TRAINING REGULATIONS

CHEMICAL PROCESS OPERATIONS NC III

CHEMICAL/PLASTIC/PETROCHEMICALS SECTOR

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

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

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

The Training Regulations (TR) serves as basis for the:

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

Each TR has four sections:

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

Section 2 The **Competency Standards** format was revised to include the Required Knowledge and Required Skills per element. These fields explicitly state the required knowledge and skills for competent performance of a unit of competency in an informed and effective manner. These also emphasize the application of knowledge and skills to situations where understanding is converted into a workplace outcome.

Section 3 **Training Arrangements** – contain the information and requirements which serve as bases for training providers in designing and delivering competency-based curriculum for the qualification. The revisions to Section 3 entail identifying the Learning Activities leading to achievement of the identified Learning Outcome.

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

TABLE OF CONTENTS

CHEMICAL PROCESS OPERATIONS NC III

CHEMICALS/PLASTIC/PETROCHEMICALS SECTOR

TRAINING REGULATIONS FOR
CHEMICAL PROCESS OPERATIONS NC III

SECTION 1 CHEMICAL PROCESS OPERATIONS NC III QUALIFICATION

The **CHEMICAL PROCESS OPERATIONS NC III** Qualification consists of competencies that a person must achieve to perform chemical operations and control chemical processes.

The Units of Competency comprising this Qualification include the following:

UNIT CODE	BASIC COMPETENCIES
500311109	Lead workplace communication
500311110	Lead small teams
500311111	Develop and practice negotiation skills
500311112	Solve problems related to work activities
500311113	Use mathematical concepts and techniques
500311114	Use relevant technologies

UNIT CODE.	COMMON COMPETENCIES
CPP313201	Observe safe working practices
CPP313202	Comply with emergency procedures
ELC724201	Use hand and measuring tools
ELC311201	Perform mensuration and calculation
CPP313203	Apply quality standards

UNIT CODE	CORE COMPETENCIES
CPP313301	Determine process requirements
CPP313302	Evaluate process data
CPP313303	Operate process equipment
CPP313304	Monitor process equipment
CPP313305	Qualify in-process and finished product samples
CPP313306	Perform shutdown activities

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

- **Chemical Process Operator**

SECTION 2 COMPETENCY STANDARDS

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

BASIC COMPETENCIES

UNIT OF COMPETENCY : LEAD WORKPLACE COMMUNICATION

UNIT CODE : 500311109

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

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1 Communicate information about workplace processes	1.1 Appropriate ***communication method*** is selected 1.2 Multiple operations involving several topics areas are communicated accordingly 1.3 Questions are used to gain extra information 1.4 Correct sources of information are identified 1.5 Information is selected and organized correctly 1.6 Verbal and written reporting is undertaken when required 1.7 Communication skills are maintained in all situations	• Organization requirements for written and electronic communication methods • Effective verbal communication methods	• Organize information • Understand and convey intended meaning • Participate in variety of workplace discussions • Comply with organization requirements for the use of written and electronic communication methods
2 Lead workplace discussions	2.1 Response to workplace issues are sought 2.2 Response to workplace issues are provided immediately 2.3 Constructive contributions are made to workplace discussions on such issues as production, quality and safety 2.4 Goals/objectives and Action plan undertaken in the workplace are	• Leading as a management function • Barriers of communication • Effective verbal communication methods • Method/techniques of discussion • How to lead discussion • How to solicit	• Communicating effectively • Consulting the LGs on the housekeeping schedules

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	communicated	response	
3 Identify and communicate issues arising in the workplace	3.1 Issues and problems are identified as they arise 3.2 Information regarding problems and issues are organized coherently to ensure clear and effective communication 3.3 Dialogue is initiated with appropriate personnel 3.4 Communication problems and issues are raised as they arise	• Types of issues and problems in the workplace • Written and electronic communication methods • Communication barriers affecting workplace discussions	• Identifying cause of problems • Identifying problems and issues • Organizing information on problems and issues • Relating problems and issues of call

RANGE OF VARIABLES

VARIABLE	RANGE
1. Methods of communication	May include: 1.1. Non-verbal gestures 1.2. Verbal 1.3. Face to face 1.4. Two-way radio 1.5. Speaking to groups 1.6. Using telephone 1.7. Written 1.8. Internet

EVIDENCE GUIDE

1. Critical Aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Dealt with a range of communication/information at one time 1.2 Made constructive contributions in workplace issues 1.3 Sought workplace issues effectively 1.4 Responded to workplace issues promptly 1.5 Presented information clearly and effectively written form 1.6 Used appropriate sources of information 1.7 Asked appropriate questions 1.8 Provided accurate information
2. Resource Implications	**The following resources should be provided**: 2.1. Variety of Information 2.2. Communication tools 2.3. Simulated workplace
3. Methods of Assessment	**Competency in this unit may be assessed through**: 3.1 Competency in this unit must be assessed through 3.2 Direct Observation 3.3 Interview
4. Context of Assessment	4.1 Competency maybe assessed in actual workplace or at the designated TESDA Accredited Assessment Center.

UNIT OF COMPETENCY : LEAD SMALL TEAMS

UNIT CODE : 500311110

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

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

1. Provide team leadership	1.1 ***Work requirements*** are identified and presented to team members
	1.2 Reasons for instructions and requirements are communicated to team members
	1.3 ***Team members' queries and concerns*** are recognized, discussed and dealt with
		• Company policies and procedures
		  ○ How performance expectations are set
		  ○ Methods of Monitoring Performance
		• Client expectations
		• Team member's duties and responsibilities
		• Skills and techniques in promoting team building
		• Up-to-date dissemination of instructions and requirements to members
		• Art of listening and treating individual team members concern
			• Communication skills required for leading teams
			• Team building skills
			• Negotiating skills

2. Assign responsibilities	2.1. Duties, and responsibilities are assigned in consideration of skills, knowledge and aptitude required to properly undertake the assigned task and according to company policy 2.2. Duties are allocated having regard to individual preference, domestic and personal considerations, whenever possible	• Concept of delegation • How to delegate • Understanding individual differences • Methods of monitoring performance • Duties and responsibilities of each team member	• Delegating skills • Identifying individual skills, knowledge and attitude as basis for allocating responsibilities • Identifying each team member duties and responsibilities

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		• Knowledge in identifying each team member duties and responsibilities	
3. Set performance expectations for team members	3.1 Performance expectations are established based on client needs and according to assignment requirements 3.2 Performance expectations are based on individual team members duties and area of responsibility 3.3 Performance expectations are discussed and disseminated to individual team members	• Definition of performance indicators/ criteria • Definition of team goals and expectations • Methods of monitoring performance • Client expectations • Team members duties and responsibilities • Defining performance expectations criteria	• Identifying performance indicators • Evaluating performance • Setting individual performance target/ expectation indicators
4. Supervise team performance	4.1. ***Monitoring of performance*** takes place against defined performance criteria and/or assignment instructions and corrective action taken if required 4.2. Team members are provided with ***feedback***, positive support and advice on strategies to overcome any deficiencies 4.3. ***Performance issues*** which cannot be rectified or addressed within the team are referenced to appropriate personnel according to employer policy 4.4. Team members are kept informed of any changes in the priority allocated to assignments or tasks which might impact on client/customer needs and satisfaction	• Understanding, monitoring of work • How to undertake corrective action • Understanding feedback and procedure • Feedback reporting procedure • Methods of monitoring performance • Team member's duties and responsibilities • Monitoring team operation to ensure client needs and satisfaction	• Monitoring skills • Setting priorities • Evaluating performance • Informal/ formal counseling skill

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

RANGE OF VARIABLES

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

EVIDENCE GUIDE

1. Critical Aspects of Competency	**Assessment requires evidence that the candidate:** 1.1. Maintained or improved individuals and/or team performance given a variety of possible scenario 1.2. Assessed and monitored team and individual performance against set criteria 1.3. Represented concerns of a team and individual to next level of management or appropriate specialist and to negotiate on their behalf 1.4. Allocated duties and responsibilities, having regard to individual's knowledge, skills and aptitude and the needs of the tasks to be performed 1.5. Set and communicated performance expectations for a range of tasks and duties within the team and provided feedback to team members
2. Resource Implications	**The following resources should be provided:** 2.1. Access to relevant workplace or appropriately simulated environment where assessment can take place 2.2. Materials relevant to the proposed activity or task
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1. Direct observations of work activities of the individual member in relation to the work activities of the group 3.2. Observation of simulation and/or role play involving the participation of individual member to the attainment of organizational goal 3.3. Case studies and scenarios as a basis for discussion of issues and strategies in teamwork
4. Context of Assessment	4.1. Competency maybe assessed in actual workplace or the designated TESDA Accredited Assessment Center.

UNIT OF COMPETENCY : DEVELOP AND PRACTICE NEGOTIATION SKILLS

UNIT CODE : 500311111

UNIT DESCRIPTOR : This unit covers the skills, knowledge and attitudes required to collect information in order to negotiate to a desired outcome and participate in the negotiation.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Plan negotiations	1.1 Information on ***preparing for negotiation*** is identified and included in the plan 1.2 Information on creating ***non-verbal environments*** for positive negotiating is identified and included in the plan 1.3 Information on ***active listening*** is identified and included in the plan 1.4 Information on different ***questioning techniques*** is identified and included in the plan 1.5 Information is checked to ensure it is correct and up-to- date	• Knowledge on Codes of practice and guidelines for the organization • Knowledge of organizations policy and procedures for negotiations • Decision making and conflict resolution strategies procedures • Concept of negotiation	• Communication skills (verbal and listening) • Active listening • Setting conflict • Preparing conflict resolution • Problem solving strategies on how to deal with unexpected questions and attitudes during negotiation • Interpersonal skills to develop rapport with other parties
2. Participate in negotiations	2.1 ***Criteria for successful outcome are agreed upon by all parties*** 2.2 Desired outcome of all parties are considered 2.3 Appropriate language is used throughout the negotiation 2.4 A variety of ***questioning techniques*** are used 2.5 The issues and processes are documented and agreed upon by all parties 2.6 Possible solutions are discussed and their viability assessed 2.7 Areas for agreement are confirmed and recorded 2.8 Follow-up action is agreed upon by all parties	• Outcome of negotiation • Knowledge on Language • Different Questioning techniques • Problem solving strategies on how to deal with unexpected questions and attitudes during negotiation • Flexibility • Empathy • Decision making and conflict resolution strategies procedures • Problem solving strategies on how to deal with unexpected questions and attitudes during negotiation	• Negotiating skill • Communication skills (verbal and listening) • Observation skills • Interpersonal skills to develop rapport with other parties • Applying effective questioning techniques • Setting conflict

RANGE OF VARIABLES

VARIABLE	RANGE
1. Preparing for negotiation	May include: 1.1 Background information on other parties to the negotiation 1.2 Good understanding of topic to be negotiated 1.3 Clear understanding of desired outcome/s 1.4 Personal attributes 1.4.1 self awareness 1.4.2 self esteem 1.4.3 objectivity 1.4.4 empathy 1.4.5 respect for others 1.5 Interpersonal skills 1.5.1 listening/reflecting 1.5.2 non- verbal communication 1.5.3 assertiveness 1.5.4 behavior labeling 1.5.5 testing understanding 1.5.6 seeking information 1.5.7 self-disclosing 1.6 Analytic skills 1.6.1 observing differences between content and process 1.6.2 identifying bargaining information 1.6.3 applying strategies to manage process 1.6.4 applying steps in negotiating process 1.6.5 strategies to manage conflict 1.6.6 steps in negotiating process 1.6.7 options within organization and externally for resolving conflict
2. Non- verbal environments	May include: 2.1 Friendly reception 2.2 Warm and welcoming room 2.3 Refreshments offered 2.4 Lead in conversation before negotiation begins
3. Active listening	May include: 3.1 Attentive 3.2 Don't interrupt 3.3 Good posture 3.4 Maintain eye contact 3.5 Reflective listening
4. Questioning techniques	May include: 4.1 Direct 4.2 Indirect 4.3 Open-ended

EVIDENCE GUIDE

1. Critical Aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Demonstrated sufficient knowledge of the factors influencing negotiation to achieve agreed outcome 1.2 Participated in negotiation with at least one person to achieve an agreed outcome
2. Resource Implications	**The following resources be provided:** 2.1 Room with facilities necessary for the negotiation process 2.2 Human resources (negotiators)
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Observation/demonstration and questioning 3.2 Portfolio assessment 3.3 Oral and written questioning 3.4 Third party report
4. Context of Assessment	4.1 Competency may be assessed in actual workplace or at the designated Accredited Assessment Center.

