and safety COMMUNICATION 2.1 Team training 2.2 Performance monitoring 2.3 Performance documentation ENVIRONMENT 2.1 Sustainable practices 2.2 Resource-efficient workflows.	2.1 Ability to provide on-the-job coaching. 2.2 Skill in promoting safe machine operation. 2.3 Competence in motivating staff to improve productivity. 2.4 Ability to evaluate individual and team performance. 2.5 Fostering collaboration and accountability. 2.6 Resolving conflicts in a professional manner.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Safety procedures	May include: 1.1 Wearing appropriate Personal Protective Equipment (PPE) 1.2 Maintaining distance to hot components of the machine 1.3 Working on well ventilated spaces 1.4 Proper material handling and disposal
2. Company regulations	May include: 2.1 Safety policy for machine operation 2.2 Safety policy for material handling 2.3 Safety policy for waste disposal
3. Workplace safety standards	May include: 3.1 Installing only printers with enclosure 3.2 Installing local exhaust ventilation 3.3 Wearing Personal Protective Equipment (PPE) when operating / maintaining the machines. 3.4 Installing High-Efficiency Particulate Air Filter (HEPA) filters to capture fumes.
4. Efficiency standards.	May include: 4.1 Optimizing material usage 4.2 Utilizing and minimizing support structures

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Enforce safety protocols and ensure compliance with workplace regulations. 1.2 Led and mentored team members in efficient and safe work practices.
2. Resource Implications	The following resources should be provided: 2.1 Tools, materials, and equipment appropriate for the unit of competency 2.2 Workplace environment appropriate for the unit of competency
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Interview 3.2 Demonstration with Questioning 3.3 Observation with Questioning 3.4 Written Examination
4. Context of Assessment	4.1 Competency may be assessed in the actual workplace or at the designated TESDA Accredited Assessment Center

UNIT OF COMPETENCY : **OVERSEE THE STATUS OF EQUIPMENT AND MATERIALS**

UNIT CODE : **ADM143306**

UNIT DESCRIPTOR : This unit covers the knowledge, skills, and attitudes required to oversee operational readiness. This includes ensuring material availability and equipment reliability by overseeing inventory control, conducting routine maintenance and calibration, and keeping detailed logs of all activities.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Monitor status of additive manufacturing materials.*	1.1 Material stock levels are checked regularly 1.2 Material replenishment is initiated in accordance with the threshold. 1.3 Materials storage conditions are maintained in accordance with additive manufacturing process standards.	SCIENCE 1.1 Material shelf life 1.2 Material properties 1.3 Material handling requirements TECHNOLOGY 1.1 Inventory and monitoring systems. ENVIRONMENT 1.1 Proper storage practices 1.2 Minimizing waste and degradation. MATHEMATICS 1.1 Track material usage rates 1.2 Material estimation needs.	1.1 Tracking material usage against job orders. 1.2 Conducting inventory checks. 1.3 Identifying material shortages. 1.4 Ensuring proper storage conditions. 1.5 Updating inventory records. 1.6 Coordinating material replenishment.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Ensure regular checks and upkeep of equipment readiness.*	2.1 <i>Equipment readiness</i> is verified according to maintenance schedules. 2.2 <i>Preventive maintenance checklists</i> are reviewed based on additive manufacturing process requirements.	TECHNOLOGY 2.1 Machine monitoring system 2.2 Machine diagnostic tools. ENGINEERING 2.1 Preventive maintenance schedules 2.2 Equipment functions COMMUNICATION 2.1 Log equipment readiness 2.2 Documented issue reports ENVIRONMENT 2.1 Energy utilization	2.1 Conduct preventive maintenance. 2.2 Checking machine calibration and alignment. 2.3 Identifying early signs of wear. 2.4 Document maintenance activities. 2.5 Ensuring the readiness of tools and equipment. 2.6 Follow standard operating procedures for maintenance.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Material	May include: <ul style="list-style-type: none"> 1.1 Filaments 1.2 Photosensitive Resin 1.3 Consumables <ul style="list-style-type: none"> 1.3.1 Isopropyl Alcohol (At least 90%) 1.3.2 Sandpaper 1.3.3 Acetone 1.3.4 Super glue 1.3.5 Polishing compound 1.3.6 Body filler 1.3.7 Polishing wheel 1.3.8 Tissue
2. Equipment readiness	May include: <ul style="list-style-type: none"> 2.1 Calibrated machine 2.2 Updated software/firmware
3. Preventive maintenance checklist	May include: <ul style="list-style-type: none"> 3.1 Maintenance schedule 3.2 Work instruction

