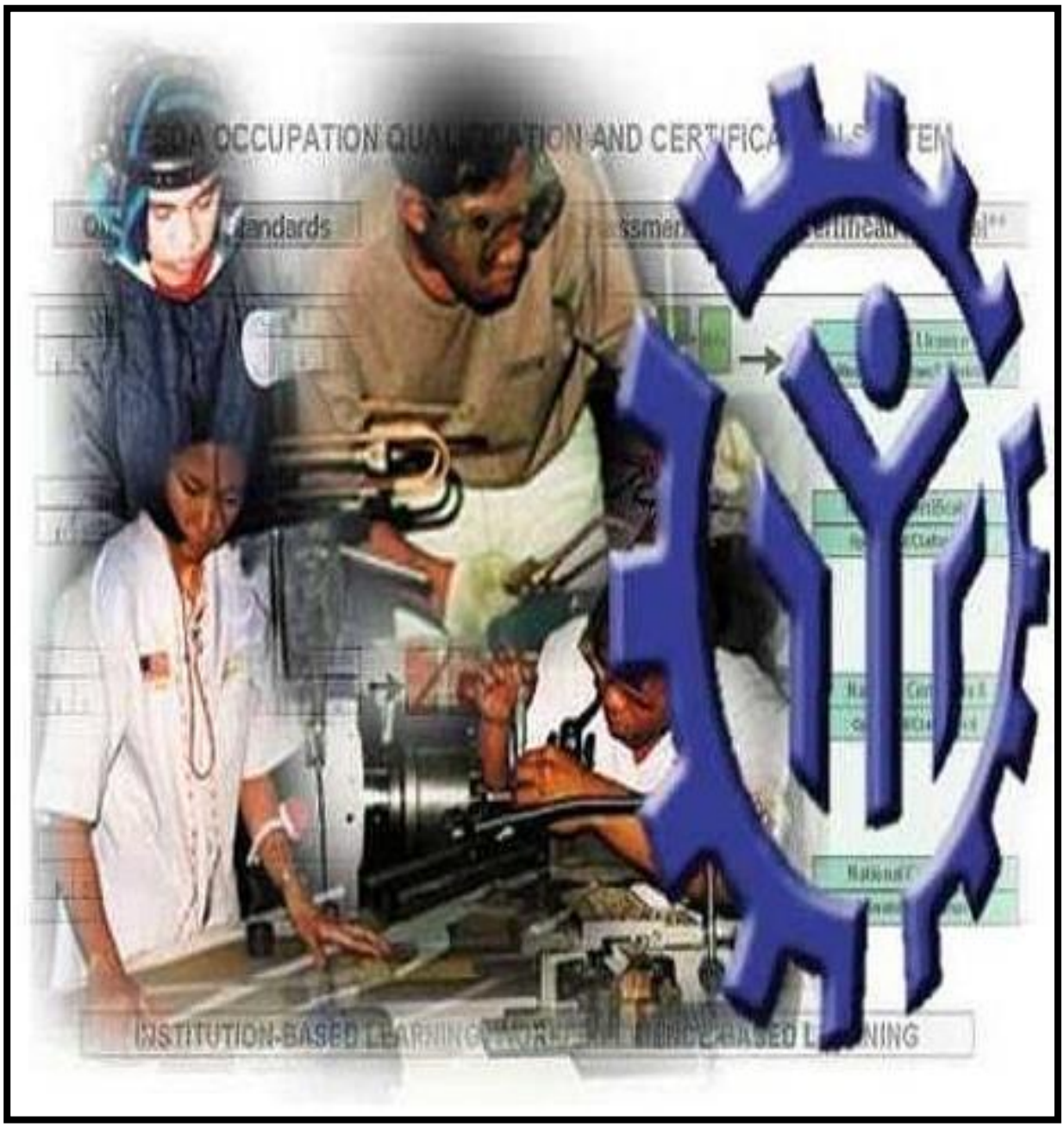
TRAINING REGULATIONS

AQUACULTURE
(HATCHERY OPERATION) NC II



AGRICULTURE, FORESTRY AND FISHERY SECTOR

TECHNICAL EDUCATION AND SKILLS DEVELOPMENT AUTHORITY
TESDA Complex East Service Road, South Luzon Expressway (SLEX),
Fort Bonifacio, Taguig City

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

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

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

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TRAINING REGULATIONS FOR

AQUACULTURE (HATCHERY OPERATION) NC II

SECTION 1 AQUACULTURE (HATCHERY OPERATION) NC II QUALIFICATION

The **AQUACULTURE (HATCHERY OPERATION) NC II** Qualification consists of competencies that a person must achieve to operate an aquaculture hatchery with the following species: milk fish (bangus), carp, silver perch (apahap), snapper, freshwater prawn (ulang), tiger shrimp, and pompano. It consists of preparing culture tanks and hatchery facilities, chlorinating and dechlorinating filtered sea water, conducting ozonation and UV treatment, sourcing and acquiring starter culture, scaling-up culture, harvesting brachionus, separating nauplii, sourcing broodstock, collecting eggs, feeding broodstock, practicing health management, introducing natural foods and artificial feeds, monitoring morphological features, transferring and harvesting fry, disposing fry and restoring workplace.

This Qualification is packaged from the competency map of the Agriculture, Forestry and Fishery Sector as shown in Annex A.

The Units of Competency comprising this Qualification include the following:

CODE NO.	BASIC COMPETENCIES
400311210	Participate in workplace communication
400311211	Work in team environment
400311212	Solve/address general workplace problems
400311213	Develop career and life decisions
400311214	Contribute to workplace innovation
400311215	Present relevant information
400311216	Practice occupational safety and health policies and procedures
400311217	Exercise efficient and effective sustainable practices in the workplace
400311218	Practice entrepreneurial skills in the workplace

CODE NO.	COMMON COMPETENCIES
AFF321201	Apply safety measures in farm operations
AFF321202	Use farm tools and equipment
AFF321203	Perform estimation and basic calculation

CODE NO.	CORE COMPETENCIES
AFF622309	Conduct preparatory activities
AFF622310	Produce natural foods
AFF622311	Conduct broodstock management and spawning
AFF622312	Manage feeding and maintain good health of stock
AFF622313	Complete hatchery operation

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

- Hatchery farm worker
- Hatchery operator
- Hatchery technician

SECTION 2 COMPETENCY STANDARDS

This section gives the details of the contents of the basic, common and core units of competency required in **AQUACULTURE (HATCHERY OPERATION) NC II**.

BASIC COMPETENCIES

UNIT OF COMPETENCY : PARTICIPATE IN WORKPLACE COMMUNICATION

UNIT CODE : 400311210

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to gather, interpret and convey information in response to workplace requirements.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Obtain and convey workplace information	1.1 Specific and relevant information is accessed from ***appropriate sources***. 1.2 Effective questioning, active listening and speaking skills are used to gather and convey information. 1.3 Appropriate ***medium*** is used to transfer information and ideas. 1.4 Appropriate non-verbal communication is used. 1.5 Appropriate lines of communication with supervisors and colleagues are identified and followed. 1.6 Defined workplace procedures for the location and ***storage*** of information are used.	1.1 Effective verbal and nonverbal communication 1.2 Different modes of communication 1.3 Medium of communication in the workplace 1.4 Organizational policies 1.5 Communication procedures and systems 1.6 Lines of Communication 1.7 Technology relevant to the enterprise and the individual's work responsibilities 1.8 Workplace etiquette	1.1 Following simple spoken language 1.2 Performing routine workplace duties following simple written notices 1.3 Participating in workplace meetings and discussions 1.4 Preparing work-related documents 1.5 Estimating, calculating and recording routine workplace measures 1.6 Relating/ Interacting with people of various levels in the workplace 1.7 Gathering and providing basic information in response to workplace requirements

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	1.7 Personal interaction is carried out clearly and concisely.		1.8 Basic business writing skills 1.9 Interpersonal skills in the workplace 1.10 Active-listening skills
2. Perform duties following workplace instructions	2.1 Written notices and instructions are read and interpreted in accordance with organizational guidelines. 2.2 Routine written instruction are followed based on established procedures. 2.3 Feedback is given to workplace supervisor based instructions/ information received. 2.4 ***Workplace interactions*** are conducted in a courteous manner. 2.5 Where necessary, clarifications about routine workplace procedures and matters concerning conditions of employment are sought and asked from ***appropriate sources***. 2.6 Meetings outcomes are interpreted and implemented.	2.1 Effective verbal and non-verbal communication 2.2 Different modes of communication 2.3 Medium of communication in the workplace 2.4 Organizational/ Workplace policies 2.5 Communication procedures and systems 2.6 Lines of communication 2.7 Technology relevant to the enterprise and the individual's work responsibilities 2.8 Effective questioning techniques (clarifying and probing) 2.9 Workplace etiquette	2.1 Following simple spoken instructions 2.2 Performing routine workplace duties following simple written notices 2.3 Participating in workplace meetings and discussions 2.4 Completing work- related documents 2.5 Estimating, calculating and recording routine workplace measures 2.6 Relating/ Responding to people of various levels in the workplace 2.7 Gathering and providing information in response to workplace requirements 2.8 Basic questioning/ querying 2.9 Skills in reading for information 2.10 Skills in locating
3. Complete relevant work-related documents	3.1 Range of ***forms*** relating to conditions of employment are completed	3.1 Effective verbal and non-verbal communication 3.2 Different modes of communication	3.1 Completing work-related documents 3.2 Applying operations of

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	accurately and legibly. 3.2 Workplace data is recorded on standard workplace forms and documents. 3.3 Errors in recording information on forms/ documents are identified and acted upon. 3.4 Reporting requirements to supervisor are completed according to organizational guidelines.	3.3 Workplace forms and documents 3.4 Organizational/ Workplace policies 3.5 Communication procedures and systems 3.6 Technology relevant to the enterprise and the individual's work responsibilities	addition, subtraction, division and multiplication 3.3 Gathering and providing information in response to workplace requirements 3.4 Effective record keeping skills

RANGE OF VARIABLES

VARIABLE	RANGE
1. Appropriate sources	May include: 1.1 Team members 1.2 Supervisor/Department Head 1.3 Suppliers 1.4 Trade personnel 1.5 Local government 1.6 Industry bodies
2. Medium	May include: 2.1 Memorandum 2.2 Circular 2.3 Notice 2.4 Information dissemination 2.5 Follow-up or verbal instructions 2.6 Face-to-face communication 2.7 Electronic media (disk files, cyberspace)
3. Storage	May include: 3.1 Manual filing system 3.2 Computer-based filing system
4. Workplace interactions	May include: 4.1 Face-to-face 4.2 Telephone 4.3 Electronic and two-way radio 4.4 Written including electronic means, memos, instruction and forms 4.5 Non-verbal including gestures, signals, signs and diagrams
5. Forms	May include: 5.1 HR/Personnel forms, telephone message forms, safety reports

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Prepared written communication following standard format of the organization 1.2 Accessed information using workplace communication equipment/systems 1.3 Made use of relevant terms as an aid to transfer information effectively 1.4 Conveyed information effectively adopting formal or informal communication
2. Resource Implications	**The following resources should be provided:** 2.1 Fax machine 2.2 Telephone 2.3 Notebook 2.4 Writing materials 2.5 Computer with Internet connection
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Demonstration with oral questioning 3.2 Interview 3.3 Written test 3.4 Third-party report
4. Context for Assessment	4.1 Competency may be assessed individually in the actual workplace or through an accredited institution

UNIT OF COMPETENCY : WORK IN TEAM ENVIRONMENT

UNIT CODE : 400311211

UNIT DESCRIPTOR : This unit covers the skills, knowledge and attitudes to identify one's roles and responsibilities as a member of a team.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Describe team role and scope	1.1 The ***role and objective of the team*** is identified from available ***sources of information***. 1.2 Team parameters, reporting relationships and responsibilities are identified from team discussions and appropriate external sources.	1.1 Group structure 1.2 Group development 1.3 Sources of information	1.1 Communicating with others, appropriately consistent with the culture of the workplace 1.2 Developing ways in improving work structure and performing respective roles in the group or organization
2. Identify one's role and responsibility within a team	2.1 Individual roles and responsibilities within the team environment are identified. 2.2 Roles and objectives of the team is identified from available ***sources of information***. 2.3 Team parameters, reporting relationships and responsibilities are identified based on team discussions and appropriate external sources.	2.1 Team roles and objectives 2.2 Team structure and parameters 2.3 Team development 2.4 Sources of information	2.1 Communicating with others, appropriately consistent with the culture of the workplace 2.2 Developing ways in improving work structure and performing respective roles in the group or organization
3. Work as a team member	3.1 Effective and appropriate forms of communications are used and interactions undertaken with	3.1 Communication Process 3.2 Workplace communication protocol	3.1 Communicating appropriately, consistent with the culture of the workplace

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	team members based on company practices. 3.2 Effective and appropriate contributions made to complement team activities and objectives, based on ***workplace context***. 3.3 Protocols in reporting are observed based on standard company practices. 3.4 Contribute to the development of team work plans based on an understanding of team's role and objectives.	3.3 Team planning and decision making 3.4 Team thinking 3.5 Team roles 3.6 Process of team development 3.7 Workplace context	3.2 Interacting effectively with others 3.3 Deciding as an individual and as a group using group think strategies and techniques 3.4 Contributing to Resolution of issues and concerns

RANGE OF VARIABLES

VARIABLE	RANGE
1. Role and objective of team	May include: 1.1 Work activities in a team environment with enterprise or specific sector 1.2 Limited discretion, initiative and judgement maybe demonstrated on the job, either individually or in a team environment
2. Sources of information	May include: 2.1 Standard operating and/or other workplace procedures 2.2 Job procedures 2.3 Machine/equipment manufacturer's specifications and instructions 2.4 Organizational or external personnel 2.5 Client/supplier instructions 2.6 Quality standards 2.7 OHS and environmental standards
3. Workplace context	May include: 3.1 Work procedures and practices 3.2 Conditions of work environments 3.3 Legislation and industrial agreements 3.4 Standard work practice including the storage, safe handling and disposal of chemicals 3.5 Safety, environmental, housekeeping and quality guidelines