UNIT OF COMPETENCY : SOLVE PROBLEMS RELATED TO WORK ACTIVITIES

UNIT CODE : 500311112

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

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Explain the analytical techniques	1.1 All the analytical techniques are identified. 1.2 Use of each technique is applied in real life situations.	• Problem identification techniques • Observation, investigation and analytical techniques • Cause and effect diagrams • PARETO analysis • SWOT analysis • GANT chart • PERT CPM and graph • SCATTERGRAMS	• Conduct investigation and root cause analysis • Implement corrective actions
2. Identify the problem	2.1. Variances are identified from normal operating parameters; and product quality 2.2. Extent, cause and nature are of the problem are defined through observation, investigation and ***analytical techniques*** 2.3. ***Problems*** are clearly stated and specified	• Competence includes a thorough knowledge and understanding of the process, normal operating parameters, and product quality to recognize non-standard situations • Competence to include the ability to apply and explain, sufficient for the identification of fundamental cause, determining the corrective action and provision of recommendations • Relevant equipment and operational processes • Enterprise goals, targets and	• Use range of formal problem solving techniques • Identify and clarify the nature of the problem • Evaluate the effectiveness of a present process in the galley • Apply analytical techniques

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		measures • Enterprise quality, OSH and environmental requirement • Enterprise information systems and data collation • Industry codes and standards • Normal operating parameters and product quality	
3. Determine fundamental causes of the problem	3.1 Possible causes are identified based on experience and the use of problem solving tools / analytical techniques. 3.2 Possible cause statements are developed based on findings 3.3 Fundamental causes are identified per results of investigation conducted	• Relevant equipment and operational processes • Enterprise goals, targets and measures • Enterprise quality, OSH and environmental requirements • Enterprise information systems and data collation • Industry codes and standards	• Analysis of root causes
4. Determine corrective action	4.1 All possible options are considered for resolution of the problem 4.2 Strengths and weaknesses of possible options are considered 4.3 Corrective actions are determined to resolve the problem and possible future causes 4.4 ***Action plans*** are developed in identifying measurable objectives, resource needs and timelines in accordance with safety and operating procedures	• Understand the procedure in undertaking corrective action • Principles of decision making strategies and techniques • Enterprise information systems and data collation • Action planning	• Identify and clarify the nature of the problem • Devise the best solution • Evaluate the solution • Implement plan to rectify the problem • Implementing corrective and preventive actions based on root cause analysis

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
5. Provide recommendation/s to manager	5.1 Report on recommendations are prepared 5.2 Recommendations are presented to appropriate personnel. 5.3 Recommendations are followed-up, if required	• Competence includes a thorough knowledge and understanding of the process, normal operating parameters, and product quality to recognize non-standard situations	• Using range of formal problem solving techniques • Identifying and clarifying the nature of the problem • Devising the best solution • Evaluating the solution • Implementation of a developed plan to rectify the problem

RANGE OF VARIABLES

VARIABLE	RANGE
1. Analytical techniques	May include: 1.1 Brainstorming 1.2 Intuitions/Logic 1.3 Cause and effect diagrams 1.4 Pareto analysis 1.5 SWOT analysis 1.6 Gant chart, Pert CPM and graphs 1.7 Scattergrams
2. Problem	May include: 2.1 Non – routine process and quality problems 2.2 Equipment selection, availability and failure 2.3 Teamwork and work allocation problem 2.4 Safety and emergency situations and incidents
3. Action plans	May include: 3.1 Priority requirements 3.2 Measurable objectives 3.3 Resource requirements 3.4 Timelines 3.5 Co-ordination and feedback requirements 3.6 Safety requirements 3.7 Risk assessment 3.8 Environmental requirements

EVIDENCE GUIDE

1. Critical Aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Identified the problem 1.2 Determined the fundamental causes of the problem 1.3 Determined the correct / preventive action 1.4 Provided recommendation to manager These aspects may be best assessed using a range of scenarios / case studies / what ifs as a stimulus with a walk through forming part of the response. These assessment activities should include a range of problems, including new, unusual and improbable situations that may have happened.
2. Resource Implications	Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios / case studies / what ifs will be required as well as bank of questions which will be used to probe the reason behind the observable action.
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Case studies on solving problems in the workplace 3.2 Observation The unit will be assessed in a holistic manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations, which will include disruptions to normal, smooth operation. Simulation may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual workplace and will include walk through of the relevant competency components.
4. Context of Assessment	4.1 Competency maybe assessed in actual workplace or at the designated TESDA Accredited Assessment Center.

UNIT OF COMPETENCY : USE MATHEMATICAL CONCEPTS AND TECHNIQUES

UNIT CODE : 500311113

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required in application of mathematical concepts and techniques.

ELEMENTS	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify mathematical tools and techniques to solve problem	1.1 Problem areas are identified based on given condition 1.2 ***Mathematical techniques*** are selected based on the given problem	• Fundamental operation (addition, subtraction, division, multiplication) • Units of measurement and its conversion • Fundamental of units • Standard formulas • Basic measuring tools/devices • Measurement system • Basic measuring tools/devices • Steps in solving problem	• Identifying and selecting different measuring tools • Applying different formulas in solving problems • Describing the units of measurement and fundamental units • Stating arithmetic calculations involving the following; addition, subtraction, division, multiplication • Stating arithmetic calculations involving the following: addition, subtraction, division, multiplication • Applying theory into actual application on lifeguard processes
2. Apply mathematical procedure/ solution	2.1 Mathematical techniques are applied based on the problem identified 2.2 Mathematical computations are performed to the level of	• Problem-based questions • Estimation • Use of	• Solving mathematical computations • Converting Metric to

ELEMENTS	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	accuracy required for the problem 2.3 Results of mathematical computation are determined and verified based on job requirements	mathematical tools and standard formulas • Mathematical techniques	English • Selecting and using appropriate and efficient techniques and strategies to solve problems
3. Analyze results	3.1 Result of application are reviewed based on expected and required specifications and outcome 3.2 ***Appropriate action*** is applied in case of error	• Techniques in analyzing the results • Process in reviewing the results • Precision and accuracy • Four fundamental operations • Steps in solving problem • Standard formulas • Conversion measurement	• Analyzing the result based on the specified requirements • Interpreting and communicating the results of the analysis

RANGE OF VARIABLES

VARIABLES	RANGE
1. Mathematical techniques	May include: 1.1 Four fundamental operations 1.2 Measurements 1.3 Use/Conversion of units of measurements 1.4 Use of standard formulas
2. Appropriate action	May include: 2.1 Review in the use of mathematical techniques (e.g. recalculation, re-modeling) 2.2 Report error to immediate superior for proper action

EVIDENCE GUIDE

1. Critical Aspects of Competency	**Assessment requires evidence that the candidate:** Identified, applied and reviewed the use of mathematical concepts and techniques to workplace problems
2. Resource Implications	**The following resources should be provided:** 2.1 Calculator 2.2 Basic measuring tools 2.3 Case Problems
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Authenticated portfolio 3.2 Written Test 3.3 Interview/Oral Questioning 3.4 Demonstration
4. Context for Assessment	4.1 Competency may be assessed in actual workplace or in at the designated TESDA Accredited Assessment Center.

UNIT OF COMPETENCY : USE RELEVANT TECHNOLOGIES
(Apply technology effectively)

UNIT CODE : 500311114

UNIT DESCRIPTOR : This unit of competency covers the knowledge, skills, and attitude required in selecting, sourcing and applying appropriate and affordable technologies in the workplace.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Study/select appropriate technology	1.1 Usage of different ***technologies*** is determined based on job requirements 1.2 Appropriate technology is selected as per work specification	• Awareness on technology and its function • Operating instructions • Communication techniques • Health and safety procedure • Company policy in relation to relevant technology	• Identifying relevant technology on job
2. Apply relevant technology	2.1 Relevant technology is effectively used in carrying out function 2.2 Applicable software and hardware are used as per task requirement 2.3 ***Management concepts*** are observed and practiced as per established industry practices	• Knowledge on operating instructions • Understanding software and hardware system • Communication techniques • Health and safety procedure • Company policy in relation to relevant technology • Different management concepts • Technology adaptability • Office technology • Industrial technology • System technology • Training technology • Different software/ hardware • 5S (Proper housekeeping)	• Applying relevant technology • Communicating skills • Using software applications skills • Conducting risk assessment

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Maintain/ enhance relevant technology	3.1 Maintenance of technology is applied in accordance with the ***industry standard operating procedure***, ***manufacturer's operating guidelines*** and ***occupational health and safety procedure*** to ensure its operative ability 3.2 Updating of technology is maintained through continuing education or training in accordance with job requirement 3.3 Technology failure/ defect is immediately reported to the concern/responsible person or section for ***appropriate action***	• Awareness on technology and its function • Repair and maintenance procedure • Health and safety procedure • Company policy in relation to relevant technology • Upgrading of technology • Organizational set-up/work flow	• Performing basic troubleshooting skills • Identifying failures or defects • Communication skills • Applying corrective and preventive maintenance

RANGE OF VARIABLES

VARIABLE	RANGE
1. Technology	May include: 1.1 Office technology 1.2 Industrial technology 1.3 System technology 1.4 Information technology 1.5 Training technology
2. Management concepts	May include: 2.1 Real Time Management 2.2 KAIZEN or continuous improvement 2.3 5 S 2.1 Total Quality Management 2.2 Other management/productivity tools
3. Industry standard operating procedure	3.1 Written guidelines relative to the usage of office technology/equipment 3.2 Verbal advise/instruction from the co-worker
4. Manufacturer's operating guidelines/ instructions	4.1 Written instruction/manuals of specific technology/ equipment 4.2 General instruction manual 4.3 Verbal advise from manufacturer relative to the operation of equipment
5. Occupational health and safety procedure	5.1 Relevant statutes on OSH 5.2 Company guidelines in using technology/equipment
6. Appropriate action	6.1 Implementing preventive maintenance schedule 6.2 Coordinating with manufacturer's technician

EVIDENCE GUIDE

1. Critical Aspects of Competency	**Assessment requires evidence that the candidate**: 1.1 Studied and selected appropriate technology consistent with work requirements 1.2 Applied relevant technology 1.3 Maintained and enhanced operative ability of relevant technology
2. Resource Implications	**The following resources should be provided:** 2.1 Relevant technology 2.2 Interview and demonstration questionnaires 2.3 Assessment packages
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Interview 3.2 Actual demonstration 3.3 Authenticated portfolio (related certificates of training/seminar)
4. Context of Assessment	4.1 Competency maybe assessed in actual workplace or at the designated TESDA Accredited Assessment Center.

COMMON COMPETENCIES

UNIT OF COMPETENCY : OBSERVE SAFE WORKING PRACTICES

UNIT CODE : CPP313201

UNIT DESCRIPTOR : This unit deals with the knowledge and skills required to Identify and follow workplace procedures for hazard identification and risk control; Contribute to arrangements for the management of occupational health and safety; and complete Occupational Safety and Health (OSH) records.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify and follow workplace procedures for hazard identification and risk control	1.1 Safety regulations and company established safety and hazard control practices and procedures are obtained, interpreted and applied to day-to-day work activities 1.2 Workplace procedures for Occupational Health and Safety and related work instructions for controlling risks are accurately followed 1.3 Workplace procedures for dealing with accidents, fire and emergencies are known and followed 1.4 ***Hazards*** in the workplace are identified and appropriate action is taken to report them and to minimize or eliminate risk to personnel.	• Knowledge on hazards and risks, aspect and impact, provision of Personal Protective Equipment and safety programs in chemical manufacturing. • The meaning of hazard symbols found on in the workplace. • For example, the meaning of Globally harmonized system GHS symbol in the labeling of chemicals. • DOLE-OSHS Rule 1070 Occupational health and environmental control, OSHS Rule 1080 PPE and devices, Rule 1090 Hazardous Materials	• Following safety rules and regulations • Applying established hazard control practices • Applying order of ways to control risks (known as the hierarchy of control)
2. Contribute to arrangements for the management of occupational health and safety	2.1 Occupational health and safety committee meetings are attended. 2.2 Safety and environmental issues are discussed to the Health and Safety committee meetings or other venues in accordance to the company procedures. 2.3 Safety audits or inspections are conducted in accordance with the company procedures. 2.4 Occupational Health and Safety Rules or Standards are understood and	• Understanding the occupational health and safety management policy of the company including the following 3.1 Programs/Plans 3.2 Procedures 3.3 Hazard identification 3.4 Risk assessment and control • Joint employer/ employee inspections • DOLE-OSHS Rule 1030 Training of	• Applying order of ways to control risks (known as the hierarchy of control) • Participating in health and safety program of the company, for example, consultation of workers that affect OHS matters

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	complied. 2.5 The role of workers in the health and safety committee is understood.	personnel in OSH. • DOLE-OSHS 1040 Health and Safety Committee • DOLE-OSHS 1070 Occupational health and environmental control • DOLE-D.O. 136 Guidelines for the implementation of GHS in Chemical Safety Program in the workplace	• Communication skills
3. Complete occupational health and safety records	3.1 Occupational health and safety records for self are completed in accordance with workplace requirements. 3.2 Legal requirements for the maintenance of records of occupational injury and diseases are followed.	• DOLE-OSHS Rule 1050 Notification and keeping of records of accidents and/or occupational illness, DOLE-OSHS Rule 1960 Occupational Health Services	• Applying proper record keeping in accordance with company requirements. • Following the order of ways to control risks (known as the hierarchy of control)

RANGE OF VARIABLES

VARIABLE	RANGE
1. Hazards	May include: 1.1. Physical hazards 1.2. Chemical hazards 1.3. Biological hazards 1.4. Psychological hazards 1.5. Ergonomics hazards
2. Personal Protective Equipment	May include: 2.1. Gloves 2.2. Spectacles 2.3. Apron/overall 2.4. Hard hat 2.5. Respirator 2.6. Safety shoes

EVIDENCE GUIDE

1. Critical Aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Identified and followed workplace procedures for hazard identification and risk control 1.2 Contributed to arrangements for the management of occupational health and safety 1.3 Completed occupational health and safety records
2.Resource Implications	**The following resources should be provided**: 2.1 Relevant technology 2.2 Interview and demonstration questionnaires 2.3 Assessment packages
3. Methods of Assessment	**Competency in this unit may be assessed through**: 3.1. Interview 3.2. Actual demonstration 3.3. Authenticated portfolio (related certificates of training/seminar)
4. Context of Assessment	4.1 Competency maybe assessed in actual workplace or at the designated TESDA Accredited Assessment Center.