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: <ul style="list-style-type: none"> 1.1 Monitored status of additive manufacturing materials 1.2 Ensured regular checks and upkeep of equipment readiness
2. Resource Implications	The following resources should be provided: <ul style="list-style-type: none"> 2.1 Tools, materials, and equipment appropriate for the unit of competency 2.2 Workplace environment appropriate for the unit of competency
3. Methods of Assessment	Competency in this unit may be assessed through: <ul style="list-style-type: none"> 3.1 Interview 3.2 Demonstration with Questioning 3.3 Observation with Questioning 3.4 Written Examination
4. Context of Assessment	4.1 Competency may be assessed in the actual workplace or at the designated TESDA Accredited Assessment Center

UNIT OF COMPETENCY : **DETERMINE THE APPROPRIATE CORRECTIVE MAINTENANCE PROCEDURES**

UNIT CODE : **ADM143307**

UNIT DESCRIPTOR : This unit covers the knowledge, skills, and attitudes required to maintain the working condition of an additive manufacturing machine. It includes machine diagnostics, maintenance scheduling, and conducting corrective maintenance.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Analyze root causes of equipment malfunctions.*	1.1 Malfunctions are analyzed based on additive manufacturing process requirements. 1.2 Root cause findings are documented according to <i>maintenance procedures.</i>	SCIENCE 1.1 Machine thermal factors 1.2 Machine physical factors TECHNOLOGY 1.1 Software systems in additive manufacturing equipment. 1.2 Diagnostic testing tools 1.3 Interpreting error logs. ENGINEERING 1.1 Mechanical parts of the machine 1.2 Electrical components of the machine COMMUNICATION 1.1 Error report/failure report	1.1 Analyzing equipment error messages. 1.2 Identifying mechanical and electrical faults. 1.3 Applying diagnostic procedures. 1.4 Assessing the severity of malfunctions. 1.5 Recommending appropriate corrective actions. 1.6 Communicating findings clearly to technical staff.
2. Conduct corrective maintenance with a technician*	2.1 Corrective maintenance is carried out following <i>standard procedures.</i> 2.2 Technical assistance is coordinated based on <i>equipment requirements.</i>	TECHNOLOGY 2.1 Installing software updates ENGINEERING 2.1 Corrective maintenance methods 2.2 Machine part replacement.	2.1 Performing basic repairs and adjustments. 2.2 Replacing worn or faulty machine components.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		COMMUNICATION 2.1 Machine maintenance requirements 2.2 Coordination with service providers ENVIRONMENT 2.1 Proper disposal of replaced parts and consumables.	2.3 Following maintenance schedules. 2.4 Coordinating with service providers when needed. 2.5 Documenting maintenance and repair actions. 2.6 Ensuring restored functionality meets operational requirements.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Maintenance procedures	May include: 1.1 Cleaning the machine 1.2 Updating firmware 1.3 Lubricating parts 1.4 Replacing parts 1.5 Repairing parts
2. Standard procedures	May include: 2.1 Slicing 2.2 Material loading 2.3 Machine preparation 2.4 Print monitoring 2.5 Post processing
3. Equipment	May include: 3.1 3D printer 3.2 Post-processing tools 3.3 Computer for slicing

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Analyzed root causes of equipment malfunctions 1.2 Conducted corrective maintenance with a technician
2. Resource Implications	The following resources should be provided: 2.1 Tools, materials, and equipment appropriate for the unit of competency 2.2 Workplace environment appropriate for the unit of competency
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Interview 3.2 Demonstration with Questioning 3.3 Observation with Questioning
4. Context of Assessment	4.1 Competency may be assessed in the actual workplace or at the designated TESDA Accredited Assessment Center

GLOSSARY OF TERMS

TERM	DEFINITION
1. Analysis	Can involve statistical methods, mathematical calculations, critical analysis, and problem-solving.
2. Collection Methods	Techniques for gathering information, such as indexing, linking, sorting, comparing, categorizing, and integrating.
3. Collection Techniques	Ways to collect information, including research, surveys, literature searches, interviews, databases, and observation.
4. Company Regulations	Safety policies for things like machine operation, material handling, and waste disposal.
5. Continuous Improvement	May include quality management systems (like PDCA, ISO 9001, TQM, and Six-Sigma), client feedback systems, and quality assurance/quality control systems.
6. Corrective actions	Actions like part repair, part replacement, and machine replacement.
7. Curiosity and Critical Inquiry	Includes concepts such as accuracy, breadth, clarity, depth, logic, relevance, social engagement, and having a growth mindset.
8. Design specifications	Details like the material, print texture, tolerance, external model dimensions, and color.
9. Deviations	Can refer to tolerance and changes in actual dimensions.
10. Documentation	Includes organization work procedures, manufacturer's instruction manuals, customer requirements, and forms.
11. Effectiveness and Efficiency	Involves developing new or more efficient ways of doing things, enhancing skills, improving products and services, and improving workplace conditions and relationships.
12. Efficiency standards	Optimizing material usage and minimizing support structures.
13. Employer Standards	Refers to organizational policies, procedures, and accepted industry practices.
14. Entrepreneurial Skills	Includes financial management, people management, operations management, and business acumen.
15. Environmental Practices and Programs	Activities such as using energy and water, waste disposal and reuse, saving resources, and handling hazardous materials.
16. Environmental Reference Guides	Resources like guidelines for air emission, water conservation, and hazardous materials management.