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Worked in a team to complete workplace activity 1.2 Worked effectively with others 1.3 Conveyed information in written or oral form 1.4 Selected and used appropriate workplace language 1.5 Followed designated work plan for the job
2. Resource Implications	**The following resources should be provided:** 2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place 2.2 Materials relevant to the proposed activity or tasks
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Role play involving the participation of individual member to the attainment of organizational goal 3.2 Case studies and scenarios as a basis for discussion of issues and strategies in teamwork 3.3 Socio-drama and socio-metric methods 3.4 Sensitivity techniques 3.5 Written Test
4. Context for Assessment	4.1 Competency may be assessed in workplace or in a simulated workplace setting 4.2 Assessment shall be observed while task are being undertaken whether individually or in group

UNIT OF COMPETENCY : SOLVE/ADDRESS GENERAL WORKPLACE PROBLEMS

UNIT CODE : 400311212

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to apply problem-solving techniques to determine the origin of problems and plan for their resolution. It also includes addressing procedural problems through documentation, and referral.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify routine problems	1.1 Routine **problems or procedural problem** areas are identified. 1.2 Problems to be investigated are defined and determined. 1.3 Current conditions of the problem are identified and documented.	1.1 Current industry hardware and software products and services 1.2 Industry maintenance, service and helpdesk practices, processes and procedures 1.3 Industry standard diagnostic tools 1.4 Malfunctions and resolutions	1.1 Identifying current industry hardware and software products and services 1.2 Identifying current industry maintenance, services and helpdesk practices, processes and procedures. 1.3 Identifying current industry standard diagnostic tools 1.4 Describing common malfunctions and resolutions. 1.5 Determining the root cause of a routine malfunction
2. Look for solutions to routine problems	2.1 Potential solutions to problem are identified. 2.2 Recommendations about possible solutions are developed, **documented**, ranked and presented to	2.1 Current industry hardware and software products and services 2.2 Industry service and helpdesk practices, processes and procedures	2.1 Identifying current industry hardware and software products and services 2.2 Identifying services and helpdesk practices,

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	appropriate person for decision.	2.3 Operating systems 2.4 Industry standard diagnostic tools 2.5 Malfunctions and resolutions. 2.6 Root cause analysis	processes and procedures. 2.3 Identifying operating system 2.4 Identifying current industry standard diagnostic tools 2.5 Describing common malfunctions and resolutions. 2.6 Determining the root cause of a routine malfunction
3. Recommend solutions to problems	3.1 Implementation of solutions are **planned**. 3.2 Evaluation of implemented solutions are planned. 3.3 Recommended solutions are documented and submit to appropriate person for confirmation.	3.1 Standard procedures 3.2 Documentation produce	3.1 Producing documentation that recommends solutions to problems 3.2 Following established procedures

RANGE OF VARIABLES

VARIABLE	RANGE
1. Problems/Procedural Problem	May include: 1.1 Routine/non – routine processes and quality problems 1.2 Equipment selection, availability and failure 1.3 Teamwork and work allocation problem 1.4 Safety and emergency situations and incidents 1.5 Work-related problems outside of own work area
2. Appropriate person	May include: 2.1 Supervisor or manager 2.2 Peers/work colleagues 2.3 Other members of the organization
3. Document	May include: 3.1 Electronic mail 3.2 Briefing notes 3.3 Written report 3.4 Evaluation report
4. Plan	May include: 4.1 Priority requirements 4.2 Co-ordination and feedback requirements 4.3 Safety requirements 4.4 Risk assessment 4.5 Environmental requirements

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Determined the root cause of a routine problem 1.2 Identified solutions to procedural problems. 1.3 Produced documentation that recommends solutions to problems. 1.4 Followed established procedures. 1.5 Referred unresolved problems to support persons.
2. Resource Implications	2.1 Assessment will require access to a workplace over an extended period, or a suitable method of gathering evidence of operating ability over a range of situations.
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Case Formulation 3.2 Life Narrative Inquiry 3.3 Standardized test The unit will be assessed in a holistic manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations, which will include disruptions to normal, smooth operation. Simulation may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual workplace and will include walk through of the relevant competency components.
4. Context for Assessment	4.1 Competency may be assessed individually in the actual workplace or simulation environment in TESDA accredited institutions.

UNIT OF COMPETENCY : DEVELOP CAREER AND LIFE DECISIONS

UNIT CODE : 400311213

UNIT DESCRIPTOR : This unit covers the knowledge, skills, and attitudes in managing one's emotions, developing reflective practice, and boosting self-confidence and developing self-regulation.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Manage one's emotion	1.1 **Self-management strategies** are identified. 1.2 Skills to work independently and to show initiative, to be conscientious, and persevering in the face of setbacks and frustrations are developed. 1.3 Techniques for effectively handling negative emotions and **unpleasant situation i**n the workplace are examined.	1.1 Self-management strategies that assist in regulating behavior and achieving personal and learning goals (e.g. Nine self-management strategies according to Robert Kelley) 1.2 Enablers and barriers in achieving personal and career goals 1.3 Techniques in handling negative emotions and unpleasant situation in the workplace such as frustration, anger, worry, anxiety, etc.	1.1 Managing properly one's emotions and recognizing situations that cannot be changed and accept them and remain professional 1.2 Developing self-discipline, working independently and showing initiative to achieve personal and career goals 1.3 Showing confidence, and resilience in the face of setbacks and frustrations and other negative emotions and unpleasant situations in the workplace
2. Develop reflective practice	2.1 Personal strengths and achievements, based on self-assessment strategies and teacher feedback are contemplated. 2.2 Progress when seeking and	2.1 Basic SWOT analysis 2.2 Strategies to improve one's attitude in the workplace 2.3 Gibbs' Reflective Cycle/Model (Description,	2.1 Using the basic SWOT analysis as self-assessment strategy 2.2 Developing reflective practice through realization of

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	responding to feedback from teachers to assist them in consolidating strengths, addressing weaknesses and fulfilling their potential are monitored. 2.3 Outcomes of personal and academic challenges by reflecting on previous problem solving and decision making strategies and feedback from peers and teachers are predicted.	Feelings, Evaluation, Analysis, Conclusion, and Action plan)	limitations, likes/ dislikes; through showing of self-confidence 2.3 Demonstrating self-acceptance and being able to accept challenges
3. Boost self-confidence and develop self-regulation	3.1 Efforts for continuous self-improvement are demonstrated. 3.2 Counter-productive tendencies at work are eliminated. 3.3 Positive outlook in life are maintained.	3.1 Four components of self-regulation based on Self-Regulation Theory (SRT) 3.2 Personality development concepts 3.3 Self-help concepts (e. g., 7 Habits by Stephen Covey, transactional analysis, psycho-spiritual concepts)	3.1 Performing effective communication skills – reading, writing, conversing skills 3.2 Showing affective skills – flexibility, adaptability, etc. 3.3 Self-assessment for determining one's strengths and weaknesses

RANGE OF VARIABLES

VARIABLE	RANGE
1. Self-management strategies	May include: 1.1 Seeking assistance in the form of job coaching or mentoring 1.2 Continuing dialogue to tackle workplace grievances 1.3 Collective negotiation/bargaining for better working conditions 1.4 Share your goals to improve with a trusted co-worker or supervisor 1.5 Make a negativity log of every instance when you catch yourself complaining to others 1.6 Make lists and schedules for necessary activities
2. Unpleasant situation	May include: 2.1 Job burn-out 2.2 Drug dependence 2.3 Sulking

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Express emotions appropriately 1.2 Work independently and show initiative 1.3 Consistently demonstrate self-confidence and self-discipline
2. Resource Implications	**The following resources should be provided:** 2.1 Access to workplace and resources 2.2 Case studies
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Demonstration or simulation with oral questioning 3.2 Case problems involving work improvement and sustainability issues 3.3 Third-party report
4. Context for Assessment	4.1 Competency assessment may occur in workplace or any appropriately simulated environment

UNIT OF COMPETENCY : CONTRIBUTE TO WORKPLACE INNOVATION

UNIT CODE : 400311214

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to make a pro-active and positive contribution to workplace innovation.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify opportunities to do things better	1.1 ***Opportunities for improvement*** are identified proactively in own area of work. 1.2 ***Information*** are gathered and reviewed which may be relevant to ideas and which might assist in gaining support for idea.	1.1 Roles of individuals in suggesting and making improvements. 1.2 Positive impacts and challenges in innovation. 1.3 Types of changes and responsibility. 1.4 Seven habits of highly effective people.	1.1 Identifying opportunities to improve and to do things better. Involvement 1.2 Identifying the positive impacts and the challenges of change and innovation 1.3 Identifying examples of the types of changes that are within and outside own scope of responsibility
2. Discuss and develop ideas with others	2.1 ***People who could provide input*** to ideas for improvements are identified. 2.2 Ways of approaching people to begin sharing ideas are selected. 2.3 Meeting is set with relevant people. 2.4 Ideas for follow up are review and selected based on feedback. 2.5 ***Critical inquiry method*** is used to discuss and develop ideas with others.	2.1 Roles of individuals in suggesting and making improvements 2.2 Positive impacts and challenges in innovation 2.3 Types of changes and responsibility. 2.4 Seven habits of highly effective people	2.1 Identifying opportunities to improve and to do things better. Involvement 2.2 Identifying the positive impacts and the challenges of change and innovation 2.3 Providing examples of the types of changes that are within and outside own scope of responsibility 2.4 Communicating ideas for change through small

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
			group discussions and meetings
3. Integrate ideas for change in the workplace	3.1 Critical inquiry method is used to integrate different ideas for change of key people. 3.2 Summarizing, analyzing and generalizing skills are used to extract salient points in the pool of ideas. 3.3 ***Reporting skills*** are likewise used to communicate results. 3.4 ***Current Issues and concerns*** on the systems, processes and procedures, as well as the need for simple innovative practices are identified.	3.1 Roles of individuals in suggesting and making improvements 3.2 Positive impacts and challenges in innovation 3.3 Types of changes and responsibility 3.4 Seven habits of highly effective people 3.5 Basic research skills	3.1 Identifying opportunities to improve and to do things better. Involvement 3.2 Identifying the positive impacts and the challenges of change and innovation 3.3 Providing examples of the types of changes that are within and outside own scope of responsibility 3.4 Communicating ideas for change through small group discussions and meetings 3.5 Demonstrating skills in analysis and interpretation of data

RANGE OF VARIABLES

VARIABLE	RANGE
1. Opportunities for improvement	May include: 1.1 Systems 1.2 Processes 1.3 Procedures 1.4 Protocols 1.5 Codes 1.6 Practices
2. Information	May include: 2.1 Workplace communication problems 2.2 Performance evaluation results 2.3 Team dynamics issues and concerns 2.4 Challenges on return of investment 2.5 New tools, processes and procedures 2.6 New people in the organization
3. People who could provide input	May include: 3.1 Leaders 3.2 Managers 3.3 Specialists 3.4 Associates 3.5 Researchers 3.6 Supervisors 3.7 Staff 3.8 Consultants (external) 3.9 People outside the organization in the same field or similar expertise/industry 3.10 Clients
4. Critical inquiry method	May include: 4.1 Preparation 4.2 Discussion 4.3 Clarification of goals 4.4 Negotiate towards a Win-Win outcome 4.5 Agreement 4.6 Implementation of a course of action 4.7 Effective verbal communication. See our pages: Verbal Communication and Effective Speaking 4.8 Listening 4.9 Reducing misunderstandings is a key part of effective negotiation 4.10 Rapport Building 4.11 Problem Solving 4.12 Decision Making 4.13 Assertiveness 4.14 Dealing with Difficult Situations
5. Reporting skills	May include: 5.1 Data management 5.2 Coding 5.3 Data analysis and interpretation

VARIABLE	RANGE
	5.4 Coherent writing 5.5 Speaking

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Identified opportunities to do things better. 1.2 Discussed and developed ideas with others on how to contribute to workplace innovation. 1.3 Integrated ideas for change in the workplace. 1.4 Analyzed and reported rooms for innovation and learning in the workplace.
2. Resource Implications	**The following resources should be provided:** 2.1 Pens, papers and writing implements 2.2 Cartolina 2.3 Manila papers
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Psychological and behavioral Interviews 3.2 Performance Evaluation 3.3 Life Narrative Inquiry 3.4 Review of portfolios of evidence and third-party workplace reports of on-the-job performance 3.5 Sensitivity analysis 3.6 Organizational analysis 3.7 Standardized assessment of character strengths and virtues applied
4. Context for Assessment	4.1 Competency may be assessed individually in the actual workplace or simulation environment in TESDA accredited institutions.

UNIT OF COMPETENCY : PRESENT RELEVANT INFORMATION

UNIT CODE : 400311215

UNIT DESCRIPTOR : This unit of covers the knowledge, skills and attitudes required to present data/information appropriately.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Gather data/ information	1.1 Evidence, facts and information are collected. 1.2 Evaluation, terms of reference and conditions are reviewed to determine whether data/information falls within project scope.	1.1 Organisational protocols 1.2 Confidentiality 1.3 Accuracy 1.4 Business mathematics and statistics 1.5 Data analysis techniques/procedures 1.6 Reporting requirements to a range of audiences 1.7 Legislation, policy and procedures relating to the conduct of evaluations 1.8 Organisational values, ethics and codes of conduct	1.1 Describing organisational protocols relating to client liaison 1.2 Protecting confidentiality 1.3 Describing accuracy 1.4 Computing business mathematics and statistics 1.5 Describing data analysis techniques/ procedures 1.6 Reporting requirements to a range of audiences 1.7 Stating legislation, policy and procedures relating to the conduct of evaluations 1.8 Stating organisational values, ethics and codes of conduct
2. Assess gathered data/ information	2.1 Validity of data/ information is assessed.	2.1 Business mathematics and statistics	2.1 Computing business mathematics and statistics

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	2.2 Analysis techniques are applied to assess data/ information. 2.3 Trends and anomalies are identified. 2.4 ***Data analysis techniques*** and procedures are documented. 2.5 Recommendations are made on areas of possible improvement.	2.2 Data analysis techniques/ procedures 2.3 Reporting requirements to a range of audiences 2.4 Legislation, policy and procedures relating to the conduct of evaluations 2.5 Organisational values, ethics and codes of conduct	2.2 Describing data analysis techniques/ procedures 2.3 Reporting requirements to a range of audiences 2.4 Stating legislation, policy and procedures relating to the conduct of evaluations 2.5 Stating organisational values, ethics and codes of conduct
3. Record and present information	3.1 Studied data/ information are recorded. 3.2 Recommendations are analysed for action to ensure they are compatible with the project's scope and terms of reference. 3.3 Interim and final reports are analysed and outcomes are compared to the criteria established at the outset. 3.4 Findings are presented to stakeholders.	3.1 Data analysis techniques/ procedures 3.2 Reporting requirements to a range of audiences 3.3 Legislation, policy and procedures relating to the conduct of evaluations 3.4 Organisational values, ethics and codes of conduct	3.1 Describing data analysis techniques/ procedures 3.2 Reporting requirements to a range of audiences 3.3 Stating legislation, policy and procedures relating to the conduct of evaluations 3.4 Stating organisational values, ethics and codes of conduct practices

RANGE OF VARIABLES

VARIABLE	RANGE
1. Data analysis techniques	May include: 1.1 Domain analysis 1.2 Content analysis 1.3 Comparison technique

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Determine data / information 1.2 Studied and applied gathered data/information 1.3 Recorded and studied data/information These aspects may be best assessed using a range of scenarios what ifs as a stimulus with a walk through forming part of the response. These assessment activities should include a range of problems, including new, unusual and improbable situations that may have happened.
2. Resource Implications	**Specific resources for assessment** 2.1 Evidence of competent performance should be obtained by observing an individual in an information management role within the workplace or operational or simulated environment.
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Written Test 3.2 Interview 3.3 Portfolio The unit will be assessed in a holistic manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations, which will include disruptions to normal, smooth operation. Simulation may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual workplace and will include walk through of the relevant competency components.
4. Context for Assessment	4.1 In all workplace, it may be appropriate to assess this unit concurrently with relevant teamwork or operation units.