UNIT OF COMPETENCY : COMPLY WITH EMERGENCY PROCEDURES

UNIT CODE : CPP313202

UNIT DESCRIPTOR : This unit deals with knowledge and skills required to take actions to prevent occurrence of emergency, follow established protocols to control or manage risks in the workplace and take appropriate actions to control the emergency.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Take actions to prevent occurrence of emergency.	1.1 Hazards and risks assessment is conducted to prior to application of new processes/ materials/ equipment in the workplace. 1.2 Emergency practice drills are performed where practicable. 1.3 Training is conducted for proper use of e***mergency equipment.*** 1.4 Unsafe acts and conditions are reported and corrected immediately. 1.5 Emergency communications and alarm signals and systems are understood and required action implemented in accordance with emergency procedures.	• Knowledge on chemical safety programs that promotes measures to prevent accident/incident from happening in the workplace. • DOLE-OSHS Rule 1960 Occupational Health Services • DOLE-OSHS Rule 1030 Training of personnel in OSH. • DOLE-OSHS Rule 1040 Health and Safety Committee	• Participating in company programs that prevents potential emergency from happening in the workplace. • Understanding the emergency management program of the company.
2. Follow established protocols to control or manage risks in the workplace	2.1 Critical areas or processes are identified. 2.2 The safety protocols are strictly followed in accordance with the procedure of the company. 2.3 Work permit system of the company are being complied. 2.4 Operational controls are in placed before starting work.	• Knowledge on the established emergency plans including its periodic review or after an emergency has taken place. • General principles of damage control including the importance of preparation, control and repair • Ways of controlling damage during emergency.	• Using appropriate personal safety equipment • Applying for relevant work permit • Implementing engineering controls where applicable
3. Take appropriate actions to control the emergency	3.1 Emergency situations are correctly recognized and	• Knowledge on different Emergency signals and	• Using emergency alarm signals

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	identified. 3.2 Information given on raising alarm is prompt, accurate, complete and clear. 3.3 Appropriate response is taken in accordance with established company procedures. 3.4 Contingency plans for emergency response are known and are implemented in real and simulated emergency situations 3.5 Evacuation routes and internal and external communications and alarm systems are correctly used in real and simulated emergency situations in accordance with regulatory requirements and established procedures.	systems in manufacturing plants. • Types of emergencies (some examples are earthquake, spill and fire) • Production contingency plans • Indications of various types of emergency situations and the action to be followed when various types of actual or potential emergency situations are identified. • DOLE-OSHS Rule 1940 Fire Protection and Control. • Escape routes and internal and external communications systems and alarms • Communication techniques used during emergencies	and systems • Applying appropriate action in various types of actual or potential emergency situations

RANGE OF VARIABLES

VARIABLE	RANGE
1. Emergency equipment	May include: 1.1 Firefighting equipment such as fire extinguishers, eye wash, fire hose. 1.2 Two-way radios 1.3 Emergency Alarm Systems 1.4 Evacuation layout plan 1.5 Flash light

EVIDENCE GUIDE

1. Critical Aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Implemented chemical safety programs that promotes measures to prevent accident and incident from happening in the plant. 1.2 Took actions to control or manage risks. 1.3 Followed established emergency procedures
2. Resource Implications	**The following resources should be provided**: 2.1 Emergency equipment 2.2 Documented emergency procedures
3. Methods of Assessment	**Competency in this unit may be assessed through**: 3.1 Interview 3.2 Actual demonstration 3.3 Authenticated portfolio (related certificates of training/seminar)
4. Context for Assessment	4.1 Competency maybe assessed in actual workplace or the designated TESDA Accredited Assessment Center.

UNIT OF COMPETENCY : USE HAND AND MEASURING TOOLS

UNIT CODE : ELC724201

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes in preparing, using and maintaining hand and measuring tools.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Prepare the required tools corresponding to tasks to be undertaken	1.1 Tasks to be undertaken are properly identified 1.2 Appropriate measuring tools are identified and selected according to the task requirements	• Principles of planning and preparation of measuring tools • Types and specifications of Measuring tools • DOLE-OSHS Rule 1422 Hand Tools	• Interpersonal Relationship • Planning and preparing skills • Practicing verbal and written communications • Following and giving instructions • Keen observation skills • Coordinating Skills • Documenting Skills
2. Use appropriate hand tools and test equipment	2.1 Appropriate hand tools are checked for proper operation and safety 2.2 Unsafe or faulty tools are identified and marked for repair according to standard company procedure 2.3 Tools are used according to tasks undertaken 2.4 All safety procedures in using tools are observed at all times and appropriate personal protective equipment (PPE) are used 2.5 Malfunctions, unplanned or unusual events are reported to the supervisor.	• Principles of planning and preparation of hand tools and test equipment • Hand tools types, uses and specifications • Test equipment types, uses and specifications • Personal protective equipment • DOLE-OSHS Rule 1422 Hand Tools	• Interpersonal Relationship • Planning and preparing skills • Practicing verbal and written communications • Following and giving instructions • Keen observation skills • Coordinating Skills • Documenting Skills
3. Maintain hand tools	3.1 Tools are not dropped to avoid damage 3.2 Routine ***maintenance*** of tools undertaken according to standard operational procedures, principles and techniques 3.3 Tools are stored safely in appropriate locations in accordance with manufacturer's specifications or standard operating procedures	• Principles of planning and preparation of hand tools • Hand tools types, uses, specifications and maintenance • Test equipment types, uses and specifications • DOLE-OSHS Rule 1422 Hand Tools	• Interpersonal Relationship • Planning and preparing skills • Practicing verbal and written communications • Following and giving instructions • Keen observation skills • Coordinating Skills • Documenting Skills

RANGE OF VARIABLES

VARIABLE	RANGE
1. Hand tools	Hand tools for adjusting, dismantling, assembling, finishing, cutting. Tools may include cutters, wrenches, spatula, sounding tape.
2. Personal Protective Equipment (PPE)	May include: 2.1 Gloves 2.2 Spectacles 2.3 Apron/overall 2.4 Hard hat 2.5 Respirator 2.6 Safety shoes
3. Maintenance	May include: 3.1 Cleaning 3.2 Lubricating 3.3 Tightening 3.4 Simple mechanical repairs 3.5 Adjustment using correct procedures

EVIDENCE GUIDE

1. Critical Aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Demonstrated safe working practices at all times ~~1.2~~ Prepared and selected the appropriate tools 1.3 Used the appropriate tools for the job 1.4 Performed all tasks to specification 1.5 Maintained and stored tools in appropriate location
2. Resource Implications	**The following resources should be provided**: 3.1 screw drivers 3.2 pliers 3.3 punches 3.4 wrenches, files
3. Methods of Assessment	**Competency in this unit must be assessed through**: 2.1 Observation 2.2 Oral questioning
4. Context of Assessment	4.1 Competency maybe in the workplace or at the designated TESDA Accredited Assessment Center.

UNIT OF COMPETENCY : PERFORM MENSURATION AND CALCULATION

UNIT CODE : ELC311201

UNIT DESCRIPTOR : This unit covers the knowledge, skills, attitudes and values needed in the selection and maintenance of measuring instruments and carrying out measurements and calculations.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Select measuring instruments	1.1. Object or component to be measured is identified 1.2. Correct specifications are obtained from relevant source 1.3. Measuring tools are selected in line with job requirements	• Principles in the selection of measuring instruments • DOLE-OSHS Rule 1422 Hand Tools	• Interpersonal Relationship • Practicing verbal and written communications • Keen observation skills • Coordinating Skills • Documenting Skills
2. Carry out measurements and calculation	2.1. Appropriate ***measuring instrument*** is selected to achieve required outcome 2.2. Accurate measurements are obtained for job 2.3. ***Calculation*** needed to complete work tasks are performed using the four basic process of addition (+), subtraction (-), multiplication (x), and division (/) 2.4. Calculation involving fractions, percentages and mixed numbers are used to complete workplace tasks. 2.5. Numerical computation is self-checked and corrected for accuracy 2.6. Instruments are read to the limit of accuracy of the tool.	• Principles in the selection of measuring instruments • Principles in calculation involving fractions, percentages and mixed numbers • DOLE-OSHS Rule 1422 Hand Tools • DOLE-OSHS Rule 1080 Protective equipment and devices	• Interpersonal Relationship • Practicing verbal and written communications • Keen observation skills • Coordinating Skills • Documenting Skills
3. Maintain measuring instruments	3.1. Measuring instruments are not dropped to avoid damage 3.2. Measuring instruments are cleaned before and after using.	• Principles of planning and preparation of hand tools	• Interpersonal Relationship • Practicing verbal and written communications • Keen observation

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	a. Proper storage of instruments undertaken according to manufacturer's specifications and standard operating procedures.	• Hand tools types, uses, specifications and maintenance • Test equipment types, uses and specifications • DOLE-OSHS Rule 1422 Hand Tools • DOLE-OSHS Rule 1080 Protective equipment and devices	skills • Coordinating Skills • Documenting Skills

RANGE OF VARIABLES

VARIABLE	RANGE
1. Measuring instruments	May include: 1.1. Straight edge 1.2. Torque gauge 1.3. Try square 1.4. Protractor 1.5. Combination gauge 1.6. Steel rule
2. Calculation	May include: 2.1. Volume 2.2. Area 2.3. Displacement 2.4. Inside diameter 2.5. Circumference 2.6. Length 2.7. Thickness 2.8. Outside diameter 2.9. Taper 2.10. Out of roundness 2.11. Weight

EVIDENCE GUIDE

1. Critical Aspects of Competency	**Assessment requires evidence that the candidate:** 1.1. Selected proper measuring instruments according to tasks 1.2. Carried out measurement and calculations 1.3. Maintained and stored instruments
2. Resource Implications	**The following resources should be provided**: 2.1. Place of assessment 2.2. Measuring instruments 2.3. Straight edge 2.4. Torque gauge 2.5. Try square 2.6. Protractor 2.7. Combination gauge 2.8. Steel rule
3. Methods of Assessment	**Competency in this unit must be assessed through**: 3.1. Observation 3.2. Oral questioning
4. Context of Assessment	4.1 Competency maybe assessed in actual workplace or at the designated TESDA Accredited Center.

UNIT TITLE : APPLY QUALITY STANDARDS

UNIT CODE : CPP313203

UNIT DESCRIPTOR : This unit covers the knowledge, skills, attitudes and values to assess quality of own work and engage in quality improvement.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Assess quality of own work	1.1. Required ***documentation*** within the company is identified. 1.2. Completed work is checked against workplace standards. 1.3. ***Errors*** are identified and isolated. 1.4. Analysis of errors including actions taken to eliminate it are documented and reported in accordance with the workplace' s standards operating procedures.	• Documents and Records Control • Management system Procedure • Customer requirements	• Complying with the documentation requirements • Identifying and analyzing errors • Maintaining records of actions taken to eliminate the errors.
2. Engage in quality improvement	2.1. Work is carried out in accordance with the company's ***management system***. 2.2. Performance are regularly monitored in accordance with the established ***company procedures***. 2.3. Continual improvement programs are in place in accordance with the established company procedures.	• Management system standards • Company procedures • Company programs • Customer requirements	• Complying with the management system requirements • Measuring and monitoring performance • Planning for improvement programs

RANGE OF VARIABLES

VARIABLE	RANGE
1. Documentation	Refer to the written policy, procedure, program, and the likes of the company which may include: 1.1 Organization work procedures 1.2 Manufacturer's instruction manual 1.3 Customer requirements 1.4 Forms 1.5 Checklists
2. Errors	Errors may include: 2.1 Deviation from the requirements of the Client 2.2 Deviation from the requirement of the organization 2.3 Deviation from applicable legal requirements
3. Management systems	Management system may include: 3.1 The company's documented management system 3.2 ISO 9001 or Quality Management system 3.3 OSHS 18001 or Occupational Health and Safety Management System 3.4 GLP or Good Laboratory Practice 3.5 RC or Responsible Care 3.6 GMP or Good Manufacturing Practice 3.7 HACCP or Hazard Analysis Critical Control Point 3.8 ISO 14001 or Environmental Management System 3.9 ISO 17025
4. Company procedures	May include: 4.1 verbal instructions 4.2 documented policies 4.3 work instructions 4.4 safety guidelines 4.5 employees handbook 4.6 formulas 4.7 production checklists 4.8 company prescribed forms

EVIDENCE GUIDE

1 Critical Aspects of Competency	**Assessment requires evidence that the candidate**: 1.1 Carried out work in accordance with the company's standard operating procedures 1.2 Performed task according to specifications 1.3 Reported defects detected in accordance with standard operating procedures 1.4 Carried out work in accordance with the process improvement procedures
2 Resource Implications	**The following resources should be provided**: Materials, software and hardware to be used in a real or simulated situation
3 Methods of assessment	**Competency in this unit may be assessed through**: 3.1 Observation and oral questioning 3.2 Third party report 3.3 Portfolio 3.4 Practical demonstration
4 Context of Assessment	4.1 Competency maybe assessed in actual workplace or at the designated TESDA Accredited Assessment Center.