17. Environmental Work Program Initiatives	Activities like using low-energy lighting, water reduction, recycling, and tree-planting.
18. Equipment	Includes a 3D printer, post-processing tools, and a computer for slicing.
19. Equipment readiness	A machine that is calibrated, has updated software, and has enough material stock.
20. Errors (in file validation)	A failed mesh or a corrupted file.
21. Errors (in quality assessment)	Deviation from the requirements of the customer or the organization.
22. Faults	Products that don't meet specifications, contain incorrect information, or have hardware defects.
23. Feedback on Performance	Can be formal or informal appraisals, and include feedback from supervisors, colleagues, and clients.
24. Functional checks	Checking for tolerance and changes in actual dimensions.
25. Information	Can include reports, proposals, project plans, articles, and promotional material.
26. Innovation	Can be products vs. processes, radical vs. incremental, and technical vs. administrative.
27. Innovative Behaviors	Generating new ideas, securing funds for new ideas, and establishing plans for implementing them.
28. Interactive Communication	Gathering information courteously, using probing and questioning skills, and avoiding controversial topics.
29. Interpersonal Skills	Includes effective communication, a good working attitude, sincerity, and being a team player.
30. Interview Situations	Scenarios such as establishing rapport, getting information, resolving issues, and developing action plans.
31. Job Order	Includes assigned personnel, costing, material type and quantity, and the machine being used. It can also include workflow duration, project deadline, material selection, and dimensional requirements.
32. Learning and Development Needs	Can involve coaching, mentoring, training programs, work experience, and career planning.
33. Learning Delivery Methods	On-the-job coaching, problem-solving, presentations, formal courses, and attending conferences.
34. Local, National and Global Issues	Issues such as poverty, unemployment, global warming, and safety and security.
35. Maintenance procedures	Includes cleaning the machine, updating firmware, lubricating parts, and replacing or repairing parts.

36. Management Information Systems	Systems that use computers, communication channels, records management, and procedures to store and retrieve data.
37. Material	Filaments and photosensitive resin.
38. Media	Print, broadcast, and social media.
39. Organizational Requirements	Goals, plans, systems, and policies related to quality assurance, safety, confidentiality, and ethics.
40. OSH Practices and Programs	Includes planning and maintaining manufacturing plants, work-related physiological and psychological practices, first aid, and safety inspections.
41. OSH Reference Guides	Resources like the Occupational Safety and Health Standards Book, OSHA Safety Bulletins, and credible OSH websites.
42. OSH Work Improvement Initiatives	Methods to reduce risk, such as eliminating, isolating, or substituting a hazard, or using administrative and engineering controls.
43. Parameters (Printing)	Settings such as printing temperature, printing speed, layer height, line width, and fan speed.
44. Personal Presence	A person's stance, posture, body language, and grooming.
45. Practical Action Plans	Can include strategies for continuous improvement, career plans, and plans for adapting to workplace changes.
46. Process requirements	The printing technology and method of post-processing used.
47. Project timelines	The duration and deadline for a project.
48. Quality standards	Standards for a product, materials, hardware, software, and customer service.
49. Resources	Can include different types of printers, filaments, resin, operators, and technicians.
50. Safety procedures	Wearing the correct PPE, maintaining distance from hot parts, and handling materials properly in a well-ventilated space.
51. Scanning/Monitoring	Sourcing information from informants, conversations with clients, and scanning print or broadcast media.
52. Specifications	The model's dimensions, material selection, surface finish, printing technology, and post-processing method.
53. Standard procedures	The steps involved in slicing, loading materials, preparing the machine, monitoring the print, and post-processing.
54. Strategies	Recognizing one's limitations, using techniques and aids, and using verbal and non-verbal communication.

55. Troubleshooting Steps	Steps that vary based on the part needing repair or replacement.
56. Workflow Requirements	The job order, materials, machine, and operator.
57. Workplace safety standards	Using printers with enclosures, having local exhaust ventilation, wearing PPE, and using HEPA filters.

GLOSSARY OF TERMS (Acronyms)

Acronym	Abbreviation
.3mf	3D Manufacturing Format
.gcode	geometric code
.obj	Object File
.stl	Standard Tessellation Language
AM	Additive Manufacturing
CAD	Computer-Aided Design
DfAM	Design for Additive Manufacturing
FDM	Fused Deposition Modeling
FFF	Fused Filament Fabrication
MSLA	Masked Stereolithography
OSH	Occupational Safety and Health
PPE	Personal Protective Equipment
QMS	Quality Management System
SLA	Stereolithography
TESDA	Technical Education and Skills Development Authority
HEPA	High-Efficiency Particulate Air
OHS	Occupational Health and Safety
PDCA	Plan-Do-Check-Act
TQM	Total Quality Management

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