UNIT OF COMPETENCY : **PRACTICE OCCUPATIONAL SAFETY AND HEALTH POLICIES AND PROCEDURES**

UNIT CODE : **400311216**

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to identify OSH compliance requirements, prepare OSH requirements for compliance, perform tasks in accordance with relevant OSH policies and procedures.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify OSH compliance requirements	1.1 Relevant ***OSH requirements, regulations, policies and procedures*** are identified in accordance with workplace policies and procedures. 1.2 OSH activity non-conformities are conveyed to ***appropriate personnel***. 1.3 ***OSH preventive and control requirements*** are identified in accordance with OSH work policies and procedures.	1.1 OSH preventive and control requirements 1.2 Hierarchy of Controls 1.3 Hazard Prevention and Control 1.4 General OSH principles 1.5 Work standards and procedures 1.6 Safe handling procedures of tools, equipment and materials 1.7 Standard emergency plan and procedures in the workplace	1.1 Communication skills 1.2 Interpersonal skills 1.3 Critical thinking skills 1.4 Observation skills
2. Prepare OSH requirements for compliance	2.1 OSH work activity material, tools and equipment requirements are identified in accordance with workplace policies and procedures. 2.2 Required OSH materials, tools and equipment are acquired in accordance with workplace policies and procedures.	2.1 Resources necessary to execute hierarchy of controls 2.2 General OSH principles 2.3 Work standards and procedures 2.4 Safe handling procedures of tools, equipment and materials 2.5 Different OSH control measures	2.1 Communication skills 2.2 Estimation skills 2.3 Interpersonal skills 2.4 Critical thinking skills 2.5 Observation skills 2.6 Material, tool and equipment identification skills

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	2.3 Required OSH materials, tools and equipment are arranged/ placed in accordance with OSH work standards.		
3. Perform tasks in accordance with relevant OSH policies and procedures	3.1 Relevant OSH work procedures are identified in accordance with workplace policies and procedures. 3.2 Work Activities are executed in accordance with OSH work standards. 3.3 ***Non-compliance work activities*** are reported to *appropriate personnel*.	3.1 OSH work standards 3.2 Industry related work activities 3.3 General OSH principles 3.4 OSH Violations Non-compliance work activities	3.1 Communication skills 3.2 Interpersonal skills 3.3 Troubleshooting skills 3.4 Critical thinking skills 3.5 Observation skills

RANGE OF VARIABLES

VARIABLE	RANGE
1. OSH Requirements, Regulations, Policies and Procedures	May include: 1.1 Clean Air Act 1.2 Building code 1.3 National Electrical and Fire Safety Codes 1.4 Waste management statutes and rules 1.5 Permit to Operate 1.6 Philippine Occupational Safety and Health Standards 1.7 Department Order No. 13 (Construction Safety and Health) 1.8 ECC regulations
2. Appropriate Personnel	May include: 2.1 Manager 2.2 Safety Officer 2.3 EHS Offices 2.4 Supervisors 2.5 Team Leaders 2.6 Administrators 2.7 Stakeholders 2.8 Government Official 2.9 Key Personnel 2.10 Specialists 2.11 Himself
3. OSH Preventive and Control Requirements	May include: 3.1 Resources needed for removing hazard effectively 3.2 Resources needed for substitution or replacement 3.3 Resources needed to establishing engineering controls 3.4 Resources needed for enforcing administrative controls 3.5 Personal Protective equipment
4. Non OSH-Compliance Work Activities	May include non-compliance or observance of the following safety measures: 4.1 Violations that may lead to serious physical harm or death 4.2 Fall Protection 4.3 Hazard Communication 4.4 Respiratory Protection 4.5 Power Industrial Trucks 4.6 Lockout/Tag-out 4.7 Working at heights (use of ladder, scaffolding) 4.8 Electrical Wiring Methods 4.9 Machine Guarding 4.10 Electrical General Requirements 4.11 Asbestos work requirements 4.12 Excavations work requirements

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Convey OSH work non-conformities to appropriate personnel 1.2 Identify OSH preventive and control requirements in accordance with OSH work policies and procedures 1.3 Identify OSH work activity material, tools and equipment requirements in accordance with workplace policies and procedures 1.4 Arrange/Place required OSH materials, tools and equipment in accordance with OSH work standards 1.5 Execute work activities in accordance with OSH work standards 1.6 Report OSH activity non-compliance work activities to appropriate personnel
2. Resource Implications	**The following resources should be provided:** 2.1 Facilities, materials tools and equipment necessary for the activity
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Observation/Demonstration with oral questioning 3.2 Third party report
4. Context for Assessment	4.1 Competency may be assessed in the work place or in a simulated work place setting

UNIT OF COMPETENCY : **EXERCISE EFFICIENT AND EFFECTIVE SUSTAINABLE PRACTICES IN THE WORKPLACE**

UNIT CODE : **400311217**

UNIT DESCRIPTOR : This unit covers knowledge, skills and attitude to identify the efficiency and effectiveness of resource utilization, determine causes of inefficiency and/or ineffectiveness of resource utilization and Convey inefficient and ineffective environmental practices.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify the efficiency and effectiveness of resource utilization	1.1 Required resource utilization in the workplace is measured using appropriate techniques. 1.2 Data are recorded in accordance with workplace protocol. 1.3 Recorded data are compared to determine the efficiency and effectiveness of resource utilization according to established ***environmental work procedures***.	1.1 Importance of Environmental Literacy 1.2 Environmental Work Procedures 1.3 Waste Minimization 1.4 Efficient Energy Consumptions	1.1 Recording Skills 1.2 Writing Skills 1.3 Innovation Skills
2. Determine causes of inefficiency and/or ineffectiveness of resource utilization	2.1 Potential causes of inefficiency and/or ineffectiveness are listed. 2.2 Causes of inefficiency and/or ineffectiveness are identified through deductive reasoning. 2.3 Identified causes of inefficiency and/or ineffectiveness are validated thru established	2.1 Causes of environmental inefficiencies and ineffective-ness	2.1 Deductive Reasoning Skills 2.2 Critical thinking 2.3 Problem Solving 2.4 Observation Skills

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	environmental procedures.		
3. Convey inefficient and ineffective environmental practices	3.1 Efficiency and effectiveness of resource utilization are reported to *appropriate personnel*. 3.2 Concerns related resource utilization are discussed with appropriate personnel. 3.3 Feedback on information/ concerns raised are clarified with appropriate personnel.	3.1 Appropriate Personnel to address the environmental hazards 3.2 Environmental corrective actions	3.1 Written and Oral Communication Skills 3.2 Critical thinking 3.3 Problem Solving 3.4 Observation Skills 3.5 Practice Environmental Awareness

RANGE OF VARIABLES

VARIABLE	RANGE
1. Environmental Work Procedures	May include: 1.1 Utilization of Energy, Water, Fuel Procedures 1.2 Waster Segregation Procedures 1.3 Waste Disposal and Reuse Procedures 1.4 Waste Collection Procedures 1.5 Usage of Hazardous Materials Procedures 1.6 Chemical Application Procedures 1.7 Labeling Procedures
2. Appropriate Personnel	May include: 2.1 Manager 2.2 Safety Officer 2.3 EHS Offices 2.4 Supervisors 2.5 Team Leaders 2.6 Administrators 2.7 Stakeholders 2.8 Government Official 2.9 Key Personnel 2.10 Specialists 2.11 Himself

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Measured required resource utilization in the workplace using appropriate techniques 1.2 Recorded data in accordance with workplace protocol 1.3 Identified causes of inefficiency and/or ineffectiveness through deductive reasoning 1.4 Validate the identified causes of inefficiency and/or ineffectiveness thru established environmental procedures 1.5 Report efficiency and effectives of resource utilization to appropriate personnel 1.6 Clarify feedback on information/concerns raised with appropriate personnel
2. Resource Implications	**The following resources should be provided:** 2.1 Workplace 2.2 Tools, materials and equipment relevant to the tasks 2.3 PPE 2.4 Manuals and references
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Demonstration 3.2 Oral questioning 3.3 Written examination
4. Context for Assessment	4.1 Competency assessment may occur in workplace or any appropriately simulated environment 4.2 Assessment shall be observed while task are being undertaken whether individually or in-group

UNIT OF COMPETENCY : PRACTICE ENTREPRENEURIAL SKILLS IN THE WORKPLACE

UNIT CODE : 400311218

UNIT DESCRIPTOR : This unit covers the outcomes required to apply entrepreneurial workplace best practices and implement cost-effective operations.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Apply entrepreneurial workplace best practices	1.1 ***Good practices*** relating to workplace operations are observed and selected following workplace policy. 1.2 Quality procedures and practices are complied with according to workplace requirements. 1.3 Cost-conscious habits in ***resource utilization*** are applied based on industry standards.	1.1 Workplace best practices, policies and criteria 1.2 Resource utilization 1.3 Ways in fostering entrepreneurial attitudes: • Patience • Honesty • Quality-consciousness • Safety-consciousness • Resourceful-ness	1.1 Communication skills 1.2 Complying with quality procedures
2. Communicate entrepreneurial workplace best practices	2.1 Observed good practices relating to workplace operations are communicated to **appropriate person**. 2.2 Observed quality procedures and practices are communicated to appropriate person.	2.1 Workplace best practices, policies and criteria 2.2 Resource utilization 2.3 Ways in fostering entrepreneurial attitudes: • Patience • Honesty • Quality-consciousness	2.1 Communication skills 2.2 Complying with quality procedures 2.3 Following workplace communication protocol

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	2.3 Cost-conscious habits in resource utilization are communicated based on industry standards.	• Safety-consciousness • Resourceful-ness	
3. Implement cost-effective operations	3.1 Preservation and optimization of workplace resources is implemented in accordance with enterprise policy. 3.2 Judicious use of workplace tools, equipment and materials are observed according to manual and work requirements. 3.3 Constructive contributions to office operations are made according to enterprise requirements. 3.4 Ability to work within one's allotted time and finances is sustained.	3.1 Optimization of workplace resources 3.2 5S procedures and concepts 3.3 Criteria for cost-effectiveness 3.4 Workplace productivity 3.5 Impact of entrepreneurial mindset to workplace productivity 3.6 Ways in fostering entrepreneurial attitudes: • Quality-consciousness • Safety-consciousness	3.1 Implementing preservation and optimizing workplace resources 3.2 Observing judicious use of workplace tools, equipment and materials 3.3 Making constructive contributions to office operations 3.4 Sustaining ability to work within allotted time and finances

RANGE OF VARIABLES

VARIABLE	RANGE
1. Good practices	May include: 1.1 Economy in use of resources 1.2 Documentation of quality practices
2. Resources utilization	May include: 2.1 Consumption/ use of consumables 2.2 Use/Maintenance of assigned equipment and furniture 2.3 Optimum use of allotted /available time

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Demonstrated ability to identify and sustain cost-effective activities in the workplace 1.2 Demonstrated ability to practice entrepreneurial knowledge, skills and attitudes in the workplace.
2. Resource Implications	**The following resources should be provided:** 2.1 Simulated or actual workplace 2.2 Tools, materials and supplies needed to demonstrate the required tasks 2.3 References and manuals 2.3.1 Enterprise procedures manuals 2.3.2 Company quality policy
3. Methods of Assessment	**Competency in this unit should be assessed through:** 3.1 Interview 3.2 Third-party report
4. Context for Assessment	4.1 Competency may be assessed in workplace or in a simulated workplace setting 4.2 Assessment shall be observed while tasks are being undertaken whether individually or in-group

COMMON COMPETENCIES

UNIT OF COMPETENCY : APPLY SAFETY MEASURES IN FARM OPERATIONS

UNIT CODE : AFF321201

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to perform safety measures effectively and efficiently. It includes identifying areas, tools, materials, time and place in performing safety measures.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Determine areas of concern for safety measures	1.1 **Work *tasks*** are identified in line with farm operations. 1.2 ***Place*** for safety measures are determined in line with farm operations. 1.3 ***Time*** for safety measures are determined in line with farm operations. 1.4 Appropriate ***tools, materials and outfits*** are prepared in line with job requirements.	1.1 Different work tasks in farm operations 1.2 Place and time for implementation of safety measures 1.3 Different hazards in the workplace 1.4 Types of tools, materials and outfits 1.5 Preparation of tools, materials and outfits	1.1 Identifying work tasks in farm operations 1.2 Determining place and time for implementation of safety measures 1.3 Reading labels, manuals and other basic safety information 1.4 Identifying effective/ functional tools, materials and outfit 1.5 Preparing tools, materials and outfits 1.6 Discarding defective tools, and materials
2. Apply appropriate safety measures	2.1 Tools and materials are used according to specifications and procedures. 2.2 Outfits are worn according to farm requirements. 2.3 Effectivity/shelf life/expiration of	2.1 Uses and functions of tools 2.2 Outfits and how to wear it 2.3 Expiration/shelf life of materials 2.4 Proper disposal of expired materials	2.1 Using tools and materials in the workplace 2.2 Wearing of outfits 2.3 Observing expiration/shelf life of materials 2.4 Disposing of expired materials