CORE COMPETENCIES

UNIT OF COMPETENCY : DETERMINE PROCESS REQUIREMENTS

UNIT CODE : CPP313301

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes in determining raw materials, verifying material specifications and identifying equipment and utilities for chemical processing.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Determine raw materials	1.1 ***Raw materials*** are identified in accordance with production plan. 1.2 Coordination with personnel or other departments is completed where necessary. 1.3 Documentation is prepared in accordance with enterprise requirements.	• **Knowledge, Theory, Practices and Systems Operations** o Physical and Chemical Properties of raw materials o Proper handling and storage of raw materials. o Technical Data Sheets o Safety Data Sheets. o Regulated Chemicals • **Communications** o Organization requirements for written communication in electronic and other forms. o Effective verbal communication methods. o Communication tools. o Production Plan • **Mathematics and Mensuration** o Basic Mathematical Operations o Quantity measurements (volume, length, weight) • **Safety Practices** o Personnel	▪ Identifying materials required for production. ▪ Communication skills needed to coordinate and confirm material requirements with the right personnel or other work centers.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		Protective Equipment o Hazmat symbols/signs. o Spill Control o Fire Control • **Codes and Regulations** o DOLE-OSHS Rule 1090, 1150 and other relevant Occupational Health and Safety Standard, o DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace • **Materials, Tools and Equipment, Uses Specifications and Maintenance** o Calculator o Prescribed forms or log sheets • **Values** o Resourcefulness o Patience o Industriousness o Attention to details o Honesty and integrity o Diligence o Consideration o Hard Work and Perseverance *(Sipag at Tiyaga)* o Care (*Malasakit)*	
2. Verify material specifications	2.1 Raw materials are retrieved or received in accordance with established ***company procedures***. 2.2 ***Quality*** and ***quantity*** of materials needed are checked and qualified. 2.3 Non-conforming materials are identified. 2.4 ***Actions*** are taken to	• **Knowledge, Theory, Practices and Systems Operations** o Basic measurement procedures o Proper handling and storage of chemicals (bulk and non-bulk) o Proper use of	• Locating and checking materials. • Comparing actual and required material specifications • Correcting the variance. • Recording and reporting materials

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	address non-conformances. 2.5 Readiness of materials is reported in accordance with company requirements.	Personal Protective Equipment o Correct identification of chemicals (labels, lot numbers) o Technical Data Sheets o Safety Data Sheets o Unit of measurements • **Communications** o Procedures for reporting or dealing with non-standard or hazardous incidents. o Emergency protocols o Production Plan • **Mathematics and Mensuration** o Basic Mathematics o Unit conversions • **Safety Practices** o Proper use of Personal Protective Equipment o Hazard and Risk Management o Safety Practices in handling chemicals o Identification and correction of unsafe acts and unsafe condition o 5S • **Codes and Regulations** o DOLE-OSHS Rule 1090, 1150 and other relevant OSHS Standards, DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace	availability. • Confirming availability of required materials.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		• **Materials, Tools and Equipment** o Trolleys o Carts o Pallet Jack/Forklift o Emergency equipment and kit (fire extinguishers, first aid, spill controls) o Weighing scale o Volumetric gauge o Calculator o Computer o Sampling tools • **Values** o Resourcefulness o Patience o Industriousness o Attention to details o Honesty and integrity o Diligence o Consideration o Hard Work and Perseverance *(Sipag at Tiyaga)* o Care *(Malasakit)*	
3. Identify equipment and utilities	3.1 Equipment are identified in accordance with production plan. 3.2 **Utilities** are identified in accordance with production. 3.3 Equipment and utilities are verified to be in good operating condition.	• **Knowledge, Theory, Practices and Systems Operations** o Basic measurement procedures o Proper handling and storage of chemicals (bulk and non-bulk) o Proper use of Personal Protective Equipment o Correct identification of chemicals (labels, lot numbers) o Technical Data Sheets o Safety Data Sheets o Unit of measurements	• Locating and checking equipment specifications. • Comparing actual and required utilities condition. • Correcting the variance. • Recording and confirming reporting equipment and utilities availability.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		• **Communications** o Procedures for reporting or dealing with non-standard or hazardous incidents. o Emergency protocols o Production Plan • **Mathematics and Mensuration** o Basic Mathematics o Unit conversions • **Safety Practices** o Proper use of Personal Protective Equipment o Hazard and Risk Management o Safety Practices in handling chemicals o Identification and correction of unsafe acts and unsafe condition o 5S • **Codes and Regulations** o DOLE-OSHS Rule 1150, 1160, 1170, 1200, 1220, 1230, 1422 other relevant OSHS Standards o DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace • **Materials, Tools and Equipment** o Trolleys o Carts o Pallet Jack/Forklift o Emergency equipment and kit (fire extinguishers, first aid, spill controls) o Weighing scale	

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		○ Volumetric gauge ○ Calculator ○ Computer ○ Sampling tools • **Values** ○ Resourcefulness ○ Patience ○ Industriousness ○ Attention to details ○ Honesty and integrity ○ Diligence ○ Consideration ○ Hard Work and Perseverance *(Sipag at Tiyaga*) ○ Care *(Malasakit)*	

RANGE OF VARIABLES

VARIABLE	RANGE
1.Raw materials	1.1 Raw materials may include: 1.1.1 Water 1.1.2 Catalysts 1.2 1.2.1 pH modifiers 1.2.2 Peroxides 1.2.3 Monomers 1.2.4 Acids 1.2.5 Bases 1.2.6 Oxidizing agent 1.2.7 Inflammables 1.2.8 Reducing agents 1.2.9 Consumables
2.Specification requirements	May include: 2.1 Chemical Properties 2.2 Quantity by weight or by volume 2.3 Hazard Classification 2.4 Chemical Compatibility 2.5 Storage condition 2.6 Packaging materials
3.Company procedures	May include: 3.1 verbal instructions 3.2 documented policies 3.2.1 work instructions 3.2.2 safety guidelines 3.2.3 employees handbook 3.3 formulas 3.4 production checklists 3.5 company prescribed forms
4.Quality	May include: 4.1 Color 4.2 Appearance/State 4.3 Packaging/Container 4.4 Lot identification
5.Quantity	5.1 Weight 5.2 Volume 5.3 Packing units
6.Actions	May include: 6.1.1 Corrections due to quality 6.1.2 Corrections due to quantity 6.1.3 Emergency response
7.Utilities	7.1 Steam 7.2 Oil Heaters 7.3 Cooling system i.e. water, Nitrogen, ammonia, etc. 7.4 Compressed air 7.5 Electricity

EVIDENCE GUIDE

1. Critical Aspects of Competency	**Assessment requires evidence that the candidate**: 1.1 Properly handled materials, tools and equipment. 1.2 Identified quantity and quality of materials needed for production. 1.3 Checked actual and required specifications of materials. 1.4 Took actions to correct non-conforming materials. 1.5 Practiced emergency protocols. 1.6 Documented and reported the tasks undertaken.
2. Resource Implications	**The following resources should be provided:** 2.1 Materials 2.2 Documented procedures 2.3 Formulas 2.4 Checklists 2.5 Company prescribed forms 2.6 Calculator 2.7 Computer 2.8 Weighing scale 2.9 Volumetric gauge 2.10 Sampling tools 2.11 Trolleys/pallet jacks
3. Methods of Assessment	**Competency in this unit may be assessed through**: 3.1 Demonstration with Questioning 3.2 Written Examination
4. Context of Assessment	4.1 Competency maybe assessed in actual workplace or at the designated TESDA Accredited Assessment Center.

UNIT OF COMPETENCY : EVALUATE PROCESS DATA

UNIT CODE : CPP 313302

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes in collecting and verifying process data and doing process adjustments.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Collect process data	1.1 **Process parameters** and **standard settings** are identified in accordance with product formulations. 1.2 Process parameters are generated and read/taken and recorded in accordance with established ***company procedures***. 1.3 Safety procedures are practiced.	• **Knowledge, Theory, Practices and Systems Operations** o Data collection methods o Production processes o Location of equipment o Basic process instrumentation o Maintenance and calibration records • **Communication** o Work schedule o Area communications protocol o Incidents reporting o Monitoring forms/checklists o Verbal and written communications • **Mathematics and Mensuration** o Basic Mathematics o Conversion of units • **Safety Practices** o Personal Safety Equipment o Work hazards • **Codes and Regulations** o OSHS Standards o DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in	• Identifying process parameters and standard settings. • Generating and reading process parameters.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		the Workplace • **Materials, Tools and Equipment, Uses Specifications and Maintenance** o Prescribed forms or log sheets o Control Panel o Pressure Gauges o Temperature Gauges o Flowmeter o Weighing Scale • **Values** o Resourcefulness o Patience o Industriousness o Attention to details o Honesty and integrity o Diligence o Consideration o Hard Work and Perseverance (Sipag at Tiyaga) o Care (Malasakit)	
2. Verify process data	2.1 Actual process parameters are compared against the standard parameters in accordance with established procedures. 2.2 Interpreted results are recorded and reported to immediate supervisor in accordance with company requirements.	• **Knowledge, Theory, Practices and Systems Operations** o Specific plant process operations o Systems operating parameters o Basic science of processes o Process drawings (P&ID, PFD) o SPC tools o Product specifications • **Communications** o Organization requirements for written communication in electronic and other forms. o Effective verbal	• Comparing actual against standard parameters. • Reporting of evaluated process parameters

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		communication methods. o Communication tools o Monitoring forms/checklists • **Mathematics and Mensuration** o Basic Mathematics o Conversion of units • **Safety Practices** o Safety Data Sheets • **Codes and Regulations** o OSHS Standards o DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace • **Materials, Tools and Equipment** o Calculator o Computer • **Values** o Resourcefulness o Patience o Industriousness o Attention to details o Honesty and integrity o Diligence o Consideration o Hard Work and Perseverance (Sipag at Tiyaga) o Care (Malasakit)	
3. Make adjustments	3.1 Process variations are identified in accordance with established ***company procedures***. 3.2 ***Troubleshooting*** is taken in accordance with established procedures. 3.3 Safety procedures are practiced.	• **Knowledge, Theory, Practices and Systems** o Basic control panel operations o Basic process controls o Basic instrumentation	• Identifying process variations. • Correcting the variance.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		○ Identification and correction of unsafe acts and conditions ○ Impact of external factors to the process, eg. variations in weather, feed etc. • **Communication** ○ Work schedule ○ Area communications protocol ○ Incidents reporting ○ Monitoring forms/checklists ○ Verbal and written communications • **Mathematics and Mensuration** ○ Basic Mathematics ○ Conversion of units • **Safety Practices** ○ Personal Safety Equipment ○ Work hazards ○ Risk assessment • **Codes and Regulations** ○ OSHS Standards ○ DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace • **Materials, Tools and Equipment, Uses Specifications and Maintenance** ○ Prescribed forms or log sheets ○ Control Panel ○ Pressure Gauges ○ Temperature Gauges ○ Flowmeter	

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		○ Weighing Scale ○ Valves ○ Pumps ○ Funnel ○ Mixers • **Values** ○ Resourcefulness ○ Patience ○ Industriousness ○ Attention to details ○ Honesty and integrity ○ Diligence ○ Consideration ○ Hard Work and Perseverance (Sipag at Tiyaga) ○ Care (Malasakit)	
4. Recommend process improvement	4.1 Process Records are reviewed 4.2 Process improvement is proposed.	• **Knowledge, Theory, Practices and Systems Operations** ○ Specific plant process operations ○ Systems operating parameters ○ Basic science of processes ○ Process drawings (P&ID, PFD) ○ SPC tools ○ Product specifications • **Communications** ○ Organization requirements for written communication in electronic and other forms. ○ Effective verbal communication methods. ○ Communication tools ○ Monitoring forms/ checklists • **Mathematics and Mensuration**	• Reviewing the trends in process control conditions. • Recommending process control modifications to improve production process and/or quality of products.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		○ Basic Mathematics ○ Conversion of units • **Safety Practices** ○ Safety Data Sheets • **Codes and Regulations** ○ DOLE-OSHS Standards ○ DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace • **Materials, Tools and Equipment** ○ Calculator ○ Computer • **Values** ○ Resourcefulness ○ Patience ○ Industriousness ○ Attention to details ○ Honesty and integrity ○ Diligence ○ Consideration ○ Hard Work and Perseverance (Sipag at Tiyaga) ○ Care (Malasakit)	

RANGE OF VARIABLES

VARIABLE	RANGE
1. Process parameters	May include: 1.1 pH 1.2 Temperature 1.3 Viscosity 1.4 % Solids 1.5 Color 1.6 Flow 1.7 Pressure 1.8 Oxidation-reduction potential 1.9 Cycle time 1.10 Production rate
2. Standard settings	May include: 2.1 Minimum 2.2 Maximum 2.3 Optimum
3. Company procedures	May include: 3.1 verbal instructions 3.2 documented policies 3.2.1 work instructions 3.2.2 safety guidelines 3.2.3 employees handbook 3.3 formulas 3.4 production checklists 3.5 company prescribed forms
4. Actions	May include: 4.1 Record condition of affected in-process product with non-conforming process parameters 4.2 Cautiously adjust settings of non-conforming parameters 4.3 Control and report hazards 4.4 Record results of adjustments

EVIDENCE GUIDE

1. Critical Aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Identified the process parameters and standard settings. 1.2 Generated process parameters and compared against standard settings. 1.3 Identified and corrected process variations. 1.4 Practiced emergency protocols. 1.5 Documented and reported the tasks undertaken.
2. Resource Implications	**The following resources should be provided:** 2.1 Equipment 2.2 Materials 2.3 Documented procedures 2.4 Formulas 2.5 Checklists 2.6 Company prescribed forms
3. Methods of Assessment	**Competency in this unit may be assessed through**: 4.1. Demonstration with interview 4.2. Written Examination
4. Context of Assessment	4.1 Competency maybe assessed in actual workplace or at the designated TESDA Accredited Assessment Center.