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	materials are strictly observed. 2.4 ***Emergency procedures*** are known and followed to ensure a safework requirement. 2.5 Hazards in the workplace are identified and reported in line with farm guidelines.	2.5 Environmental rules and regulations 2.6 Emergency procedures 2.7 Hazards identification and reporting 2.8 Communication skills 2.9 OSHS	2.5 Following emergency procedures 2.6 Identifying and reporting of hazards in workplace area
3. Safekeep /dispose tools, materials and outfit	3.1 Used tools and outfit are cleaned after use and stored in designated areas. 3.2 Unused materials are properly labeled and stored according to manufacturer's recommendation and farm requirements. 3.3 Waste materials are disposed according to manufacturers, government and farm requirements.	3.1 Procedures of cleaning used tools and outfits 3.2 Label and storage unused materials 3.3 Disposal of wastes materials 3.4 Manufacturers' recommendation on keeping materials 3.5 Environmental rules and regulations	3.1 Cleaning used tools and outfit 3.2 Labeling and storing unused materials 3.3 Disposing waste materials

RANGE OF VARIABLES

VARIABLE	RANGE
1. Work tasks	Work task may be selected from any of the subsectors: 1.1 Crop Production 1.2 Post-harvest 1.3 Agri-marketing 1.4 Farm Equipment
2. Place	2.1 Stock room/storage areas/warehouse 2.2 Field/farm/orchard
3. Time	3.1 Fertilizer and pesticides application 3.2 Feed mixing and feeding 3.3 Harvesting and hauling
4. Tools, materials and outfits	4.1 Tools 4.1.1 Wrenches 4.1.2 Screw driver 4.1.3 Pliers 4.2 Outfit 4.2.1 Masks 4.2.2 Gloves 4.2.3 Boots 4.2.4 Overall coats 4.2.5 Hat 4.2.6 Eye goggles
5. Emergency procedures	5.1 Location of first aid kit 5.2 Evacuation 5.3 Agencies contract 5.4 Farm emergency procedures
6. Hazards	6.1 Chemical 6.2 Electrical 6.3 Falls

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Determined areas of concern for safety measures 1.2 Applied appropriate safety measures according to industry requirements 1.3 Prepared tools, materials and outfit needed 1.4 Performed proper disposal of used materials 1.5 Cleaned and stored tools, materials and outfit in designated facilities
2. Resource Implications	The following resources should be provided: 2.1 Farm location 2.2 Tools, equipment and outfits appropriate in applying safety measures
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Practical demonstration 3.2 Third Party Report
4. Context for Assessment	4.1 Competency may be assessed individually in the actual workplace or simulation environment in TESDA accredited institutions.

UNIT OF COMPETENCY : USE FARM TOOLS AND EQUIPMENT

UNIT CODE : AFF321202

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to use farm tools and equipment. It includes selection, operation and preventive maintenance of farm tools and equipment.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Select and use farm tools	1.1 Appropriate farm tools are identified according to requirement/use. 1.2 Farm tools are checked for faults and defective tools reported in accordance with farm procedures. 1.3 Appropriate tools are safely used according to job requirements and manufacturers conditions.	1.1 Types and uses of farm tools 1.2 Characteristics of functional tools 1.3 Checking tools for defects/faults 1.4 Segregation and reporting defective tools 1.5 Uses of tools	1.1 Identifying farm tools for the work 1.2 Checking the conditions of tools 1.3 Reporting defective tools 1.4 Using tools
2. Select and operate farm equipment	2.1 Identify appropriate ***farm equipment***. 2.2 Instructional manual of the farm tools and equipment are carefully read prior to operation. 2.3 Pre-operation check-up is conducted in line with manufacturers manual. 2.4 Faults in farm equipment are identified and reported in line with farm procedures. 2.5 Farm equipment is used according to its function. 2.6 Safety procedures are followed.	2.1 Types and operations of farm equipment 2.2 Standards operating procedures of farm equipment 2.3 Instructional manual of equipment 2.4 Pre-operation check-up 2.5 Equipment Specification 2.6 Procedures in calibrating and use of equipment 2.7 Equipment faults identification and reporting 2.8 Operation of equipment	2.1 Identifying appropriate farm equipment for the work 2.2 Reading instructional manual 2.3 Conducting pre-operation check-up 2.4 Identifying faults/defects of farm equipment 2.5 Reporting on defective farm equipment 2.6 Operating farm equipment 2.7 Following safety procedures

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		2.9 Codes and Regulations on environmental protection 2.10 Safety and keeping of equipment every after use 2.11 Safety measures	
3. Perform preventive maintenance	3.1 Tools and equipment are cleaned immediately after use in line with farm procedures. 3.2 Routine check-up and maintenance are performed. 3.3 Tools and equipment are stored in designated areas in line with farm procedures.	3.1 Cleaning procedures of tools and equipment 3.2 Maintenance procedures of farm equipment 3.3 Storage of tools and equipment 3.4 Designated storage areas	3.1 Cleaning tools and equipment 3.2 Performing routinely check-up of tools and equipment 3.3 Maintaining farm equipment 3.4 Storing tools and equipment

RANGE OF VARIABLES

VARIABLE	RANGE
1. Farm equipment	May include: 1.1 Engine 1.2 Pumps 1.3 Generators 1.4 Sprayers
2. Farm tools	May include: 2.1 Sickle 2.2 Cutters 2.3 Weighing scales 2.4 Hand tools 2.5 Measuring tools 2.6 Garden tools
3. Pre-operation check-up	May include: 3.1 Tires 3.2 Brake fluid 3.3 Fuel 3.4 Water 3.5 Oil 3.6 Lubricants 3.7 Battery

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Correctly identified appropriate farm tools and equipment 1.2 Operated farm equipment according to manual specification 1.3 Performed preventive maintenance
2. Resource Implications	The following resources should be provided: 2.1 Service/operational manual of farm tools and equipment 2.2 Tools and equipment 2.3 Farm implements
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Direct observation 3.2 Practical demonstration 3.3 Third Party Report
4. Context for Assessment	4.1 Competency may be assessed individually in the actual workplace or simulation environment in TESDA accredited institutions.

UNIT OF COMPETENCY : PERFORM ESTIMATION AND BASIC CALCULATION

UNIT CODE : AFF321203

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to perform basic workplace calculations.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Perform estimation	1.1 Job requirements are identified from written or oral communications. 1.2 Quantities of materials and resources required to complete a work task are estimated. 1.3 The time needed to complete a work activity is estimated. 1.4 Accurate estimate for work completion are made. 1.5 Estimate of materials and resources are reported to appropriate person.	1.1 Job requirements/ labor needs 1.2 Calculation of quantities of materials and resources required 1.3 Calculation of time for job completion 1.4 Preparation of estimate report 1.5 Basic mathematical operations 1.6 Percentage and ratios 1.7 Unit Conversion	1.1 Identifying job requirements/ labor 1.2 Estimating quantities of materials and resources required 1.3 Estimating time for job completion 1.4 Performing basic calculation 1.5 Compute percentage 1.6 Convert English to metric systems of measurement 1.7 Preparing estimate report
2. Perform basic workplace calculation	1.1 ***System and units of measurement*** to be followed are ascertained. 1.2 Calculation needed to complete work tasks are performed using the ***four basic mathematical operation***. 1.3 Calculate whole fraction, percentage and mixed when are used to complete the instructions.	2.1 Four basic mathematical operation 2.2 System and units of measurement 2.3 Fraction, percentage and ratio 2.4 Material take-off 2.5 Materials costing	2.1 Compute bill of materials 2.2 Compute project cost

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	1.4 Number computed is checked following work requirements		

RANGE OF VARIABLES

VARIABLE	RANGE
1. Four basic mathematical operation	Includes: 1.1 Addition 1.2 Subtraction 1.3 Multiplication 1.4 Division
2. System of measurement	Includes: 2.1 English 2.2 Metric
3. Units of measurement	Includes: 3.1 Area 3.2 Volume 3.3 Weight 3.4 Length

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Performed estimation 1.2 Performed basic workplace calculation 1.3 Applied corrective measures as maybe necessary
2. Resource Implications	The following resources should be provided: 2.1 Relevant tools and equipment for basic calculation 2.2 Recommended data
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Practical demonstration 3.2 Written examination
4. Context for Assessment	4.1 Competency may be assessed individually in the actual workplace or simulation environment in TESDA accredited institutions.

CORE COMPETENCY

UNIT OF COMPETENCY : CONDUCT PREPARATORY ACTIVITIES

UNIT CODE : AFF622309

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to prepare hatchery tanks and facilities, filter water, chlorinate and dechlorinate water.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Prepare hatchery tanks	1.1 Tanks are cleaned and disinfected following GAqP. 1.2 Filter bags are installed in water inlet according to established practices. 1.3 Screen on drainage pipes are installed based on industry standards. 1.4 Tank is filled with water according to standard industry procedures. 1.5 Aeration system is installed based from GAqP.	1.1 Proper aeration (water movement and bubbles) 1.2 Types filter bags and screen (with different mesh size) 1.3 Installation procedure of filter bags and drainage pipes 1.4 Filling-up tank based on species requirement 1.5 Operation of aeration system 1.6 Water depth based on species requirements 1.7 Estimation of airstone 1.8 Following guidelines in GAqP 1.9 GAqP on cleaning and disinfection of tanks 1.10 OSHS on hatchery tank preparation 1.11 Attitude: 1.11.1 Honest 1.11.2 Patient 1.11.3 Time-conscious 1.11.4 Resource-ful 1.11.5 Obedient 1.11.6 Focus	1.1 Cleaning and disinfecting tanks 1.2 Installing filter bags 1.3 Installing screen on drainage pipes 1.4 Filling tank with water 1.5 Installing aeration system 1.6 Following GAqP 1.7 Practicing OSHS

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Prepare hatchery facilities	2.1 ***Tools and materials*** are prepared for hatchery activities according to work requirements. 2.2 Inspection activities of ***facilities*** are conducted for functionality according to GAqP. 2.3 ***Minor repairs*** are performed according to manual following industry practices. 2.4 Major breakdowns in the facilities are reported to immediate authorities. 2.5 ***Water quality monitoring instruments*** are inspected and calibrated according to manual. 2.6 Safety practices are applied according to OSHS.	2.1 Preparation of tools and materials 2.2 Inspection and calibration of tools and instruments 2.3 Inspection of facilities 2.4 GAqP 2.5 Minor repairs of facilities 2.6 Major breakdowns 2.7 Water quality monitoring instruments 2.8 OSHS	2.1 Conducting inspection activities 2.2 Installing aeration accessories 2.3 Performing minor repairs 2.4 Reporting major breakdowns in the facilities 2.5 Inspecting and calibrating water quality monitoring instruments 2.6 Applying safety practices
3. Perform water filtration and treatment	3.1 Water filtration technique is applied following GAqP. 3.2 ***Water treatment technique*** is applied following GAqP. 3.3 Chlorine test for filtered water is performed according to industry practices. 3.4 Safety practices are applied following OSHS 3.5 Filtered water is UV treated.	3.1 Water filtration technique 3.2 Water treatment technique 3.3 Procedure in chlorine testing filtered water 3.4 UV treatment procedure 3.5 OSHS 3.6 GAqP	3.1 Filtering sea water using rapid sand filter 3.2 Back washing rapid sand filter 3.3 Chlorinating and dechlorinating filtered sea water in reservoir 3.4 Use chlorine test kit 3.5 Conducting ozonation and UV treatment to filtered sea water

RANGE OF VARIABLES

VARIABLE	RANGE
1. Tools and materials	Tools and materials may include: 1.1 Tools 1.1.1 Filter bags 1.1.2 Scoop nets 1.1.3 Basin 1.1.4 Pail 1.1.5 Fish tubs 1.1.6 Small bowl 1.1.7 Screen 1.1.8 Air hose 1.1.9 Air stone 1.1.10 Air connector 1.1.11 Seine net 1.1.12 Thermometer 1.1.13 Microscope 1.1.14 Haemocythometer 1.1.15 Counting chamber 1.1.16 Glass slides 1.1.17 Hatching jar 1.2 Materials for cleaning and disinfection: 1.2.1 Push brush 1.2.2 Chlorine powder and liquid 1.2.3 Bleach 1.2.4 Sponge 1.2.5 Scouring pads 1.2.6 Detergent bar and powder
2. Facilities	Facilities includes: 2.1 Water line 2.2 Aeration line 2.3 Filter system 2.4 Water pumps 2.5 Air blowers 2.6 Emergency power system 2.7 Culture tanks 2.8 drainage system 2.9 Lighting system
3. Minor repairs	Minor repairs may include: 3.1 Centrifugal pumps repair 3.2 Minor electrical repair 3.3 Minor plumbing repair 3.4 Net mending and patching 3.5 Minor carpentry
4. Water quality monitoring instruments	Water quality monitoring instruments may include but not limited to: 4.1 DO meter

VARIABLE	RANGE
	4.2 pH meter 4.3 Refractometer
5. Water treatment technique	Water treatment technique may include: 5.1 Chlorination 5.2 Dechlorination 5.3 Ozonation 5.4 UV treatment

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Prepared hatchery tanks. 1.1.1 Cleaned tanks. 1.1.2 Installed aeration. 1.2 Prepared hatchery facilities. 1.2.1 Performed minor repairs. 1.2.2 Inspected and calibrated water quality monitoring instruments. 1.2.3 Applied safety practices. 1.3 Performed water filtration and treatment. 1.3.1 Used measuring instruments and equipment. 1.3.2 Applied water filtration technique. 1.3.3 Applied water treatment technique.
2. Resource Implications	The following resources should be provided: 2.1 Actual or simulated workplace 2.2 Tools, instruments, supplies materials and equipment needed to perform required tasks 2.3 References and manuals 2.4 PPEs
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Demonstration 3.2 Written exam 3.3 Oral questioning
4. Context for Assessment	4.1 Competency maybe assessed in actual workplace or at the designated TESDA accredited Assessment Center.