UNIT OF COMPETENCY : OPERATE PROCESS EQUIPMENT

UNIT CODE : CPP313303

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes in conducting ready-for-start-up and starting up equipment and practicing occupational health, safety and environmental protocols.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Conduct ready-for-start-up activities	1.1 ***Process Equipment*** is identified in accordance with job requirements and the manufacturer's specifications. 1.2 Process Equipment are inspected in accordance with the established procedures. 1.3 Where necessary, needed ***corrections*** are made to ensure readiness of process equipment in accordance with established procedures 1.4 Documentation in relation to ready-for-start-up activities is forwarded to ***appropriate personnel*** in accordance with company requirements.	• **Knowledge, Theory, Practices and Systems Operations** o Standard operating procedures o workflow sequences o correct selection and use of equipment, materials, processes and procedures o factors which may affect production output • **Communication** o Area communications protocol o Checklists o Communication tools • **Mathematics and Mensuration** o Basic calculations o Conversion of units • **Safety** o Personal Protective equipment o Safety protocols/ o practices o Risk assessment	• Reading and interpreting operating instructions and documents • Using verbal and written communications • Following instructions • identifying factors which may affect product quality or production output • completing workplace forms/log sheets/ checklists

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		○ Work permits • **Codes and Regulations** ○ Effluents and Emissions standards ○ Industrial safety and health standards ○ DOLE-OSHS Rule 1150, 1160, 1170, 1200, 1220, 1230, 1422 other relevant OSHS Standards ○ DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace • **Materials, Tools & Equipment: Uses, Specifications and Maintenance** ○ Wrenches ○ Valve key ○ Emergency equipment • **Values/Attitudes** ○ Resourcefulness ○ Patience ○ Industriousness ○ Attention to details ○ Diligence ○ Honesty and integrity ○ Consideration ○ Hard Work and Perseverance (Sipag at Tiyaga) ○ Care (Malasakit)	

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Start-up equipment	2.1 All Equipment are started up in accordance with manufacturer's specifications and operations manual. 2.2 Required ***control rate*** is built and maintained in accordance with established requirements.	• **Knowledge, Theory, Practices and Systems Operations** o Standard operating procedures o Work instruction o operation of equipment and components • **Communication** o manufacturer's specifications and operations manual o Area communications protocol o Communication tools • **Mathematics and Mensuration** o Basic calculations o Conversion of Units • **Safety** o Personal Protective equipment o Safety protocols/practices o Risk assessment • **Codes and Regulations** o DAO 35, DAO 81 and other relevant Effluents and Emissions Regulations o Industrial safety and health standards	• monitoring performance data against specifications and control parameters • Communicating with other personnel

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		○ DOLE-OSHS Rule 1150, 1160, 1170, 1200, 1220, 1230, 1422 other relevant OSHS Standards ○ DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace • **Materials, Tools & Equipment: Uses, Specifications and Maintenance** ○ Wrenches ○ Valve key ○ Emergency equipment ○ Pumps ○ Process instruments • **Values/Attitudes** ○ Resourcefulness ○ Patience ○ Industriousness ○ Attention to details ○ Diligence ○ Honesty and integrity ○ Consideration ○ Hard Work and Perseverance (Sipag at Tiyaga) ○ Care (Malasakit)	
3. Occupational health and safety protocols are practiced	3.1 Engineering controls are installed and in good working condition 3.2 Administrative controls are documented and implemented. 3.3 Appropriate ***Personal Protective Equipment*** is	• **Knowledge, Theory, Practices and Systems Operations** ○ Equipment controls and parameters ○ Basic process	• Strictly complying the Occupational Rules and Regulations to ensure safety of workers. • Identifying the appropriate

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	used.	control o Basic principles in mechatronics • **Communication** o Work schedule o Area communications protocol o Incidents reporting o Monitoring forms/checklists o Verbal and written communications • **Mathematics and Mensuration** o Basic Mathematics o Conversion of units o Safety Practices o Personal Safety Equipment o Work hazards o Risk assessment • **Codes and Regulations** o DAO 35, DAO 81 and other relevant Effluents and Emissions Regulations o Industrial safety and health standards o DOLE-OSHS Rules 1020, 1030, 1040, 1050, 1060, 1070, 1080, 1090, 1120, 1150, 1160, 1170, 1200, 1210, 1220, 1230, 1422, 1910, 1940,	Personal Protective Equipment (PPE) needed in handling different types of chemicals

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		1960 and other relevant OSHS Standards ○ DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace • **Materials, Tools and Equipment, Uses Specifications and Maintenance** ○ Prescribed forms or log sheets ○ Control Panel ○ Pressure Gauges ○ Temperature Gauges ○ Flowmeter ○ Weighing Scale ○ Valves ○ Pumps ○ Funnel ○ Mixers • **Values/Attitudes** ○ Resourcefulness ○ Patience ○ Industriousness ○ Attention to details ○ Diligence ○ Honesty and integrity ○ Consideration ○ Hard Work and Perseverance (Sipag at Tiyaga) ○ Care (Malasakit)	
4. Environmental protocols are implemented	4.1 Wastes are managed accordingly 4.2 Emissions and discharges are within regulatory limit.	• **Knowledge, Theory, Practices and Systems Operations** ○ Equipment controls and	• Identifying different types of wastes • Handling, labelling, storage and treatment of

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		parameters ○ Basic process control ○ Basic principles in mechatronics • **Communication** ○ Work schedule ○ Area communications protocol ○ Incidents reporting ○ Monitoring forms/checklists ○ Verbal and written communications • **Mathematics and Mensuration** ○ Basic Mathematics ○ Conversion of units • **Safety Practices** ○ Personal Safety Equipment ○ Work hazards ○ Risk assessment • **Codes and Regulations** ○ DAO 35, DAO 81, RA 9003, RA 6969 and other relevant Effluents and Emissions Regulations ○ Industrial safety and health standards ○ DOLE-OSHS Rules 1020, 1030, 1040, 1050, 1060, 1070, 1080, 1090, 1120,	chemical wastes • Identifying the legal requirements that corresponds to emissions and discharges.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		1150, 1160, 1170, 1200, 1210, 1220, 1230, 1422, 1910, 1940, 1960 and other relevant OSHS Standards ○ DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace • **Materials, Tools and Equipment, Uses Specifications and Maintenance** ○ Prescribed forms or log sheets ○ Control Panel ○ Pressure Gauges ○ Temperature Gauges ○ Flowmeter ○ Weighing Scale ○ Valves ○ Pumps ○ Funnel ○ Mixers • **Values/Attitudes** ○ Resourcefulness ○ Patience ○ Industriousness ○ Attention to details ○ Diligence ○ Honesty and integrity ○ Consideration ○ Hard Work and Perseverance (Sipag at Tiyaga) ○ Care (Malasakit)	

RANGE OF VARIABLES

VARIABLE	RANGE
1.Process equipment	May include: 1.1 Reactors 1.2 Condensers 1.3 Mixers 1.4 Pumps 1.5 Storage units for materials 1.6 Storage units for finished products 1.7 Deaeration units 1.8 Scrubber unit 1.9 Heat exchange system 1.10 Boilers 1.11 Control Panel/Control Room 1.12 Funnel 1.13 Filling Machine 1.14 Evaporator 1.15 Emission controls 1.16 Distillation equipment 1.17 Conveyor
2 Personal Protective Equipment	May include: 2.1 Spectacles/Goggles 2.2 Mask 2.3 Gloves 2.4 Apron/Smock 2.5 Safety Shoes 2.6 Hard hat 2.7 Long sleeves/Jacket 2.8 Self-Contained Breathing Apparatus
3 Corrections	May include: 3.1 Repair or replace defective parts 3.2 re-calibrate/validate process instruments 3.3 re-start equipment
4 Appropriate personnel	May include: 4.1 Production/Process Engineer 4.2 Foreman/Leadman 4.3 Supervisor 4.4 Safety Officer 4.5 Maintenance Engineer 4.6 Quality Control Personnel

VARIABLE	RANGE
5 Control rate	May include: 5.1 Temperature 5.2 Pressure 5.3 Agitation Rate 5.4 Feed/Flow rate 5.5 Cycle time 5.6 Production Rate

EVIDENCE GUIDE

1 Critical Aspects of Competency	**Assessment requires evidence that the candidate**: 1.1 Identified process equipment needed for production. 1.2 Used appropriate PPE. 1.3 Performed ocular inspection of process equipment. 1.4 Identified and corrected process equipment problems. 1.5 Started up process equipment. 1.6 Built and maintained required process Control/Rate. 1.7 Documented and reported the tasks undertaken.
2 Resource Implications	**The following resources should be provided:** 2.1 Process Equipment 2.2 Materials 2.3 Personal Protective equipment 2.4 Emergency Equipment
3 Methods of Assessment	**Competency in this unit may be assessed through**: 3.1 Interview/Questioning 3.2 Demonstration/Observation 3.3 Written Examination
4 Context of Assessment	4.1 Competency maybe assessed in actual workplace or at the designated TESDA Accredited Assessment Center.

UNIT OF COMPETENCY : MONITOR PROCESS EQUIPMENT

UNIT CODE : CPP313304

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes in verifying operating parameters, adjusting equipment settings and updating operating records of process equipment

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Verify operating parameters.	1.1 Routine checks of process equipment ***conditions*** during operation are performed and completed in accordance with the established procedures. 1.2 ***Indications of potential and actual equipment problems*** are recognized and immediately reported in accordance with the established procedures. 1.3 Documentation is prepared and forwarded immediately to ***appropriate personnel*** and/or authority in accordance with company requirements. 1.4 Safety protocols are practiced.	• **Knowledge, Theory, Practices and Systems Operations** o Standard operating procedures o Primary Operating Parameters o Workflow sequences o Correct selection and use of equipment, materials, processes and procedures o Factors which may affect production output • **Communication** o Manufacturer's specifications and operations manual o Area communications protocol o Communication tools • **Mathematics and Mensuration** o Basic calculation o Conversion of units • **Safety Practices** o Safety Data Sheets • **Codes and Regulations** o DAO 35, DAO 81 and other relevant Effluents and Emissions	• Identifying potential and actual problems • Examining equipment, products and processes for possible causes of variations • Preparing and routing of necessary documents to appropriate personnel

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		Regulations o Industrial safety and health standards o DOLE-OSHS Rule 1150, 1160, 1170, 1200, 1220, 1230, 1422 other relevant OSHS Standards o DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace • **Materials, Tools and Equipment** o Calculator o Computer • **Values/Attitudes** o Resourcefulness o Patience o Industriousness o Attention to details o Diligence o Honesty and integrity o Consideration o Hard Work and Perseverance *(Sipag at Tiyaga)* o Care *(Malasakit)*	
2. Adjust equipment setting.	2.1 Manual/electronic ***adjustments and actions*** are done to address indications of potential and actual equipment problems in accordance with the established procedures. 2.2 Manual/electronic adjustments done are recorded and reported to immediate supervisor in accordance with the established procedures. 2.3 Safety protocols are practiced.	• **Knowledge, Theory, Practices and Systems Operations** o Equipment controls and parameters o Basic process control o Basic principles in mechatronics • **Communication** o Work schedule o Area communications protocol o Incidents reporting o Monitoring forms/checklists	• Monitoring performance data against standard operating parameters • Identifying and correcting equipment problem. • Recording and reporting adjustments

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		○ Verbal and written communications • **Mathematics and Mensuration** ○ Basic Mathematics ○ Conversion of units • **Safety Practices** ○ Personal Safety Equipment ○ Work hazards ○ Risk assessment • **Codes and Regulations** ○ DAO 35, DAO 81 and other relevant Effluents and Emissions Regulations ○ Industrial safety and health standards ○ DOLE-OSHS Rule 1150, 1160, 1170, 1200, 1220, 1230, 1422 other relevant OSHS Standards ○ DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace • **Materials, Tools and Equipment, Uses Specifications and Maintenance** ○ Prescribed forms or log sheets ○ Control Panel ○ Pressure Gauges ○ Temperature Gauges ○ Flowmeter ○ Weighing Scale ○ Valves ○ Pumps ○ Funnel ○ Mixers • **Values/Attitudes**	

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		○ Resourcefulness ○ Patience ○ Industriousness ○ Attention to details ○ Diligence ○ Honesty and integrity ○ Consideration ○ Hard Work and Perseverance (Sipag at Tiyaga) ○ Care (Malasakit)	
3. Update data sheets.	3.1 Required ***production data sheet*** is prepared in accordance with established procedures. 3.2 Production Data sheet is filled up in accordance with established procedures. 3.3 Data sheet is ***regularly*** accomplished in a timely, truthful and accurate manner.	• **Knowledge, Theory, Practices and Systems Operations** ○ Use of data sheets/Log sheets/ Record sheets ○ data collection methods • **Communication** ○ Written ○ Oral ○ Electronic • **Mathematics and Mensuration** ○ Basic calculation ○ Conversion of units • **Safety** ○ Safety Records • **Codes and Regulations** ○ DOLE-OSHS Rule 1070 and other OSHS Standards • **Materials, Tools & Equipment: Uses, Specifications and Maintenance** ○ Computer ○ Checklists/ ○ forms ○ Log sheets • **Values/Attitudes** ○ Resourcefulness	• Preparing data sheets/ log sheets • Collecting data • Updating and maintaining records

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		○ Patience ○ Industriousness ○ Attention to details ○ Hard Work and Perseverance (Sipag at Tiyaga) ○ Honesty and integrity ○ Care (Malasakit)	

RANGE OF VARIABLES

VARIABLE	RANGE
1. Conditions	May include: 1.1 Operating Temperature 1.2 Operating Pressure 1.3 Agitation Rate 1.4 Feed Rate 1.5 Flow rate 1.6 Cycle time 1.7 Amperage 1.8 Speed 1.9 Production rate
2. Signs of potential and actual equipment problems	May include: 2.1 Unusual noise 2.2 Visual defects 2.3 Erratic vibrations 2.4 Temperature, pressure, and flow rate deviations
3. Appropriate personnel	May include: 3.1 Process Engineer 3.2 Foreman/Leadman 3.3 Supervisor 3.4 Safety Officer 3.5 Maintenance Engineer 3.6 Quality Control Personnel
4. Adjustments and actions	May include: 4.1Repair or replace defective parts 4.2Re-calibrate/validate instruments 4.3Re-start equipment
5. Regularly	May include: 5.1 scheduled 5.2 random

EVIDENCE GUIDE

1. Critical Aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Identified and corrected process equipment problems. 1.2 Documented and reported the tasks undertaken.
2. Resource Implications	**The following resources should be provided**: 2.1 Equipment 2.2 Materials 2.3 Personal Protective equipment
3. Methods of Assessment	**Competency in this unit may be assessed through**: 3.1 Interview/Questioning 3.2 Demonstration 3.3 Written Examination
4. Context of Assessment	4.1 Competency maybe assessed in actual workplace or at the designated TESDA Accredited Assessment Center.

UNIT OF COMPETENCY : QUALIFY IN-PROCESS AND FINISHED PRODUCT SAMPLES

UNIT CODE : CPP313305

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes collecting samples in chemical processing plant, verifying its conformance and documenting the findings.