UNIT OF COMPETENCY : PRODUCE NATURAL FOODS

UNIT CODE : AFF622310

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to perform pre-culture activities, conduct mass culture of natural food, provide quality water condition and hatch and harvest artemia nauplii.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Perform pre-culture activities	1.1 Starter culture is sourced and acquired following established industry procedures. 1.2 Density of culture is monitored following GAqP. 1.3 ***Fertilizers*** are weighed for ***natural food*** based on the scale of culture.	1.1 Starter culture 1.2 Density of culture 1.3 Procedure in monitoring density of culture 1.4 Good Aquaculture Practices (GAqP) 1.5 Kinds of Fertilizer 1.6 Kinds of Natural Food	1.1 Sourcing and acquiring starter culture 1.2 Preparing stock solution of nutrients for micro-algae 1.3 Preparing light bank 1.4 Producing new batch of starter culture
2. Conduct mass culture of natural food	2.1 Required density of natural food is stocked according to instructions from immediate authority. 2.2 Methods of mass culture production are employed according to industry practices and species. 2.3 Natural food production is monitored following workplace requirement. 2.4 Containers are ***prepared*** following industry procedures. 2.5 Cultures are transferred progressively to bigger containers to	2.1 Density of natural food 2.2 Stocking procedure 2.3 Methods of mass culture production 2.4 Production of natural food production 2.5 Procedure in transferring micro-algae	2.1 Preparing algal tank 2.2 Inoculating algal tank with micro-algae 2.3 Transferring micro-algae to rotifer tank 2.4 Inoculating rotifer tank with brachionus

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	increase the volume.		
3. Provide quality water condition	3.1 Aeration is provided to maintain water circulation and oxygenation according to GAqP. 3.2 Water temperature is maintained following industry procedures. 3.3 Water salinity is adjusted following industry practices.	3.1 Aeration 3.2 Maintenance of water circulation and oxygenation 3.3 Maintenance of water temperature 3.4 Procedure in adjusting water salinity	3.1 Providing aeration for water circulation and oxygenation 3.2 Maintaining water temperature 3.3 Adjusting water salinity
4. Hatch and harvest artemia nauplii	4.1 Artemia hatching is prepared following workplace requirement. 4.2 Artemia cysts requirement is computed following established aquaculture practices. 4.3 Density is monitored and recorded following workplace procedures. 4.4 Artemia nauplii are gathered and separated for feeding based on GAqP.	4.1 Preparation of artemia hatching 4.2 Artemia cysts requirements 4.3 Good Aquaculture Practices (GAqP) 4.4 Density monitoring and recording 4.5 Procedure in gathering and separating artemia nauplii	4.1 Preparing artemia hatching tank 4.2 Computing artemia requirement 4.3 Disinfecting artemia cyst 4.4 Aerating and hatching artemia cyst 4.5 Separating nauplii

RANGE OF VARIABLES

VARIABLE	RANGE
1. Fertilizers	Fertilizers may include but not limited to: 1.1 Urea 46-0-0 1.2 Ammonium phosphate 16-20-0 1.3 Ammonium sulfate 21-0-0
2. Natural food	Natural food includes: 2.1 Micro-algae 2.1.1 Green algae 2.1.2 Brown algae (diatoms) 2.2 Brachionus sp. (marine) 2.3 Moina sp. (freshwater)
3. Preparation of containers	Preparation of containers may include but not limited to: 2.1 Cleaning 2.2 Sanitation 2.3 Labeling of volume and date

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Prepared hatchery tanks. 1.1.1 Cleaned and disinfected tanks. 1.1.2 Installed filter bags in water inlet. 1.1.3 Installed screen on drainage pipes. 1.1.4 Filled tank with water. 1.1.5 Installed aeration system. 1.2 Prepared hatchery facilities. 1.2.1 Prepared tools and materials. 1.2.2 Conducted inspection activities of facilities. 1.2.3 Performed minor repairs. 1.2.4 Reported major breakdowns in the facilities. 1.2.5 Inspected and calibrated water quality monitoring instruments. 1.2.6 Applied safety practices. 1.3 Performed water filtration and treatment. 1.3.1 Applied water filtration technique. 1.3.2 Applied water treatment technique. 1.3.3 Performed chlorine test for filtered water. 1.3.4 Applied safety practices.
2. Resource Implications	The following resources should be provided: 2.1 Actual or simulated workplace 2.2 Tools, materials and equipment needed to perform the required tasks. 2.3 References and manuals 2.4 PPE
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Written exam 3.2 Demonstration 3.3 Oral questioning

4. Context for Assessment	4.1 Competency may be assessed individually in the actual workplace or simulation environment in TESDA accredited institutions.

UNIT OF COMPETENCY : CONDUCT BROODSTOCK MANAGEMENT AND SPAWNING

UNIT CODE : AFF622311

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to source and maintain broodstock, induce spawning and collect eggs, larvae and fry.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Source and maintain broodstock	1.1 Future broodstock are purchased from reputable sources. 1.2 ***Marking*** of broodstock is performed. 1.3 ***Sex determination*** technique is performed following industry practices. 1.4 Breeders are segregated according to sex. 1.5 Breeders are selected based on reproductive maturity. 1.6 Breeders are handled during transport to hatchery site.	1.1 Broodstock 1.2 Reputable sources of broodstock 1.3 Sex determination technique 1.4 Segregation of breeders 1.5 Selection of breeders 1.6 Reproductive maturity of breeders 1.7 Proper handling of breeders	1.1 Purchasing future broodstock 1.2 Fin clipping broodstock 1.3 Cannulating and segregating broodstock 1.4 Selecting and re-clipping broodstock 1.5 Sedating broodstock 1.6 Transporting broodstock
2. Induce spawning	2.1 Pre-spawning activities are performed following work requirements. 2.2 ***Spawn induction techniques*** are applied based on the species requirement. 2.3 Spawning of breeder is monitored according to industry procedures. 2.4 Breeder is separated and	2.1 Pre-spawning activities 2.2 Work requirements 2.3 Spawn induction techniques 2.4 Species requirement 2.5 Procedure in spawning breeder 2.6 Procedure in separating and transferring breeder 2.7 Good Aquaculture Practices (GAqP)	2.1 Selecting and acquiring hormone 2.2 Preparing hormone 2.3 Sedating fish 2.4 Injecting hormone 2.5 Returning sedated fish to spawning tank 2.6 Monitoring brood stock 2.7 Monitoring spawning activities

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	transferred following GAqP. 2.5 ***Quality assessments of spawns*** are conducted based on industry practice.	2.8 Quality assessment of spawns	
3. Collect eggs, larvae and fry	3.1 Egg collection is performed following established standard procedures per species. 3.2 Fertilization and hatching rates are estimated according to industry procedures. 3.3 Newly hatched larvae are transferred to larval rearing tanks. 3.4 Breeders are stocked for conditioning for another breeding cycle according to GAqP. 3.5 Estimates are recorded based on industry practices.	3.1 Procedure in collecting egg per species 3.2 Estimation 3.3 Fertilization rate 3.4 Hatching rate 3.5 Procedure in transferring newly hatched larvae 3.6 Larval rearing tanks 3.7 Procedure in stocking breeders 3.8 Conditioning breeders 3.9 Good Aquaculture Practices (GAqP) 3.10 Recordkeeping	3.1 Installing air lift 3.2 Estimating fertilization rate 3.3 Transferring eggs to hatching tanks 3.4 Hatching rate is estimated 3.5 Recording estimates 3.6 Transferring hatchlings to larval rearing tanks

RANGE OF VARIABLES

VARIABLE	RANGE
1. Marking	Marking may include: 1.1 Tagging 1.2 Clipping
2. Sex determination	Sex determination may include: 2.1 Cannulation 2.2 Manual identification
3. Spawn induction techniques	Spawn induction may include: 3.1 Chemical 3.2 Environmental, temperature, light, lunar cycle and atmospheric pressure 3.3 Hormonal 3.4 Special feed requirements
4. Quality assessment of spawns	Quality assessment of spawns may include: 4.1 Behaviour and activity 4.2 Colour and shape 4.3 Density 4.4 Health, disease and/or prophylactic treatment history 4.5 Number 4.6 Collected Uniformity

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Sourced and maintained broodstock. 1.1.1 Purchased future broodstock. 1.1.2 Performed marking of broodstock. 1.1.3 Performed sec determination technique. 1.1.4 Segregated breeders. 1.1.5 Selected breeders. 1.1.6 Handled breeders. 1.2 Induced spawning. 1.2.1 Performed pre-spawning. 1.2.2 Applied spawn induction techniques. 1.2.3 Monitored spawning of breeder. 1.2.4 Separated and transferred breeder. 1.2.5 Conducted quality assessments of spawns. 1.3 Collected eggs/larvae/fry. 1.3.1 Performed egg collection. 1.3.2 Estimated fertilization and hatching rates. 1.3.3 Transferred newly hatched larvae. 1.3.4 Stocked breeders. 1.3.5 Recorded estimates.
2. Resource Implications	The following resources should be provided: 2.1 Actual or simulated workplace 2.2 Tools, materials and equipment needed to perform the required tasks. 2.3 References and manuals 2.4 PPE
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Written examination 3.2 Demonstration 3.3 Oral questioning
4. Context for Assessment	4.1 Competency may be assessed individually in the actual workplace or simulation environment in TESDA accredited institutions.

UNIT OF COMPETENCY : MANAGE FEEDING AND MAINTAIN GOOD HEALTH OF STOCK

UNIT CODE : AFF622312

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to feed broodstock, practice health management, introduce natural foods and artificial feeds, and count, stock, and transfer fry.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Maintain breeders	1.1 Stocking density is computed based on industry practice. 1.2 Daily feed requirement of breeders are computed according to growth stages. 1.3 Kind of feeds appropriate to growth stages of are determined according to industry practice. 1.4 Breeders are fed based on weight and growth stages 1.5 Measures to manage health of breeders are applied following industry standards.	1.1 Stocking density 1.2 Daily feed requirement 1.3 Kind of feeds 1.4 Growth stages 1.5 Procedure in feeding breeders 1.6 Measures in managing health of breeders	1.1 Computing stocking density 1.2 Computing feed ration 1.3 Feeding broodstock 1.4 Treating lesions and wounds 1.5 Practicing health management
2. Rear larvae, fries and fingerlings	2.1 Larval stages are determined per species according to industry standards. 2.2 ***Natural foods*** are introduced to larval rearing tanks 2.3 Natural food density is monitored following industry practice.	2.1 Good Aquaculture Practices (GAqP) 2.2 Larval stages per species 2.3 Natural foods 2.3.1 Density computation 2.3.2 Density adjustment 2.3.3 Monitoring procedure 2.4 Procedure in stocking	2.1 Determining larval stages 2.2 Introducing natural foods to larval rearing tanks 2.3 Monitoring natural food density 2.4 Adjusting feeding 2.5 Introducing artificial feeds 2.6 Perform acclimatization

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	2.4 Feed size is adjusted based on larval size. 2.5 ***Artificial feeds*** are introduced based on requirements. 2.5 Acclimatized ***post-larvae*** are stocked based species. 2.6 Growth of fry is monitored following industry established practices. 2.8 Fries are counted and stocked at appropriate density. 2.9 Fries are transferred to nursery tanks according to industry practice.	acclimatized post-larvae 2.6 Rearing requirements and procedure 2.7 Monitoring procedures for growth of fries 2.8 Fry counting and stocking 2.9 Transfer of fry from larval rearing tanks to nursery tanks	2.7 Stocking acclimatized post-larvae 2.8 Rearing fries 2.9 Monitoring growth of fries 2.10 Counting and stocking fry 2.11 Transferring fry to nursery tanks
3. Conduct water management	3.1 Water quality parameters are monitored following industry practices. 3.2 Remedial actions are applied based on results of water quality monitoring. 3.3 Water are replenished according to GAqP. 3.4 Aeration are maintained following GAqP. 3.5 Rearing water is changed following GAqP.	3.1 Water quality parameters 3.2 Monitoring procedure 3.3 Remedial actions 3.4 Procedure in water replenishment 3.5 Maintenance of aeration 3.6 Good Aquaculture Practices (GAqP) 3.7 Periodic changing of rearing water	3.1 Monitoring water quality 3.2 Applying remedial actions 3.3 Reading results of water quality monitoring 3.4 Replenishing water 3.5 Applying GAqP 3.6 Maintaining aeration 3.7 Changing rearing water

RANGE OF VARIABLES

VARIABLE	RANGE
1. Natural foods	Natural foods may include but not limited to: 1.1 Artemia cyst 1.2 Rotifers
2. Artificial feeds	Artificial feeds include: 2.1 Micro pellet 2.2 Fry booster
3. Post-larvae	Post larvae may include: 3.1 Fry 3.2 Seedlings

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Maintained breeders. 1.1.1 Computed stocking density. 1.1.2 Computer daily feed requirement. 1.1.3 Determined appropriate feeds. 1.1.4 Fed breeders. 1.1.5 Identified measures to manage health. 1.2 Rear larvae and fry. 1.2.1 Changed larval rearing water. 1.2.2 Determined larval stages. 1.2.3 Introduced natural/live foods. 1.2.4 Monitored natural/lived food. 1.2.5 Shifted natural/live food to bigger sizes. 1.2.6 Stocked acclimatized post-larvae. 1.2.7 Reared fry. 1.2.8 Monitored growth of fry. 1.2.9 Counted and stocked fry. 1.3 Conducted water management. 1.3.1 Monitored water quality parameters. 1.3.2 Applied remedial actions. 1.3.3 Replenished water. 1.3.4 Maintained aeration.
2. Resource Implications	The following resources should be provided: 2.1 Actual or simulated workplace 2.2 Tools, materials and equipment needed to perform required tasks 2.3 References and manuals 2.4 PPE
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Written examination 3.2 Demonstration 3.3 Oral questioning
4. Context for Assessment	4.1 Competency may be assessed individually in the actual workplace or simulation environment in TESDA accredited institutions.