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Collect samples	1.1 ***Sampling requirements*** are secured in accordance with sampling plan. 1.2 Safety ***Personal Protective Equipment*** is worn in accordance with established procedures. 1.3 Samples are taken in accordance with established procedures. 1.4 Samples are labeled properly and turned over to appropriate personnel in accordance with established procedures.	• **Knowledge, Theory, Practices and Systems Operations** o concepts of metrology o key terminologies and concepts, such as sample, contamination, traceability o international system of units (SI) o basic principles of taking samples o hazards, risks and safety o procedures associated with sampling o sampling procedure o Location of sampling points o characteristics of samples o contaminants in the sample • **Communication** o Written o Oral • **Mathematics and Mensuration** o Basic calculation o Conversion of units	• Using appropriate personal protective equipment. • Collecting samples. • Identifying samples relative to the source • Maintaining integrity and security of samples • Labeling of samples • Handling and transporting samples

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		• **Safety** o Personal Protective equipment o Risk assessment o Safety data sheet • **Codes and Regulations** o DOLE-OSHS Rule 1080, 1090, 1422 and other relevant OSHS Standards o DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace • **Materials, Tools & Equipment, Uses, Specifications and Maintenance** o Sampling tools o Sampling plan • **Values/ Attitudes** o Resourcefulness o Patience o Industriousness o Attention to details o Diligence o Honesty and integrity o Consideration o Hard Work and Perseverance (Sipag at Tiyaga) o Care (Malasakit)	
2. Verify conformance	2.1 Results of quality control tests are retrieved or received in accordance with established procedures. 2.2 Actual results are compared against ***standard product and process specifications***	• **Knowledge, Theory, Practices and Systems Operations** o Product specifications o quality	• Interpreting and comparing results against specifications • Taking appropriate actions.

ELEMENT	PERFORMANCE CRITERIA *Italicized* terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	in accordance with established procedures. 2.3 Non-conforming samples are identified in accordance with ***established procedures***. 2.3 ***Actions*** are taken to address non-conformances in accordance with ***established procedures***.	management systems • **Communication** o Written o Oral o Log sheets/ Monitoring forms • **Mathematics and Mensuration** o Basic calculation o Conversion of units • **Safety** o Personal Protective equipment • **Codes and Regulations** o A process may require many unit operations to obtain the desired product from the starting materials, or feedstocks. DOLE-OSHS Rule 1070 and other relevant OSHS Standards o DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace • **Values/ Attitudes** o Resourcefulness o Patience o Industriousness o Attention to details o Honesty and integrity o Diligence o Consideration o Hard Work and	

ELEMENT	PERFORMANCE CRITERIA *Italicized* terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		Perseverance (Sipag at Tiyaga) ○ Care (Malasakit)	
3. Document findings	3.1 Required data sheet is prepared in accordance with established procedures. Reports are prepared and maintained in accordance with established procedures.	• **Knowledge, Theory, Practices and Systems Operations** ○ Product specifications ○ Sampling planning • **Communication** ○ Written ○ Oral • **Mathematics and Mensuration** ○ Basic calculation ○ Conversion of units • **Safety** ○ Personal Protective equipment • **Codes and Regulations** ○ DOLE-OSHS 1070 and other relevant OSHS Standards • **Values/ Attitudes** ○ Resourcefulness ○ Patience ○ Industriousness ○ Attention to details ○ Honesty and integrity ○ Diligence ○ Consideration ○ Hard Work and Perseverance (Sipag at Tiyaga) ○ Care (Malasakit)	• Completing sampling records. • Taking appropriate document and record control.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Sampling requirements	May include: 1.1 Quantity 1.2 Sampling sequence/plan 1.3 Sampling tools 1.4 Personal Protective Equipment 1.5 Equipment 1.6 Location 1.7 Labels
2. Personal Protective Equipment	May include: 2.1 Spectacles/Goggles 2.2 Mask 2.3 Gloves 2.4 Apron 2.5 Safety Shoes 2.6 Hard hat 2.7 Long sleeves/Jacket
3. Standard process specifications	May include: 3.1 Viscosity 3.2 pH/acid value 3.3 % Non-volatile Solids 3.4 Density 3.5 Color 3.6 Film Properties 3.7 Melt Flow/Melt Index/Flow Index 3.8 Pellets per gram 3.9 Product specifications

EVIDENCE GUIDE

1. Critical Aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Took the right sample size from the right equipment. 1.2 Retrieved and record results of QC. 1.3 Compared results against standard specifications. 1.4 Documented and reported the task taken.
2. Resource Implications	**The following resources should be provided**: 2.1 Equipment 2.2 Materials 2.3 Personal Protective equipment
3. Methods of Assessment	**Competency in this unit may be assessed through**: 3.1 Interview/Questioning 3.2 Demonstration 3.3 Written Examination
4. Context of Assessment	4.1 Competency maybe assessed in actual workplace or at the designated TESDA Accredited Assessment Center.

UNIT OF COMPETENCY : PERFORM SHUTDOWN ACTIVITIES

UNIT CODE : CPP313306

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes in preparing to shut down and shutting down process equipment

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Prepare for shutdown	1.1 R***equirements*** are complied with in accordance with established procedures. 1.2 Proper coordination is done with ***appropriate personnel*** in accordance with the established procedures. 1.3 Final inspection is conducted to ensure proper sequence and safety of shutdown in accordance with the established procedures.	• **Knowledge, Theory, Practices and Systems Operations** o Shutdown procedures o operational function of the machine/ equipment o procedures for isolating the machine/ equipment o safety precautions for shutting down o safe work practices and procedures • **Communication** o Written o Oral • **Mathematics and Mensuration** o Basic calculation o Conversion of units • **Safety** o Personal Protective equipment o the safety/security lock-off devices and signage to be installed o use and application of personal	• Reading, interpreting and following work instructions and other applicable reference documents • entering information onto standard workplace forms

ELEMENT	PERFORMANCE CRITERIA *Italicized* terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		protective equipment • **Codes and Regulations** o DAO 35, DAO 81 and other relevant Effluents and Emissions Regulations o Industrial safety and health standards o DOLE-OSHS Rule 1150, 1160, 1170, 1200, 1220, 1230, 1422 other relevant OSHS Standards o DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace • **Materials, Tools & Equipment: Uses, Specifications and Maintenance** o Wrenches o Valve Key • **Values/ Attitudes** o Resourcefulness o Patience o Industriousness o Attention to details o Diligence o Honesty and integrity o Consideration o Hardwork and Perseverance (Sipag at Tiyaga) o Care (Malasakit)	
2. Shutdown process equipment	2.1 Equipment is properly shut down in accordance with the established procedures	• **Knowledge, Theory, Practices and Systems Operations**	• shutting down machine/ equipment

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	for scheduled and emergency shutdowns. 2.2 Shutdown record is prepared and forwarded immediately to appropriate personnel in accordance with company requirements. 2.3 Safety protocol is practiced.	○ Standard operating procedures ○ operational function of the machine/ equipment ○ Lock-out/ Tag-out • **Communication** ○ Written ○ Oral • **Mathematics and Mensuration** ○ Basic calculation ○ Conversion of units • **Safety** ○ Personal Protective equipment • **Codes and Regulations** ○ DAO 35, DAO 81 and other relevant Effluents and Emissions Regulations ○ Industrial safety and health standards ○ DOLE-OSHS Rule 1150, 1160, 1170, 1200, 1220, 1230, 1422 other relevant OSHS Standards ○ DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace • **Values/ Attitudes** ○ Resourcefulness ○ Patience ○ Industriousness ○ Attention to	• de-energizing equipment • observing Lock-out/ Tag-out procedure • Preparing and forwarding shutdown records to appropriate personnel

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		details o Hard Work and Perseverance (Sipag at Tiyaga) o Honesty and integrity o Care (Malasakit)	

RANGE OF VARIABLES

VARIABLE	RANGE
1. Requirements	May include: 3.1 Shutdown experience 3.2 Work permit 3.3 Coordination with/notification to other work centers/process units
2. Appropriate personnel	May include: 1.1 Engineer 1.2 Supervisor

EVIDENCE GUIDE

1. Critical aspects of Competency	**Competency assessment requires evidence that the candidate**: 1.1 Followed shutdown procedures. 1.2 Powered off individual equipment in the right sequence until all units are shutdown. 1.3 Documented and reported the task taken.
2. Resource Implications	**The following resources should be provided**: 2.1 Equipment 2.2 Materials 2.3 Personal Protective equipment
3. Methods of Assessment	**Competency in this unit may be assessed through**: 3.1 Interview/Questioning 3.2 Demonstration 3.3 Written Examination
4. Context for assessment	4.1 Competency maybe assessed in actual workplace or at the designated TESDA Accredited Assessment Center

SECTION 3 TRAINING ARRANGEMENTS

These standards are set to provide technical and vocational education and training (TVET) providers with information and other important requirements to consider when designing training programs for **CHEMICAL PROCESS OPERATIONS NC III**.

They include information on curriculum design; training delivery; trainee entry requirements; tools and equipment; training facilities; and trainer's qualification.

3.1 CURRICULUM DESIGN

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

Delivery of knowledge requirements for the basic, common and core units of competency specifically in the areas of mathematics, science/technology, communication/language and other academic subjects shall be contextualized. To this end, TVET providers shall develop a Contextual Learning Matrix (CLM) to include MLC-2006, green technology, issues on health and drugs and cater person with disabilities (PWD's).

Course Title: CHEMICAL PROCESS OPERATIONS **NC Level: NCIII**

Nominal Training Duration:	20	Hours	Basic Competencies
	56	Hours	Common Competencies
	224	Hours	Core Competencies
Total:	**300**	Hours	

Course Description:

This course is designed to enhance the knowledge, skills and attitude of **CHEMICAL PROCESS OERATIONS NC III** in accordance with industry standards**.** This covers competencies that a person must achieve to perform chemical operations and control chemical processes.

To obtain this, all units prescribed for this qualification must be achieved.

BASIC COMPETENCIES
(20 hours)

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
1. Lead workplace communication	1.1 Communicate information about workplace processes	• Read o Effective verbal communication methods	• Lecture	• Written Test	4 Hours
		o Sources of information			
		• Practice organizing information	• Demonstration	• Observation	
		• Identify organization requirements for written and electronic communication methods	• Lecture	• Written Test	
		• Follow organization requirements for the use of written and electronic communication methods	• Demonstration • Practical exercises	• Observation	
		• Perform exercises on understanding and conveying intended meaning scenario	• Demonstration • Role Play	• Observation	
	1.2 Lead workplace discussions	• Describe: o Organizational policy on production, quality and safety	• Group discussion	• Oral evaluation	
		o Goals/ objectives and action plan setting			
		• Read	• Lecture	• Written Test	
		o Effective verbal communication methods	•	•	
		• Prepare/set action plans based on organizational goals and objectives	• Demonstration	• Observation	
	1.3 Identify and communicate issues arising in the workplace	• Describe: o Organizational policy in dealing with issues and problems	• Group discussion	• Oral evaluation	
		• Read	• Lecture	• Written Test	
		o Effective verbal communication methods			

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• Practice organizing information	• Demonstration	• Observation	
		• Perform exercises on understanding and conveying intended meaning scenario	• Demonstration • Role Play	• Observation	
2. Lead small team	2.1 Provide team leadership	• Describe: Company policies and procedures	• Group discussion	• Oral evaluation	4 Hours
		• Identify client expectations	• Lecture	• Written examination	
		• Practice team building skills	• Demonstration	• Observation	
		• Perform exercises on communication skills required for leading teams	• Demonstration • Role Play	• Observation	
	2.2 Assign responsibilities	• Describe: o Team member's duties and responsibilities	• Group discussion	• Oral evaluation	
		• Identify client expectations	• Lecture	• Written examination	
		• Practice negotiating skills	• Demonstration	• Observation	
		• Perform group exercises showing the skills and techniques in promoting team building	• Demonstration • Role Play	• Observation	
	2.3 Set performance expectations for team members	• Describe: o Team member's duties and responsibilities	• Group discussion	• Oral evaluation	
		o How performance expectations are set			
		• Identify client expectations	• Lecture	• Written examination	
		• Perform group exercises in setting individual target/ expectation	• Demonstration • Role Play	• Observation	
		• Read instruction and requirements in	• Lecture	• Written	

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		up to date dissemination to members		examination	
	2.4 Supervise team performance	• Describe listening and treating individual team members concern	• Group discussion	• Oral evaluation	
		• Identify methods of Monitoring Performance	• Lecture	• Written examination	
		• Perform group exercises showing the skills in monitoring team performance	• Demonstration	• Observation	
3. Solve workplace problems related to work activities	3.1 Identify the problem	• Describe Normal operating parameters & product quality	• Group discussion	• Oral evaluation	2 Hours
		• Identify & clarify the nature of problem	• Lecture	• Written examination	
		• Read: o Brainstorming	• Lecture	• Written examination	
		o Cause and effect diagrams			
		o PARETO analysis			
		o SWOT analysis			
		o GANT chart			
		o PERT CPM & graph			
		o SCATTERGRAMS			
		• Apply observation, investigation and analytical techniques in solving problem in the workplace	• Demonstration	• Observation	

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	3.2 Determine fundamental cause of the problem	• Describe Teamwork and work allocation problem	• Group discussion	• Oral evaluation	
		• Read: ○ Using range of formal problem solving techniques	• Lecture	• Written examination	
		○ Enterprise goals, targets and measures			
		○ Enterprise quality, OSH and environmental requirement			
		○ Non-routine process and quality problems			
		• Perform group exercises showing safety in emergency situations and incidents	• Demonstration • Role Play	• Observation	
		• Identify & clarify the nature of problem	• Lecture	• Written examination	
		• Select relevant equipment and operational processes	• Lecture	• Written examination	
	3.3 Determine correct / preventive action	• Describe principles of decision making strategies and techniques	• Group Discussion	• Oral evaluation	
		• Read: ○ Evaluating the solution	• Lecture	• Written examination	
		○ Devising the best solution			
		• Perform group exercise how to implement the developed plan to	• Demonstration	• Observation	

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		rectify a problem	• Role Play		
	3.4 Provide recommendation to manager	• Describe industry codes and standards	• Group Discussion	• Oral evaluation	
		• Apply enterprise information systems and data collation	• Demonstration	• Observation	
		• Prepare recommendation letter			
4. Develop and practice negotiation skills	4.1 Identify relevant information in planning negotiations	• Describe: o codes of practice and guidelines for the organization	• Group Discussion	• Oral evaluation	2 hours
		differences between content and process			
		• Read: o Organizations policy and procedures for negotiations	• Lecture	• Written examination	
		o Decision making and conflict resolution strategies procedures			
		o Strategies to manage conflict	• Lecture	• Written examination	
		o Steps in negotiating process	•	•	
		• Identify bargaining information	• Lecture	• Written examination	
		• Apply strategies to manage process	• Demonstration	• Observation	
		• Apply steps in negotiating process			
	4.2 Participate in negotiations	• Describe the following strategies during negotiation:	• Group Discussion • Case studies	• Oral evaluation	
		o Decision making and conflict resolution strategies procedures			
		o Problem solving strategies on how to deal with unexpected questions			

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		and attitudes during negotiation			
		• Practice the following scenarios in a group activity: o Perform interpersonal skills to develop rapport with other parties	• Demonstration • Simulation/ Role play	• Observation	
		o Perform verbal communication and listening skill			
		o observation skills			
		o negotiation skills			
	4.3 Document areas for agreement	• Describe the Procedure in documenting negotiations	• Group Discussion • Simulation/ Role play	• Oral evaluation	
		• Apply a filing system in managing information	• Demonstration	• Observation	
		• Demonstrate filing of documents			
5. Use mathematical concepts and techniques	5.1 Identify mathematical tools and techniques to solve problems	• Describe the four fundamental operation (addition, subtraction, division, multiplication)	• Group Discussion	• Oral evaluation	4 Hours
		• Read: o Measurement system	• Lecture	• Written examination	
		o Precision and accuracy			
		o Basic measuring tools/devices	• Lecture	• Written examination	
		• Apply mathematical computations	• Demonstration	• Observation	
		• Demonstrate activities on: Use of calculator	• Demonstration	• Observation	

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• Use of different measuring tools			
	5.2 Apply mathematical procedures / solution	• Read: o Estimation	• Lecture	• Written examination	
		o Problem-based questions			
		o Mathematical techniques			
		• Apply mathematical computations	• Demonstration • Simulation/ Role play	• Observation	
		• Demonstrate activities on: o Use of calculator	• Demonstration	• Observation	
		o Use of different measuring tools			
		o Use of mathematical tools and standard formulas			
	5.3 Analyze results	• Describe the four fundamental operation (addition, subtraction, division, multiplication)	• Group Discussion	• Oral evaluation	
		• Read: o Measurement system	• Lecture	• Written examination	
		o Precision and accuracy			
		o Basic measuring tools/devices			
		• Apply mathematical computations	• Demonstration	• Observation	
		• Demonstrate activities on: Use of calculator	• Demonstration	• Observation	

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		Use of different measuring tools	• Demonstration	• Observation	
6. Use relevant technologies	6.1 Identify appropriate technology	• Describe company policy in relation to relevant technology	• Group Discussion	• Oral evaluation	4 Hours
		• Read: o Awareness on technology and its function	• Lecture	• Written examination	
		o Relevant technology application/ implementation			
		o Operating instructions			
		• Practice basic communication skill in a group activity	• Demonstration • Simulation/ Role Play	• Observation	
	6.2 Apply relevant technology	• Describe different management concepts	• Group Discussion	• Oral evaluation	
		• Read: o Relevant technology application/ implementation	• Lecture	• Written examination	
		o Technology adaptability			
		o Different management concepts			
		o Health and safety procedure			
		o Communication techniques			
		• Apply software applications skills	• Demonstration	• Observation	
		• Practice drills on installing application software	• Demonstration • Simulation/ Role Play	• Observation	
		• Practice basic communication skill in a group activity			
	6.3 Maintenance / enhance relevant technology	• Read: o Repair and maintenance procedure	• Lecture	• Written examination	

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		○ Operating instructions	• Lecture	• Written examination	
		• Practice drills: ○ installing application software ○ Basic troubleshooting skills	• Demonstration • Simulation/ Role Play	• Observation	

COMMON COMPETENCIES
(56 hours)

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Method	Nominal Duration
1. Observe safe working practices	1.1 Identify and follow workplace procedures for hazard identification and risk control	• Identify hazards and corresponding risks • Identify environmental aspects and corresponding impacts. • Understand the basic safety practice in chemical manufacturing. • Understand the basic work operations to control risks, for example, permit to work systems and isolation procedures • Read: - Occupational Health and Safety Hazard and risk concepts - The hierarchy of ways to control risks - Environmental Aspect and Impact concepts - DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace - DOLE-OSHS Rule 1070, 1080 and 1090	• Self-paced learning • Discussion • Group work • Individual Practice	• Written Test • Oral Questioning • Demonstration	8 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Method	Nominal Duration
	1.2 Contribute to arrangements for the management of occupational health and safety	• The company procedures in managing occupational health and safety concerns, which includes - Policies - Plant and equipment maintenance - Hazard identification - Risk assessment and control - Environmental aspect identification - Environmental impact assessment and control • Training on basic understanding of Occupational Health and Safety Rules (or Standards) • Understanding the role of workers in the Health and Safety committee. • Communication skills • Workplace procedures for raising Occupational Health and Safety issues - DOLE-OSHS Rule 1030 Training of personnel in OSH - DOLE-OSHS Rule 1040 Health and Safety Committee - DOLE-OSHS Rule 1070 Occupational Health and Environmental Control - DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace	• Self-paced learning • Discussion • Group work • Individual Practice	• Written Test • Oral Questioning • Demonstration	
	1.3 Complete occupational health and safety records	• Understand the difference between disabling and non-disabling accidents • Workplace procedures for reporting accidents • Read: - The roles of safety officers in a chemical manufacturing plant - DOLE-OSHS Rule 1050 Notification and keeping of records of accidents and/or occupational illness - DOLE-OSHS Rule 1960 Occupational Health Services	• Self-paced learning • Discussion • Group work • Individual Practice	• Written Test • Oral Questioning • Demonstration	

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Method	Nominal Duration
2. Comply with emergency procedures	2.1 Take actions to prevent occurrence of emergency	• Conducts hazards and risks assessment • Conducts environmental aspect and impact assessment • Emergency practice drills may include drills for fire, spillage and earthquake. • Proper use of emergency equipment such as Fire extinguishers, Fire alarm switch, etc. • Understand the emergency warning signs and symbols such as emergency alarms. • Read: - Types of emergencies - Preventive programs to prevent emergency - Contingency plans for emergency - DOLE-OSHS Rule 1960 Occupational Health Services - DOLE-OSHS Rule 1040 Health and safety committee - DOLE-OSHS Rule 1030 Training personnel in OSH	• Self-paced learning • Discussion • Group work • Individual Practice	• Written Test • Oral Questioning • Demonstration	8 hours
	2.2 Follow established protocols to control risks in the work place	• Emergency alarm signals and systems in use in manufacturing plants and procedures to be followed when an emergency alarm is raised • Escape routes and internal and external communications systems and alarms • Communication techniques used during emergencies • Applying appropriate action in various types of actual or potential emergency situations • Read: - DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace	• Self-paced learning • Discussion • Group work • Individual Practice	• Written Test • Oral Questioning • Demonstration	

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Method	Nominal Duration
	2.3 Take immediate actions in the event of an emergency	• General principles of damage control including the importance of preparation, control and recovery stages in the emergency management plan • Contingency plans for emergency including procedures for review of its effectiveness after an emergency. • Ways of controlling damage during emergency. • Using emergency alarm signals and systems • Using personal protective equipment • Read: - DOLE-OSHS Rule 1940 Fire Protection and Control	• Self-paced learning • Discussion • Group work • Individual Practice	• Written Test • Oral Questioning • Demonstration	
3. Use hand and measuring tools	3.1 Prepare the required tools corresponding to tasks to be undertaken	• Familiarization of the work plan and corresponding tools needed per activity or task • Familiarization of tool and test equipment specifications • Read: - DOLE-OSHS Rule 1422 Hand Tools	• Self-paced learning • Discussion • Group work • Individual Practice	• Written Test • Oral Questioning • Demonstration	16 hours
	3.2 Use appropriate tools and test equipment	• Types of tools and test equipment used in chemical processing. • Proper use of tools and test equipment • Proper operation of chemical control panels. • Read: - DOLE-OSHS Rule 1422 Hand Tools	• Self-paced learning • Discussion • Group work • Individual Practice	• Written Test • Oral Questioning • Demonstration	
	3.3 Maintain tools	• Preventive maintenance program for tools and equipment. • Recognize unsafe tools or test equipment • Coordination for repair of defective tools • Familiarization of tool and test equipment specifications • Proper storage of tools. • Read: - DOLE-OSHS Rule 1422 Hand Tools	• Self-paced learning • Discussion • Group work • Individual Practice	• Written Test • Oral Questioning • Demonstration	

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Method	Nominal Duration
4. Perform Mensuration and Calculation	4.1 Select measuring instruments	• Identify what component needs to be measured • Selection measuring instruments • Basic units of measurement • Conversion of units • Read: - Units of measurement - Conversion of units - Fractions and Percentages - Ratio and proportion - DOLE-OSHS Rule 1422 Hand Tools	• Self-paced learning • Discussion • Group work • Individual Practice	• Written Test • Oral Questioning • Demonstration	16 hours
	4.2 Carry out measurements and calculation	• Proper use of measuring tools • Accuracy in measurement and calculations • Perform the corresponding calculations required • Read: - DOLE-OSHS Rule 1422 Hand Tools - DOLE-OSHS Rule 1080 Protective equipment and devices - DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace -	• Self-paced learning • Discussion • Group work • Individual Practice	• Written Test • Oral Questioning • Demonstration	
	4.3 Maintain measuring instruments	• Proper storage of measuring equipment • Preventive maintenance of measuring equipment • Calibration of measuring equipment • Repair of measuring equipment • Read: - DOLE-OSHS Rule 1422 Hand Tools - DOLE-OSHS Rule 1080 Protective equipment and devices	• Self-paced learning • Discussion • Group work • Individual Practice	• Written Test • Oral Questioning • Demonstration	

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Method	Nominal Duration
5. Apply Quality Standard	5.1 Assess quality of own work	• Identify task requirements or target and corresponding performance indicators • Measure and monitor actual performance and compare with the targets • Take appropriate actions to ensure that target shall be meet as scheduled • Identifying and analyzing errors • Maintain records of actions taken to eliminate the errors	• Self-paced learning • Discussion • Group work • Individual Practice	• Written Test • Oral Questioning • Demonstration	8 hours
	5.2 Engage in quality improvement	• Management system standards • Company Policy, programs and/or procedures • Comply with relevant management system requirements • Measure and monitor actual performance and compare with the targets • Take appropriate actions to ensure that target shall be meet as scheduled • Plan for improvement	• Self-paced learning • Discussion • Group work • Individual Practice	• Written Test • Oral Questioning • Demonstration	

CORE COMPETENCIES
(224 hours)

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
1. Determine process requirements	1.1 Determine raw materials	• Describe the properties of raw materials. • Demonstrate ability to detect non-conformance to requirements • Demonstrate ability to comprehend oral and written communication • Read: - Safety data sheets (SDS) - Raw Material specifications - Product specifications - DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace	• Self-paced learning • Discussion • Group work • Individual Practice	• Written Test • Oral Questioning • Demonstration	16 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	1.2 Verify raw material specifications	• Demonstrate proper handling and storage of chemicals. • Demonstrate proper use of PPEs • Correct the non-conformance detected • Demonstrate ability to comprehend oral and written communication • Read: - Safety data sheets(SDS) - Raw material specifications - Product specifications - Hazards classification - Labeling of chemicals - DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace	• Self-paced learning • Video presentation • Discussion • Practical exercise	• Oral Questioning • Demonstration • Oral Questioning	16hours
	1.3 Identify equipment and utilities	• Demonstrate ability to verify that equipment needed in the process is in good working condition. • Demonstrate ability to verify that utilities needed in the process is in good working condition. • Correct the non-conformance detected • Read: - DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace	• Self-paced learning • Video presentation • Discussion • Practical exercise	• Oral Questioning • Demonstration • Oral Questioning	16hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
2. Evaluate process data	2.1 Collect process data	• Describe production process control parameters (temperature, pressure, federate) • Demonstrate how to generate and read process parameters • Demonstrate ability to comprehend oral and written communication • Read: - Basic process instrumentation - Basic operating parameters - DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace	• Self-paced learning • Video presentation • Lecturette • Discussion • Simulation Practical exercises	• Written Test • Oral Questioning • Demonstration	16 hours
	2.2 Verify process data	• Demonstrate ability to detect non-conformance to requirements • Demonstrate ability to comprehend oral and written communication • Read: - Basic process instrumentation - Basic operating parameters - Product specifications - DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace	• Self-paced learning • Video presentation • Focus group discussion • Simulation Practical exercises	• Written Test • Oral Questioning • Demonstration	16 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	2.3 Make adjustments	• Demonstrate ability to interpret data. • Demonstrate how to correct the variance. • Demonstrate ability to comprehend oral and written communication • Read: - DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace	• Self-paced learning • Video presentation • Focus group discussion • Simulation • Practical exercises	• Written Test • Oral Questioning • Demonstration	16hours
	2.4 Recommend process improvement	• Conduct statistical trend analysis based on reviewed historical data of the process. • Propose actions that may be taken to improve process. • DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace	• Self-paced learning • Video presentation • Focus group discussion • Simulation • Practical exercises	• Written Test • Oral Questioning • Demonstration	16