UNIT OF COMPETENCY : COMPLETE HATCHERY OPERATION

UNIT CODE : AFF622313

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to harvest post larvae and fries, coordinate dispersal of hatchery produce and restore aquaculture hatchery facilities. Specifically, it includes functions such as monitoring morphological features, transporting, disposing fry and restoring workplace.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Harvest post-larvae and fries	1.1 Hatchery harvesting equipment and paraphernalia are prepared based on of stock to be harvested. 1.2 Morphological features are monitored to determine stage. 1.3 Post-larvae and fries are collected following GAqP. 1.4 Post-larvae and fries are conditioned and counted for packing and transporting. 1.5 Recordkeeping is performed following workplace procedures.	1.1 Hatchery harvesting equipment and paraphernalia 1.2 Morphological features 1.3 Procedure in collecting post-larvae and fry 1.4 Good Aquaculture Practices (GAqP) 1.5 Procedure in conditioning and counting post-larvae and fry 1.6 Procedure in packing and transporting post-larvae and fry 1.7 Recordkeeping procedure	1.1 Monitoring morphological features 1.2 Collecting fully metamorphosed larvae (fry) 1.3 Sorting harvested fry 1.4 Conditioning and counting fry for packing
2. Coordinate dispersal of hatchery produce	2.1 Dispersal transactions are confirmed with the immediate superior following industry established practices. 2.2 Pick-up and delivery schedule is arranged according to established	2.1 Dispersal transactions 2.2 Procedure in securing forms and documents on dispersal arrangements 2.3 Procedure in arranging pick-up and delivery schedule	2.1 Confirming dispersal transactions 2.2 Scheduling pick-up and delivery 2.3 Securing forms and documents 2.4 Handing hatchery produce

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	enterprise procedures. 2.3 Forms and documents on dispersal arrangements are secured according to established industry procedures. 2.4 ***Hatchery produce*** is handled during dispersal according to industry procedures. 2.5 Basic bookkeeping is performed according to workplace procedures.	2.4 Handling of hatchery produce 2.5 Basic bookkeeping	2.5 Conducting simple book-keeping
3. Restore aquaculture hatchery facilities	3.1 Tools are cleaned and stored following enterprise procedures. 3.2 Equipment and facilities are disinfected based on instructional manuals and standing operating procedures. 3.3 Safety practices are applied based on OSHS. 3.4 Waste management is performed according environmental rules and regulations.	3.1 Procedure in cleaning and storing tools 3.2 Procedure in disinfecting equipment and facilities 3.3 Instructional manuals and standard operating procedures 3.4 Occupational Safety and Health Standards (OSHS) 3.5 Waste management	3.1 Cleaning and storing tools are cleaned 3.2 Disinfecting equipment and facilities 3.3 Applying safety practices 3.4 Performing waste management

RANGE OF VARIABLES

VARIABLE	RANGE
1. Hatchery produce	Hatchery produce includes: 1.1 Eggs 1.2 Fry 1.3 Post-larvae

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Harvested larvae and fry. 1.1.1 Prepared hatchery harvesting equipment, paraphernalia appropriate to stage of stock. 1.1.2 Monitored morphological features. 1.1.3 Collected post-larvae and fry. 1.1.4 Conditioned and counted post-larvae and fry. 1.1.5 Performed recordkeeping. 1.2 Coordinated dispersal of hatchery produce. 1.2.1 Confirmed dispersal transactions. 1.2.2 Arranged pick-up and delivery schedule. 1.2.3 Secured forms and documents on dispersal arrangements. 1.2.4 Handled hatchery produce. 1.2.5 Performed basic bookkeeping. 1.3 Restored aquaculture hatchery facilities. 1.3.1 Cleaned and stored tools. 1.3.2 Disinfected equipment and facilities. 1.3.3 Applied safety practices. 1.3.4 Performed waste management.
2. Resource Implications	The following resources should be provided: 2.1 Actual or simulated Hatchery facilities 2.2 Tools, materials and equipment needed to perform required tasks 2.3 References and manuals 2.4 PPE
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Written examination 3.2 Demonstration 3.3 Oral questioning
4. Context for Assessment	4.1 Competency may be assessed individually in the actual workplace or simulation environment in TESDA accredited institutions.

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 **AQUACULTURE (HATCHERY OPERATION) NC II**.

3.1 CURRICULUM DESIGN

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

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

Course Title: **AQUACULTURE (HATCHERY OPERATION) NC II**

Nominal Training Duration:	37	Hours (Basic Competencies)
	72	Hours (Common Competencies)
	77	Hours (Core Competencies)
	186	
	80	**Supervised Industry Learning (SIL)**
	266	**TOTAL HOURS**

Course Description:

This course is designed to develop and enhance the knowledge, desirable attitudes and skills of a conducting preparatory activities, producing natural foods, conducting broodstock management and spawning, managing feeding and maintaining good health of stocks, and completing hatchery operation.

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

BASIC COMPETENCIES
37 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration

1. Participate in workplace communication	1.1 Obtain and convey workplace information	• Describe Organizational policies
		• Read:
		  ○ Effective communication
		  ○ Written communication
		  ○ Communication procedures and systems
		• Identify:
		  ○ Different modes of communication
		  ○ Medium of communication
		  ○ Flow of communication
		  ○ Available technology relevant to the enterprise and the individual's work responsibilities
		• Prepare different Types of question
		• Gather different sources of information
		• Apply storage system in establishing workplace information
		• Demonstrate Telephone courtesy
			• Group discussion
			• Lecture
			• Demonstration
				• Oral evaluation
				• Written examination
				• Observation
					2 Hours

	1.2 Perform duties following workplace instructions	• Read:
		  ○ Written notices and instructions
		  ○ Workplace interactions and procedures
			• Group discussion
			• Lecture
			• Demonstration
				• Oral evaluation
				• Written examination
				• Observation
					2 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• Read instructions on work related forms/documents • Perform workplace duties scenario following workplace instructions			

	1.3 Complete relevant work related documents	• Describe Communication procedures and systems
		• Read:
		  ○ Meeting protocols
		  ○ Nature of workplace meetings
		  ○ Workplace interactions
		  ○ Barriers of communication
		• Read instructions on work related forms/documents
		• Practice:
		  ○ Estimate, calculate and record routine workplace measures
		  ○ Basic mathematical processes of addition, subtraction, division and multiplication
		• Demonstrate office activities in:
		  ○ workplace meetings and discussions scenario
		• Perform workplace duties scenario following simple written notices
		• Follow simple spoken language
		• Identify the different Non-verbal communication
			• Group discussion
			• Lecture
			• Demonstration
			• Role play
				• Oral evaluation
				• Written examination
				• Observation
					2 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• Demonstrate ability to relate to people of social range in the workplace • Gather and provide information in response to workplace requirements • Complete work related documents			
2. Work in a team environment	2.1 Describe team role and scope	• Discussion on team roles and scope • Participate in the discussion: ○ Definition of Team ○ Difference between team and group ○ Objectives and goals of team • Locate needed information from the different sources of information	• Lecture/ Discussion • Group Work • Individual Work • Role Play	• Role Play • Case Study • Written Test	1 Hour
	2.2 Identify one's role and responsibility within team	• Role play: ○ individual role and responsibility • Role Play ○ Understanding Individual differences • Discussion on gender sensitivity	• Role Play • Lecture/ Discussion	• Role Play • Written Test	1 Hour
	2.3 Work as a team member	• Participate in group planning activities • Role play: Communication protocols • Participate in the discussion of standard work procedures and practices	• Group work • Role Play • Lecture/ Discussion	• Role Play • Written Test	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
3. Solve/address routine problems	3.1 Identify routine problems	• Determine the current industry hardware and software products and services • Identify correctly the industry maintenance, service and helpdesk practices, processes and procedures • Make use of the industry standard diagnostic tools • Share best practices in determining basic malfunctions and resolutions to general problems in the workplace • Analyze routine/procedural problems	• Group discussion • Lecture • Demonstration • Role playing	• Case Formulation • Life Narrative Inquiry (Interview) • Standardized test	1 Hour
	3.2 Look for solutions to routine problems	• Determine the current industry hardware and software products and services • Identify correctly the industry maintenance, service and helpdesk practices, processes and procedures • Make use of the industry standard diagnostic tools • Share best practices in determining basic malfunctions and resolutions to general problems in the workplace • Formulate possible solutions to problems and document procedures for reporting	• Group discussion • Lecture • Demonstration • Role playing	• Case Formulation • Life Narrative Inquiry (Interview) • Standardized test	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	3.3 Recommend solutions to problems	• Discuss standard operating procedures and documentation processes	• Group discussion • Lecture • Demonstration • Role playing	• Case Formulation • Life Narrative Inquiry (Interview) • Standardized test	1 Hour
4. Develop Career and Life Decisions	4.1 Manage one's emotion	• Demonstrate self-management strategies that assist in regulating behavior and achieving personal and learning goals • Explain enablers and barriers in achieving personal and career goals • Identify techniques in handling negative emotions and unpleasant situation in the workplace such as frustration, anger, worry, anxiety, etc. • Manage properly one's emotions and recognize situations that cannot be changed and accept them and remain professional • Recall instances that demonstrate self- discipline, working independently and showing initiative to achieve personal and career goals	• Discussion • Interactive Lecture • Brainstorming • Demonstration • Role-playing	• Demonstration or simulation with oral questioning • Case problems involving workplace diversity issues	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• Share experiences that show confidence, and resilience in the face of setbacks and frustrations and other negative emotions and unpleasant situations in the workplace			
	4.2 Develop reflective practice	• Enumerate strategies to improve one's attitude in the workplace • Explain Gibbs' Reflective Cycle/Model (Description, Feelings, Evaluation, Analysis, Conclusion, and Action plan) • Use basic SWOT analysis as self-assessment strategy • Develop reflective practice through realization of limitations, likes/ dislikes; through showing of self-confidence • Demonstrate self-acceptance and being able to accept challenges	• Small Group Discussion • Interactive Lecture • Brainstorming • Demonstration • 5 Role-playing	• Demonstration or simulation with oral questioning • Case problems involving workplace diversity issues	1 Hour
	4.3 Boost self-confidence and develop self-regulation	• Describe the components of self-regulation based on Self-Regulation Theory (SRT) • Explain personality development concepts • Cite self-help concepts (e. g., 7 Habits by Stephen Covey, transactional analysis, psycho-spiritual concepts) • Perform effective communication skills – reading, writing, conversing skills	• Small Group Discussion • Interactive Lecture • Brainstorming • Demonstration • Role-playing	• Demonstration or simulation with oral questioning • Case problems involving workplace diversity issues	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• Show affective skills – flexibility, adaptability, etc. • Determine strengths and weaknesses			
5. Contribute to workplace innovation	5.1 Identify opportunities to do things better	• Identify different roles of individuals in contributing to doing things better in the workplace • Appreciate positive impacts and challenges in innovation • Show mastery of the different types of changes and levels of participation in the workplace • Discuss 7 habits of highly effective people	• Interactive Lecture • Appreciative Inquiry • Demonstration • Group work	• Psychological and behavioral Interviews • Performance Evaluation • Life Narrative Inquiry • Review of portfolios of evidence and third-party workplace reports of on-the-job performance. • Standardized assessment of character strengths and virtues applied	1 Hour
	5.2 Discuss and develop ideas with others	• Identify different roles of individuals in contributing to doing things better in the workplace • Appreciate positive impacts and challenges in innovation • Show mastery of the different types of changes and levels of participation in the workplace	• Interactive Lecture • Appreciative Inquiry • Demonstration • Group work	• Psychological and behavioral Interviews • Performance Evaluation • Life Narrative Inquiry	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• Discuss 7 habits of highly effective people • Communicate ideas through small group discussions and meetings		• Review of portfolios of evidence and third-party workplace reports of on-the-job performance. • Standardized assessment of character strengths and virtues applied	
	5.3 Integrate ideas for change in the workplace	• Identify different roles of individuals in contributing to doing things better in the workplace • Appreciate positive impacts and challenges in innovation • Show mastery of the different types of changes and levels of participation in the workplace • Discuss 7 habits of highly effective people • Communicate ideas through small group discussions and meetings • Demonstrate basic skills in data analysis	• Interactive Lecture • Appreciative Inquiry • Demonstration • Group work	• Psychological and behavioral Interviews • Performance Evaluation • Life Narrative Inquiry • Review of portfolios of evidence and third-party workplace reports of on-the-job performance. • Standardized assessment of character strengths and virtues applied	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
6. Present relevant information	6.1 Gather data/ information	• Lecture and discussion on: - Organisational protocols - Confidentiality and accuracy - Computing for expenses and possible earnings - Legislation, policy and procedures relating to the conduct of evaluations • Reviewing data/ information	• Group discussion • Lecture • Demonstration • Role Play	• Oral evaluation • Written Test • Observation • Presentation	2 Hours
	6.2 Assess gathered data/ information	• Lecture and discussion on: - Evaluation of gathered information using basic mathematical operation - Organisational values, ethics and codes of conduct - Trends and anomalies • Computing for expenses and possible earnings	• Group discussion • Lecture • Demonstration • Role Play • Practical exercises	• Oral evaluation • Written Test • Observation • Presentation	3 Hours
	6.3 Record and present information	• Lecture and discussion on: - Reporting requirements to a range of audiences - Recommendations for possible improvements • Comparison of interim and final reports' outcomes • Reporting of data findings	• Group discussion • Lecture • Demonstration • Role Play • Practical exercises	• Oral evaluation • Written Test • Observation • Presentation	3 Hours
7. Practice Occupational Safety And Health Policies And Procedures	7.1 Identify OSH compliance requirements	• Discussion regarding: - Hierarchy of Controls - Hazard Prevention and Controls - Work Standards and Procedures - Personal Protective Equipment	• Lecture • Group Discussion	• Written Exam • Demonstration • Observation • Interviews / • Questioning	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	7.2 Prepare OSH requirements for compliance	• Identification of required safety materials, tools and equipment • Handling of safety control resources	• Lecture • Group Discussion	• Written Exam • Demonstration • Observation • Interviews / • Questioning	1 Hour
	7.3 Perform tasks in accordance with relevant OSH policies and procedures	• Discussion of General OSH Standards and Principles • Performing industry related work activities in accordance with OSH Standards	• Lecture • Group Discussion	• Written Exam • Demonstration • Observation • Interviews / • Questioning	2 Hours
8. Exercise Efficient and Effective Sustainable Practices in the Workplace	8.1 Identify the efficiency and effectiveness of resource utilization	- Discussion on the process how Environmental Policies coherence is achieved • Discussion on Necessary Skills in response to changing environmental policies needs - Waste Skills - Energy Skills - Water Skills - Building Skills - Transport Skills - Material Skills	• Lecture • Group Discussion • Simulation • Demonstration	• Written Exam • Demonstration • Observation • Interviews / • Questioning	1 Hour
	8.2 Determine causes of inefficiency and/or ineffectiveness of resource utilization	• Discussion of Environmental Protection and Resource Efficiency Targets • Analysis on the Relevant Work Procedure	• Lecture • Group Discussion • Demonstration	• Written Exam • Demonstration • Observation • Interviews / • Questioning	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	8.3 Convey inefficient and ineffective environmental practices	• Identification of (re)training needs and usage of environment friendly methods and technologies • Identification of environmental corrective actions • Practicing Environment Awareness	• Lecture • Group Discussion • Role Play • Demonstration	• Written Exam • Demonstration • Observation • Interviews / • Questioning	1 Hour
9. Practice Entrepreneurial Skills in the Workplace	9.1 Apply entrepreneurial workplace best practices	• Determine best entrepreneurial practices • Discussion on Quality procedures and practices • Explain cost consciousness in resource utilization	• Interview • Lecture/Discussion	• Written Test • Interview	1 Hour
	9.2 Communicate entrepreneurial workplace best practices	• Discussion on communicating entrepreneurial workplace best practices	• Lecture/Discussion	• Written Test • Interview	1 Hour
	9.3 Implement cost-effective operations	• Apply preservation, optimization and judicious use of workplace resources	• Interview • Lecture/Discussion	• Written Test • Interview	2 Hours

COMMON COMPETENCIES
72 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
1. Apply safety measures in farm operations	1.1 Determine areas of concern for safety measures	• Identify work tasks in farm operations	• Lecture • Discussion • Incomplete worksheet • Power point presentation • Video presentation	• Written examination • Interview • Oral questioning • Demonstration	(Total-7 hrs) 1 hr
		• Discuss safety measures in a workplace during farm operations	• Lecture • Discussion • Incomplete worksheet • Power point presentation • Video presentation • Role playing	• Written examination • Interview • Oral questioning • Demonstration	1 hr
		• Explain farm operations situations and period when to observe safety	• Lecture • Discussion • Incomplete worksheet • Power point presentation • Video presentation • Role playing	• Written examination • Interview • Oral questioning • Demonstration	1 hr
		• Identify appropriate tools, materials and outfits to be used	• Lecture • Discussion	• Written examination	2 hrs

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
			• Incomplete worksheet • Power point presentation • Video presentation	• Interview • Oral questioning • Demonstration	
		• Prepare tools, materials and outfits for the farm operation	• Lecture • Discussion • Power point presentation • Video presentation • Demonstration	• Written examination • Interview • Oral questioning • Demonstration	2 hrs
	1.2 Apply appropriate safety measures	• Enumerate uses and functions of tools and materials	• Discussion • Power point presentation • Video presentation • Demonstration	• Written examination • Interview • Oral questioning • Demonstration	(Total -11 hrs.) 1 hr
		• Explain procedures of wearing personal protective equipment	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning	1 hr
		• Discuss topics on effectivity, shelf life and expirations of materials to be used	• Discussion • Power point presentation • Video presentation	• Written examination • Interview • Oral questioning	1 hr

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
			• Incomplete worksheet		
		• Identify the emergency procedures	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning	2 hrs
		• Identify hazards in a farm workplace	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning	2 hrs
		• Use tools and materials	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration • Hands-on	• Written examination • Interview • Oral questioning • Demonstration	2 hrs
		• Wear personal protective equipment	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning • Demonstration	0.5 hr

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
			• Demonstration		
		• Prepare report on hazards in the workplace	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning • Demonstration	1 hr
		• Report on hazards in the workplace	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Role playing	• Written examination • Interview • Oral questioning • Demonstration	0.5 hr
	1.3 Safekeep/ dispose of tools, materials and outfit	• Explain cleaning and storing procedures of the used tools and outfit	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning	(Total – 6 hrs) 1 hr
		• State labelling and storing procedures for unused materials	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning	1 hr
		• Explain proper wastes disposal	• Discussion	• Written examination	1 hr

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
			• Power point presentation • Video presentation • Incomplete worksheet	• Interview • Oral questioning	
		• Clean and store used tools and outfit	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration • Hands-on	• Written examination • Interview • Oral questioning • Demonstration	1 hr
		• Label and store unused materials	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration • Hands-on	• Written examination • Interview • Oral questioning • Demonstration	1 hr
		• Dispose waste materials	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration	• Written examination • Interview • Oral questioning • Demonstration	1 hr

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
			• Hands-on		
2. Use farm tools	2.1 Select and use farm tools	• Identify farm tools	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration	• Written examination • Interview • Oral questioning • Demonstration	(Total -6 hrs) 1 hr
		• Describe faults and defective tools	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration	• Written examination • Interview • Oral questioning • Demonstration	1 hr
		• Discuss using of tools and equipment relating to manufacturer's manual	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration • Hands-on	• Written examination • Interview • Oral questioning • Demonstration	1 hr
		• Check farm tools for faults and defects	• Discussion • Power point presentation • Video presentation	• Written examination • Interview • Oral questioning • Demonstration	1 hr

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
			• Incomplete worksheet • Demonstration • Hands-on		
		• Use tools and equipment relating to manufacturer's manual	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration • Hands-on	• Written examination • Interview • Oral questioning • Demonstration	2 hrs
	2.2 Select and operate farm equipment	• Identify farm equipment	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning	(Total -19 hrs) 1 hr
		• Explain importance of reading manufacturer's manual	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning	1 hr
		• Discuss pre-operation check and its importance	• Discussion • Power point presentation • Video presentation	• Written examination • Interview • Oral questioning	1 hr

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
			• Incomplete worksheet		
		• Identify different types of faults in farm equipment	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning	1 hr
		• Enumerate reporting procedures	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Role playing	• Written examination • Interview • Oral questioning • Demonstration	1 hr
		• Enumerate procedures in using farm equipment	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning	1 hr
		• Discuss safety procedures for farm operation	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning	1 hr

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• Read manufacturer's manual	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration	• Written examination • Interview • Oral questioning • Demonstration	1 hr
		• Conduct pre-operation check-up	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration • Hands-on	• Written examination • Interview • Oral questioning • Demonstration	1 hr
		• Report identified faults	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration • Hands-on	• Written examination • Interview • Oral questioning • Demonstration	1 hr
		• Operate farm equipment	• Discussion • Power point presentation • Video presentation	• Written examination • Interview • Oral questioning • Demonstration	8 hrs

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
			• Incomplete worksheet • Demonstration • Hands-on • Field visit		
		• Follow safety procedures	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration • Hands-on	• Written examination • Interview • Oral questioning • Demonstration	1 hr
	2.3 Perform preventive maintenance	• Enumerate cleaning procedures for tools and equipment	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning • Demonstration	(Total -7 hrs) 1 hr
		• Discuss significance of routine check-up and maintenance	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning • Demonstration	1 hr
		• Explain procedures in storing tools and equipment	• Discussion • Power point presentation	• Written examination • Interview • Oral questioning	1 hr

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
			• Video presentation • Incomplete worksheet •	•	
		• Clean tools and equipment	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration • Hands-on •	• Written examination • Interview • Oral questioning • Demonstration	2 hrs
		• Perform routine check –up and maintenance	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration • Hands-on	• Written examination • Interview • Oral questioning • Demonstration	1 hr
		• Store tools and equipment	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration	• Written examination • Interview • Oral questioning • Demonstration	1 hr

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
			• Hands-on		
3. Perform estimation and basic calculation	3.1 Perform estimation	• Identify job requirements and work task/activity	• Lecture • Discussion	• Written exam • Oral questioning	(Total -8 hrs) 1 hr
		• Identify materials and resources of job requirements	• Lecture • Discussion	• Written exam • Oral questioning	1 hr
		• Estimate time to complete work task/activity	• Lecture • Discussion • Demonstration • Video presentation	• Written exam • Oral questioning	2 hrs
		• Estimate quantities of materials and resources	• Lecture • Discussion • Demonstration	• Written exam • Oral questioning	2 hrs
		• Prepare and submit bill of materials	• Lecture • Discussion • Demonstration	• Written exam • Oral questioning • Demonstration	2 hrs
	3.2 Perform basic workplace calculation	• Describe different types of calculation	• Lecture • Discussion	• Written exam • Oral questioning	(Total -8 hrs) 1 hr
		• Discuss different methods of calculation	• Lecture • Discussion	• Written exam • Oral questioning	1 hr
		• Describe system and unit of measurement	• Lecture • Discussion	• Written exam • Oral questioning	2 hrs
		• Compute quantity of feeds, amount of fertilizer and amount of medicines using methods of calculation, system of measurement and units of measurement	• Lecture • Discussion • Demonstration	• Written exam • Oral questioning	4 hrs

CORE COMPETENCIES
77 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
1. Conduct preparatory activities	1.1 Prepare hatchery tanks	1.1.1 Discuss and explain the following: • Proper aeration (water movement and bubbles) • Types filter bags and screen (with different mesh size) • Installation procedure of filter bags and drainage pipes • Filling-up tank based on species requirement • Operation of aeration system • Water depth based on species requirements • Estimation of airstone • Following guidelines in GAqP • GAqP on cleaning and disinfection of tanks • OSHS on hatchery tank preparation • Attitude: - Honest - Patient - Time-conscious - Resourceful - Obedient - Focus 1.1.2 Prepare hatchery tanks	• Lecture • Discussion • Demonstration	• Interviews • Written • Demonstration	2 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	1.2 Prepare hatchery facilities	1.2.1 Discuss and explain the following: • Preparation of tools and materials • Inspection and calibration of tools and instruments • Inspection of facilities • GAqP • Minor repairs of facilities • Major breakdowns • Water quality monitoring instruments • OSHS 1.2.2 Prepare hatchery facilities	• Lecture • Discussion • Demonstration	• Interviews • Written • Demonstration	2 hours
	1.3 Perform water filtration and treatment	1.3.1 Discuss and explain the following: • Water filtration technique • Water treatment technique • Procedure in chlorine testing filtered water • UV treatment procedure • OSHS • GAqP 1.3.2 Perform water filtration and treatment	• Lecture • Discussion • Demonstration	• Interviews • Written • Demonstration	4 hours
2. Produce natural foods	2.1 Perform pre-culture activities	2.1.1 Discuss and explain the following: • Starter culture • Density of culture • Procedure in monitoring density of culture	• Lecture • Discussion • Demonstration	• Interviews • Written • Demonstration	3 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• Good Aquaculture Practices (GAqP) • Kinds of Fertilizer • Kinds of Natural Food 2.1.2 Perform pre-culture activities			
	2.2 Conduct mass culture of natural food	2.2.1 Discuss and explain the following: • Density of natural food • Stocking procedure • Methods of mass culture production • Production of natural food production • Procedure in transferring micro-algae 2.2.2 Conduct mass culture of natural food	• Lecture • Discussion • Demonstration	• Interviews • Written • Demonstration	3 hours
	2.3 Provide quality water condition	2.3.1 Discuss and explain the following: • Aeration • Maintenance of water circulation and oxygenation • Maintenance of water temperature • Procedure in adjusting water salinity 2.3.2 Provide quality water condition	• Lecture • Discussion • Demonstration	• Interviews • Written • Demonstration	4 hours
	2.4 Hatch and harvest artemia nauplii	2.4.1 Discuss and explain the following: • Preparation of artemia hatching • Artemia cysts requirements	• Lecture • Discussion • Demonstration	• Interviews • Written • Demonstration	3 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• Good Aquaculture Practices (GAqP) • Density monitoring and recording • Procedure in gathering and separating artemia nauplii 2.4.2 Hatch and harvest artemia nauplii			
3. Conduct broodstock management and spawning	3.1 Source and maintain broodstock	3.1.1 Discuss and explain the following: • Broodstock • Reputable sources of broodstock • Sex determination technique • Segregation of breeders • Selection of breeders • Reproductive maturity of breeders • Proper handling of breeders 3.1.2 Source and maintain broodstock	• Lecture • Discussion • Demonstration	• Interviews • Written • Demonstration	10 hours
	3.2 Induce spawning	3.2.1 Discuss and explain the following: • Pre-spawning activities • Work requirements • Spawn induction techniques • Species requirement • Procedure in spawning breeder • Procedure in separating and transferring breeder	• Lecture • Discussion • Demonstration	• Interviews • Written • Demonstration	8 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• Good Aquaculture Practices (GAqP) • Quality assessment of spawns 3.2.2 Induce spawning			
	3.3 Collect eggs/ larvae/fry	3.3.1 Discuss and explain the following: • Procedure in collecting egg per species • Estimation • Fertilization rate • Hatching rate • Procedure in transferring newly hatched larvae • Larval rearing tanks • Procedure in stocking breeders • Conditioning breeders • Good Aquaculture Practices (GAqP) • Recordkeeping 3.3.2 Collect eggs/ larvae/fry	• Lecture • Discussion • Demonstration	• Interviews • Written • Demonstration	8 hours
4. Manage feeding and maintain good health of stock	4.1 Maintain breeders	4.1.1 Discuss and explain the following: • Stocking density • Daily feed requirement • Kind of feeds • Growth stages • Procedure in feeding breeders • Measures in managing health of breeders	• Lecture • Discussion • Demonstration	• Interviews • Written • Demonstration	3 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		4.1.2 Maintain breeders			
	4.2 Rear larvae and fry	4.2.1 Discuss and explain the following: • Periodic changing of larval rearing water • Good Aquaculture Practices (GAqP) • Larval stages per species • Natural foods - Density computation - Density adjustment - Monitoring procedure • Procedure in stocking acclimatized post-larvae • Rearing requirements and procedure • Monitoring growth of fry • Fry counting and stocking 4.2.2 Rear larvae and fry	• Lecture • Discussion • Demonstration	• Interviews • Written • Demonstration	10 hours
	4.3 Conduct water management	4.3.1 Discuss and explain the following: • Water quality parameters • Monitoring procedure • Remedial actions • Procedure in water replenishment • Maintenance of aeration • Good Aquaculture Practices (GAqP) 4.3.2 Conduct water management	• Lecture • Discussion • Demonstration	• Interviews • Written • Demonstration	6 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
5. Complete hatchery operation	5.1 Harvest post-larvae and fry	5.1.1 Discuss and explain the following: • Hatchery harvesting equipment and paraphernalia • Morphological features • Procedure in collecting post-larvae and fry • Good Aquaculture Practices (GAqP) • Procedure in conditioning and counting post-larvae and fry • Procedure in packing and transporting post-larvae and fry • Recordkeeping procedure 5.1.2 Harvest post-larvae and fry	• Lecture • Discussion • Demonstration	• Interviews • Written • Demonstration	4 hours
	5.2 Coordinate dispersal of hatchery produce	5.2.1 Discuss and explain the following: • Dispersal transactions • Procedure in securing forms and documents on dispersal arrangements • Procedure in arranging pick-up and delivery schedule • Handling of hatchery produce • Basic bookkeeping 5.2.2 Coordinate dispersal of hatchery produce	• Lecture • Discussion • Demonstration	• Interviews • Written • Demonstration	4 hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	5.3 Restore aquaculture hatchery facilities	5.3.1 Discuss and explain the following: • Procedure in cleaning and storing tools • Procedure in disinfecting equipment and facilities • Instructional manuals and standard operating procedures • Occupational Safety and Health Standards (OSHS) • Waste management 5.3.2 Restore aquaculture hatchery facilities	• Lecture • Discussion • Demonstration	• Interviews • Written • Demonstration	3 hours

3.2 TRAINING DELIVERY

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

    a. Course design is based on competency standards set by the industry or recognized industry sector; (Learning system is driven by competencies written to industry standards)
    b. Training delivery is learner-centered and should accommodate individualized and self-paced learning strategies;
    c. Training can be done on an actual workplace setting, simulation of a workplace and/or through adoption of modern technology.
    d. Assessment is based in the collection of evidence of the performance of work to the industry required standards;
    e. Assessment of competency takes the trainee's knowledge and attitude into account but requires evidence of actual performance of the competency as the primary source of evidence.
    f. Training program allows for recognition of prior learning (RPL) or current competencies;
    g. Training completion is based on satisfactory 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. Details can be referred to the Implementing Rules and Regulations of the DTS Law and the TESDA Guidelines on the DTP;

    - Distance learning is a formal education process in which majority of the instruction occurs when the students and instructor are not in the same place. Distance learning may employ correspondence study, audio, video, computer technologies or other modern technology that can be used to facilitate learning and formal and non-formal training. Specific guidelines on this mode shall be issued by the TESDA Secretariat.