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
3. Operate process equipment	3.1 Conduct Ready-for-Start-up activities	• Describe sequence of equipment operation • Prepare equipment for production operation • Identify factors that may affect processing quality • Demonstrate ability to comprehend oral and written communication • Read: - Equipment operations Manual - Work instructions - DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace	• Self-paced learning • Video presentation • Focus group discussion • Simulation • Practical exercises	• Written Test • Oral Questioning • Demonstration	16 hours
	3.2 Start up equipment	• Demonstrate how to turn equipment on in correct sequence • Demonstrate ability to comprehend oral and written communication • Read: - Equipment operations Manual - Work instruction - DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace	• Self-paced learning • Video presentation • Focus group discussion • Simulation • Practical exercises	• Oral Questioning • Demonstration	16hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	3.3 Occupational health and safety protocols are practiced	• Describe engineering controls and how it protect workers from hazards • Familiarization of Safety Data sheets • Understand the basic safety practice in chemical manufacturing such as the use of Safety Data Sheets (SDS) and understanding the Globally Harmonized System (GHS) • Understand the basic work operations to control risks, for example, permit to work systems and isolation procedures • Read: - DOLE-OSHS Rules and other occupational health and safety regulations - Occupational Health and Safety Hazard and risk concepts - The hierarchy of ways to control risks - DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace	• Self-paced learning • Video presentation • Focus group discussion • Simulation • Practical exercises	• Written Test • Oral Questioning • Demonstration	16hours
	3.4 Environmental protocols are implemented	• Describe different types of wastes • Describe proper ways of handling, labeling, storing and treating chemical wastes. • Read: 1. DAO 35, DAO 81, RA 9003, RA 6969 and other relevant wastes, effluent and emission regulations 2. Environmental Aspect and Impact concepts	• Self-paced learning • Video presentation • Focus group discussion • Simulation • Practical exercises	• Written Test • Oral Questioning • Demonstration	16hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
4. Monitor process equipment	4.1 Verify operating parameters	• Describe and evaluate equipment condition. • Identify and correct equipment problem. • Demonstrate ability to comprehend oral and written communication • Read: - Equipment operations Manual - DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace - Work instruction	• Self-paced learning • Video presentation • Group discussion • Role play	• Written Test • Oral Questioning • Demonstration	16 hours
	4.2 Adjust equipment setting	• Demonstrate manual or electronic adjustment of equipment settings. • Practice safety protocols in handling equipment. • Demonstrate ability to comprehend oral and written communication	• Self-paced learning • Video presentation • Group discussion • Role play	• Written Test • Oral Questioning • Demonstration	16 hour
		• Read: - Equipment operations Manual - DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace - Work instruction - Equipment calibration and maintenance			
	4.3 Update data sheets	• Demonstrate proper documents and records control • Demonstrate ability to comprehend oral and written communication	• Self-paced learning • Video presentation • Group discussion • Role play	• Written Exam • Oral Questioning • Demonstration	4 hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
5. Qualify in-process and finished product samples	5.1 Collect samples	• Describe the protocols for sample collection • Describe the sources of sample contamination • Describe the control measures to avoid sample contamination • Describe the risks associated in collecting samples • Demonstrate proper use of PPEs • Demonstrate ability to comprehend oral and written communication • Read: - Sampling plan - Sample labeling - DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace	• Self-paced learning • Video presentation • Group discussion Practical exercises	• Written Exam • Oral Questioning • Demonstration	16 hours
	5.2 Verify conformance	• Describe product specifications. • Demonstrate ability to detect non-conformance to requirements • Demonstrate ability to comprehend oral and written communication • Read: - Product specifications - DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace	• Self-paced learning • Video presentation • Group discussion • Practical exercises	• Oral Questioning Demonstration	24 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	5.3 Document findings	• Demonstrate proper documents and records control • Demonstrate ability to comprehend oral and written communication	• Practical exercises	• Oral Questioning	4 hrs
6. Perform shutdown activities	6.1 Prepare for shut down	• Describe the requirements for shutdown • Demonstrate ability to comprehend oral and written communication • Read: - Equipment operations Manual - DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace - Work instruction	• Self-paced learning • Video presentation • Group discussion • Practical exercises	• Written Exam • Oral Questioning • Demonstration	8 hours
	6.2 Shutdown process equipment	• Demonstrate how to turn equipment off in correct sequence • Demonstrate ability to comprehend oral and written communication • Read: - Equipment operations Manual - DOLE-DO 136 Guidelines for the implementation of GHS in Chemical Safety Program in the Workplace - Work instruction	• Self-paced learning • Video presentation • Group discussion • Practical exercises	• Oral Questioning • Demonstration	

3.2 TRAINING DELIVERY

1. The delivery of training shall adhere to the design of the curriculum. Delivery shall be guided by the principles of competency-based TVET.

    a. Course design is based on competency standards set by the industry or recognized industry sector; (Learning system is driven by competencies written to industry standards)

    b. Training delivery is learner-centered and should accommodate individualized and self-paced learning strategies;

    c. Training can be done on an actual workplace setting, simulation of a workplace and/or through adoption of modern technology.

    d. Assessment is based in the collection of evidence of the performance of work to the industry required standards;

    e. Assessment of competency takes the trainee's knowledge and attitude into account but requires evidence of actual performance of the competency as the primary source of evidence.

    f. Training program allows for recognition of prior learning (RPL) or current competencies;

    g. Training completion is based on satisfactory performance of all specified competencies.

2. The competency-based TVET system recognizes various types of delivery modes, both on- and off-the-job as long as the learning is driven by the competency standards specified by the industry. The following training modalities and their variations/components may be adopted singly or in combination with other modalities when designing and delivering training programs:

    2.1 School/Institution-Based

    - Dual Training System (DTS) / Dualized Training Program (DTP) which contain both in-school and in-industry training or fieldwork components.

    - Supervised Industry Training (SIT) or on-the-job training (OJT) is an approach in training designed to enhance the knowledge and skills of the trainee through actual experience in the workplace to acquire specific competencies as prescribed in the training regulations. It is imperative that the deployment of trainees in the workplace is adhered to training programs and agreed by the institution and enterprise and status and progress of trainees are closely monitored by the training institutions to prevent opportunity for work exploitation.

- Project-based instruction is an authentic instructional model or strategy in which students plan, implement and evaluate projects that have real world applications.

2.2 Enterprised-Based:

Enterprised-based training may also be taken to mean a school or training center with one or more partner enterprise or an enterprise or group of enterprises setting up a common training facility or partnering with a school or training center.

- **Enterprised-based training** – where training is implemented within the company in accordance with the requirements of the specific company.

- **Formal Apprenticeship** – Training within employment involving a contract between an apprentice and an enterprise on an approved apprenticeable occupation.

- **Informal Apprenticeship** – is based on training (and working) agreement between an apprentice and an experienced chemical operator wherein the agreement may be written or oral. The experienced chemical operator commits to training the apprentice in all the skills relevant to his or her trade over a significant period of time, usually between one and four years, while the apprentice commits to contributing productively to the work of the business. Training is integrated into the production process and apprentices learn by working alongside the experienced chemical technician.

3.3 TRAINEE ENTRY REQUIREMENTS

Trainees or students wishing to gain entry into this course should possess the following requirements:

- Must have completed 12 years basic education
- Can communicate in English language both oral and written
- Must be physically fit

3.4 TOOLS AND EQUIPMENT

CHEMICAL PROCESS OPERATION NC III

Recommended List of tools, equipment and materials for the training of a maximum of 15trainees for **CHEMICAL PROCESS OPERATION NC III** are as follows:

TOOLS			EQUIPMENT			MATERIALS		
Quantity	Unit	Description	Quantity	Unit	Description	Quantity	Unit	Description
2	PCS	Wrench	2	PCS	Personal Computer	1	Ream	Bond Paper
11	PCS	Cutting tools	1	SET	Audio-video equipment/ Projector	11	PCS	Permanent Marker
11	SETS	Sampling tools	1	UNIT	Chemical Reactor	1	SET	First Aid Kit
11	PCS	Spatula	1	UNIT	Heat exchanger	11	PCS	Dust masks
1	LITER	Detergent	1	UNIT	Chemical Mixer	11	PCS	Respirator
1	PC	Broom	1	UNIT	Boiler	11	PCS	Apron
1	PC	Dust pan	1	UNIT	Condenser	1	PC	Fire Extinguisher
1	PC	Garbage bin	1	UNIT	Scrubber unit	11	PCS	Cotton Gloves
1	SET	MOP	1	UNIT	Deaeration unit	11	PCS	Rubber Gloves
			1	UNIT	Pumps	1	SET	Video (CD)
			1	UNIT	Evaporator	1	SET	Chemical operations Manual
			1	UNIT	Emission controls	1	SET	DOLE OSHC Standards
			1	UNIT	Conveyor	1	SET	GHS symbols/Signs
			1	PC	Pallet Jack	1	PC	White board
			1	PC	Gas Tester	11	PCS	Calculator
			1	PC	Weighing Scale	2	PCS	Spill containment pan
			2	PCS	Lock-out/Tag-out devices			
			1	UNIT	Funnel			
			1	UNIT	Cart/trolley			
			1	UNIT	Control Panel/ Control Room			
			1	UNIT	Distillation equipment			
			PROCESS EQUIPMENT* (*may be entered into Memorandum of Agreement with a chemical manufacturing company thru Samahan sa Pilipinas ng Industria Kimika)					

3.5 TRAINING FACILITIES

Based on a class intake of 15 students/trainees

Space Requirement	Size in Meters	Area in Sq. Meters	Total Area in Sq. Meters
Lecture/Demo Room	8 x 7 m.	56 sq. m.	56 sq. m.
Learning Resource Center	3 x 5 m.	15 sq. m.	15 sq. m.
Wash room/Comfort Room (Male and Female	3 x 4 m.	12 sq. m.	12 sq. m.
		Total workshop area:	**83 sq. m.**
Practical Work Area	Training Center must enter into a Memorandum of Agreement with a company which has manufacturing facilities including the tools, equipment and materials listed in Section 3.4 of this TR.		

3.6 TRAINER'S QUALIFICATIONS FOR CHEMICAL PROCESS OPERATIONS NC III

- Holder of National TVET Trainer Certificate Level I on Chemical Process Operation NC III.
- Have at least three (3) years' work experience in chemical manufacturing/ chemical process operations.
- Holder of Certificate Training in Globally Harmonized System (GHS).

3.7 INSTITUTIONAL ASSESSMENT

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

SECTION 4 ASSESSMENT AND CERTIFICATION ARRANGEMENT

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

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

4.1 NATIONAL ASSESSMENTAND CERTIFICATION ARRANGEMENTS

4.1.1 To attain the National Qualification of **CHEMICAL PROCESS OPERATIONS NC III,** the candidate must demonstrate competence covering all the units of competency listed in Section 1. A successful candidate shall be awarded a National Certificate by the TESDA Director General.

4.1.2 Assessment shall focus on the core units of competency. The basic and common units are assessed concurrently with the core units.

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

4.1.4 The following are qualified to apply for assessment:

4.1.4.1 Graduating students/trainees of WTR-registered programs, graduates of NTR programs or graduates of formal/non-formal/informal including enterprise-based trainings related to chemical process operations.

4.1.4.2 Industry workers in chemical process operations.

4.1.5 A candidate who fails the assessment for two (2) consecutive times shall be advised to go through a refresher course before taking another assessment.

4.2 **COMPETENCY ASSESSMENT REQUISITE**

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

This document can:

a) Identify the candidate's skills and knowledge

b) Highlight gaps in candidate's skills and knowledge

c) Provide critical guidance to the assessor and candidate on the evidence that need to be presented

d) Assist the candidate to identify key areas in which practice is needed or additional information or skills that should be gained prior to assessment.

4.2.1 **Accredited Assessment Center**. Only a TESDA accredited Assessment Center is authorized to conduct competency assessment. The center has to undergo a quality assured procedure for accreditation before it is authorized by TESDA to manage the assessment for National Certification. It shall enter into a Memorandum of Agreement with a company that has chemical manufacturing facility and other requirements that may be deemed necessary in the conduct of assessment.

4.2.2 **Accredited Competency Assessor**. Only an accredited competency assessor is authorized to conduct assessment of competence. A competency assessor undergoes a quality assured system of accreditation procedure before being authorized by TESDA to assess the competencies of candidates for National Certification.

4.3 Qualification of Competency Assessors

For Trainer-Assessor

- Holder of National TVET Trainer Certificate Level I (NTTC) on Chemical Process Operations NC III with at least three (3) years work experience in chemical manufacturing/chemical process operations.
- Holder of Certificate of Training in Globally Harmonized System (GHS).
- Have assisted in the actual conduct of assessment to at least two (2) candidates.

For Industry-Assessor

- Holder of National Certificate in Chemical Process Operations NC III.
- Holder of Certificate of Competency (COC) in Conduct Competency Assessment under the Trainers Methodology Level 1 (TM1) and
- Have at least three (3) years work experience in chemical manufacturing/chemical process operations.
- Holder of Certificate of Training in Globally Harmonized System (GHS).
- Have assisted in the actual conduct of assessment to at least two (2) candidates.

ANNEX A - COMPETENCY MAP
CHEMICAL PROCESS OPERATIONS NC III

BASIC COMPETENCIES

Receive and respond to workplace communication	Work with Others	Demonstrate work values	Practice basic housekeeping procedures	Participate in workplace communication
Work in a team environment	Practice career professionalism	Practice occupational health and safety procedures	Lead workplace communication	Lead small team
Develop and practice negotiation skills	Solve problems related to work activities	Use mathematical concepts and techniques	Use relevant technologies	Utilize specialist communication skills
Develop team and Individuals	Apply problem solving techniques in the workplace	Collect, analyze and organize information	Plan and organize Work	Promote environmental protection

COMMON COMPETENCIES

Observe safe working practices	Comply with emergency procedures	Use hand and measuring tools	Perform mensuration and calculation	Apply quality standards

CORE COMPETENCIES

Determine process requirements	Evaluate process data	Operate process equipment	Monitor process equipment	Qualify in-process and finished product samples
Perform shutdown activities				

GLOSSARY OF TERMS

1. Process	An action or series of actions, changes, or functions that converts input into output. A process may require many unit operations to obtain the desired product from the starting materials, or feedstocks.
2. Unit operation	Is a basic step in a process. Unit operations involve a physical change or chemical transformation such as separation, crystallization, evaporation, filtration, polymerization, isomerization, and other reactions. For example, in milk processing, homogenization, pasteurization, chilling, and packaging are each unit operations which are connected to create the overall process
3. Process Control	A mechanism for maintaining the output of a specific process within a desired range.
4. Requirements	Need or expectation that is stated, generally implied or obligatory
5. In-process sample	Refers to samples taken during chemical processing stages. Test Results or Data from in-process samples are used in order to prevent off-specs finished product.
6. Final Sample	Refers to samples taken from the desired product at the end of the process in order to identify defects in the finished product.

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