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

- The classroom-based or in-center instruction uses of learner-centered methods as well as laboratory or field-work components.

2.2 Enterprise-Based:

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

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

- **Enterprise-based Training**- where training is implemented within the company in accordance with the requirements of the specific company. Specific guidelines on this mode shall be issued by the TESDA Secretariat.

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

3.3 TRAINEE ENTRY REQUIREMENTS

Trainees or students who would like to enroll in this program must possess the following requirements:

- Basic communication skills
- Basic mathematical skills

3.4 LIST OF TOOLS, EQUIPMENT, AND MATERIALS

AQUACULTURE (HATCHERY OPERATION) NC II

Recommended list of tools, equipment and materials for the training of 25 trainees for Aquaculture (Hatchery Operation) NC II.

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

A. FULL QUALIFICATION

TOOLS	
QTY	**DESCRIPTION**
5 pcs	Calculator
5 pcs	Containers glass or clear polycarbonate, 1 Liter cap.
5 pcs	Containers glass or clear polycarbonate: 1 gallon cap.
5 pcs	Containers glass or clear polycarbonate: 20 Liter cap.
5 pcs	Containers glass or clear polycarbonate: 500 Liter cap.
5 pcs	Scissors
5 pcs	Pail with handle, 16 L cap.
5 pcs	Beakers, 500 ml cap.
5 pcs	Beaker, 200ml cap.
5 pcs	Plastic scoop
5 pcs	Plastic basin
5 pcs	Dipper
5 pcs	Plastic bowl

EQUIPMENT	
QTY	**DESCRIPTION**
1 unit	Breeding tank, 100-tons cap.
1 unit	Aeration system
2 units	DO meter
2 units	pH meter
2 units	Refractometer
1unit	Ozonator
1unit	UV filter
2 units	Weighing scale, .01 readability, 1 Kg cap.
2 units	Weighing scale, .01 readability, 10 Kg cap.
5 units	Microscope
5 units	Counting chamber

EQUIPMENT	
QTY	**DESCRIPTION**
5 pcs	Tally counter
5 units	1-ton mass culture tank, PE
1 unit	Conical tank, 300L cap.
2 cans	Artemia cyst
1 unit	Digital microscope
2 units	Hemacytometer

MATERIALS	
QTY	**DESCRIPTION**
5 Kg	Calcium hypochlorite
5 Kg	Sodium thiosulfate
1 unit	Rapid sand filter
½ Kg	EDTA
2 units	Chlorine test kit
5 pcs	Goggles
25 pairs	Gloves
5 L	Micro-algae
5 L	Brachionus
1 gal	Nutrients solution
500 g	Potassium nitrate
50 g	Disodium phosphate
15 g	Ferric chloride
5 g	Disodium silicate
1 pc	Clean bench
2 units	Daylight lamp-40watts
1 unit	Alcohol lamp
24 Kg	Urea 46-0-0
12 Kg	Ammonium phosphate 16-20-0
60 Kg	Ammonium sulfate 21-0-0
2 meters	60-micron mesh nylon bolting cloth
1 Kg	Live fish
5 sets	Dextrose hose, 5 meter
1 box	Glass slide
1 vial	MS 222
	Plastic bag
5 pcs	Syringe, 5ml cap.
2 pcs	PVC pipe, 10cm x 3m
6 pcs	Elbow, 10cm
1 pc	Lady stockings
1,000 Kg	½ million eggs
5 pcs	Notebooks
25 Kg	Broodstock pellet
1 L	Formalin
1 Kg	Micro-pellet
1 Kg	Fry booster
1,000 pcs	Fry (kawag-kawag)
500 pcs	Fingerlings 30-50g (garungan)
500 pcs	Fingerlings 1g (haterin)

MATERIALS	
QTY	**DESCRIPTION**
5 pcs	Hapa net
1 set	Mesh, different size
10 pcs	Plastic bag
1 box	Rubber band
1 unit	Medical oxygen tank with hose
5 pcs	Styro box
5 pcs	Record book
5 pcs	Ball pen
5 pcs	Cleaning brush
5 pcs	Sponges
3 pcs	Trash can

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

B. PER COC

COC 1 – PRODUCE NATURAL FOODS

TOOLS	
QTY	**DESCRIPTION**
5 pcs	Filter bags
5 pcs	Scoop nets
5 pcs	Basin
5 pcs	Pail
5 pcs	Fish tubs
5 pcs	Small bowl
5 meters	Screen
5 meters	Air hose
5 pcs	Air stone
5 pcs	Air connector
5 meters	Seine net (1mm)
5 pcs	Thermometer
1 unit	Haemocythometer
1 pc	Counting chamber
1 box	Glass slides
5 pcs	Hatching jar

EQUIPMENT	
QTY	**DESCRIPTION**
2 units	Microscope

MATERIALS	
QTY	**DESCRIPTION**
5 pcs	Push brush
5 L	Chlorine powder and liquid
5 L	Bleach

MATERIALS	
QTY	**DESCRIPTION**
25 pcs	Sponge
25 pcs	Scouring pads
5 bars	Detergent bar
3 kls	Powder
3 kl	Micro-algae
2 L	Brachionus (starters)
2 L	Moina (starters)
2 kl	Fertilizer, Urea 46-0-0
2 kl	Fertilizer, Ammonium phosphate 16-20-0
2 kl	Fertilizer, Ammonium sulfate 21-0-0

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

COC 2 – CONDUCT BROODSTOCK MANAGEMENT AND SPAWNING

TOOLS	
QTY	**DESCRIPTION**
5 pcs	Filter bags
5 pcs	Scoop nets
5 pcs	Basin
5 pcs	Pail
5 pcs	Fish tubs
5 pcs	Small bowl
5 meters	Screen
5 meters	Air hose
5 pcs	Air stone
5 pcs	Air connector
5 meters	Seine net (1mm)
5 pcs	Thermometer
1 unit	Haemocythometer
1 pc	Counting chamber
1 box	Glass slides
5 pcs	Hatching jar

EQUIPMENT	
QTY	**DESCRIPTION**
2 units	Microscope

MATERIALS	
QTY	**DESCRIPTION**
5 pcs	Push brush
5 L	Chlorine liquid
5 L	Bleach
25 pcs	Sponge
25 pcs	Scouring pads
5 bars	Detergent bar

MATERIALS	
QTY	**DESCRIPTION**
3 kl	Detergent powder

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

COC 3 – MANAGE FEEDING AND MAINTAIN GOOD HEALTH OF STOCK

TOOLS	
QTY	**DESCRIPTION**
5 pcs	Filter bags
5 pcs	Scoop nets
5 pcs	Basin
5 pcs	Pail
5 pcs	Fish tubs
5 pcs	Small bowl
5 meters	Screen
5 meters	Air hose
5 pcs	Air stone
5 pcs	Air connector
5 meters	Seine net (1mm)
5 pcs	Thermometer
1 unit	Haemocythometer
1 pc	Counting chamber
1 box	Glass slides
5 pcs	Hatching jar

EQUIPMENT	
QTY	**DESCRIPTION**
2 units	Microscope

MATERIALS	
QTY	**DESCRIPTION**
5 pcs	Push brush
5 L	Chlorine liquid
5 L	Bleach
25 pcs	Sponge
25 pcs	Scouring pads
5 bars	Detergent bar
3 kl	Detergent powder
3 bot	Artemia cyst (50g/bottle)
2L	Rotifers
50 kl	Micro pellet
50 kl	Fry booster

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

COC 4 – COMPLETE HATCHERY OPERATION

TOOLS	
QTY	**DESCRIPTION**
5 pcs	Calculator

MATERIALS	
QTY	**DESCRIPTION**
500 pcs	Hatchery produce, eggs
500 pcs	Hatchery produce, fry
500 pcs	Hatchery produce, post-larvae
5 pcs	Record book

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

3.5 TRAINING FACILITIES

AQUACULTURE (HATCHERY OPERATION) NC II

The size of the hatchery operation workshop must be suited on the requirements of the competencies. The class size of 25 learners/trainees is reserved for the teaching/ learning and circulation areas as follows:

SPACE REQUIREMENT	SIZE IN METERS	AREA IN SQ. METERS	TOTAL AREA IN SQ. METERS
A. Building (permanent)			**295.20**
• Student/Trainee Working Space	2.00 x 2.00 per student/trainee	4.00 per student	100.00
• Learning Resource Center	3.00 x 5.00	15.00	15.00
• Activity Room			180.20
- Wash room	10X15	150.00	
- Store room	4X4	16.00	
- Rest room Male Female PWD	 3.7 5.2 5.3	14.20	
B. Demo Farm			**4,750.00**
Pond		3,000.00	
Artificial incubation system		500.00	
Conditioning pond		1,200.00	
Tanks		50.00	
GRAND TOTAL			**5,045.20**

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

3.6 TRAINER'S QUALIFICATIONS FOR AQUACULTURE (HATCHERY OPERATION) NC II

- Must be a holder of NTTC I (NC + TMC) in AQUACULTURE (HATCHERY OPERATION) NC II
- Must have at least 2 years industry experience within the last five (5) years

3.7 INSTITUTIONAL Assessment

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

SECTION 4 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 ASSESSMENT AND CERTIFICATION ARRANGEMENTS

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

4.1.2 A Certificate of Competency (COC) is issued by the Authority to individuals who were assessed as competent in a single unit or cluster of related units of competency.

COC1: Produce natural foods
- Conduct preparatory activities
- Produce natural foods

COC2: Conduct broodstock management and spawning
- Conduct preparatory activities
- Conduct broodstock management and spawning

COC3: Manage feeding and maintain good health of stock
- Conduct preparatory activities
- Manage feeding and maintain good health of stock

COC4: Complete hatchery operation

4.1.3 Upon accumulation of the COCs acquired, an individual shall be issued the corresponding National Certificate for the Qualification.

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

4.1.5 The industry shall determine assessment and certification requirements for each qualification with promulgated Training Regulations. It includes the following:

a. Entry requirements for candidates
b. Evidence gathering methods
c. Qualification requirements of competency assessors
d. Specific assessment and certification arrangements as identified by industry

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

4.1.7 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

4.2.2 **Accredited Assessment Center.** Only Assessment Center accredited by TESDA is authorized to conduct competency assessment. Assessment centers undergo a quality assured procedure for accreditation before they are authorized by TESDA to manage the assessment for National Certification.

4.2.3 **Accredited Competency Assessor**. Only accredited competency assessor is authorized to conduct assessment of competence. Competency assessors undergo a quality assured system of accreditation procedure before they are authorized by TESDA to assess the competencies of candidates for National Certification.

COMPETENCY MAP FOR AGRICULTURE, FORESTRY AND FISHERY SECTOR
AQUACULTURE (HATCHERY OPERATION) NC II

ANNEX A

BASIC COMPETENCIES

Receive and respond to workplace communication	Participate in workplace communication	Lead workplace communication	Utilize specialized communication skill	Manage and sustain effective communication strategies
Work with others	Work in a team environment	Lead small teams	Develop and lead teams	Manage and sustain high performing teams
Solve/address routine problems	Solve/address general workplace problems	Apply critical thinking and problem solving techniques in the workplace	Perform higher-order thinking processes and apply techniques in the workplace	Evaluate higher order thinking skills and adjust problem solving techniques
Enhance self-management skills	Develop career and life decisions	Work in a diverse environment	Contribute to the practice of social justice in the workplace	Advocate strategic thinking for global citizenship
Support innovation	Contribute to workplace innovation	Propose methods of applying learning and innovation in the organization	Manage innovative work instructions	Incorporate innovation into work procedures
Access and maintain information	Present relevant information	Use information systematically	Manage and evaluate usage of information	Develop systems in managing, and maintaining information
Follow occupational safety and health policies and procedures	Practice occupational safety and health policies and procedures	Evaluate occupational safety and health work practices	Lead in improvement of occupational safety and health program, policies and procedures	Manage implementation of OSH programs in the workplace
Apply environmental work standards	Exercise efficient and effective sustainable practices in the workplace	Evaluate environmental work practices	Lead towards improvement of environmental work programs, policies and procedures	Manage implementation of environmental programs in the workplace
Adopt entrepreneurial mindset in the workplace	Practice entrepreneurial skills in the workplace	Facilitate entrepreneurial skills for micro-small-medium enterprises (MSMEs)	Sustain entrepreneurial skills	Develop and sustain a high-performing enterprise

COMMON COMPETENCIES

Apply safety measures in farm operation	Use farm tools and equipment	Perform estimation and basic calculation	Apply basic first aid	Process farm wastes
Perform record keeping	Maintain service records	Conduct Diagnosis	Perform Shop Maintenance	Provide Quality Customer Service
Comply with Quality and Ethical Standards	Perform mensuration and calculations	Maintain tools and equipment	Apply food safety and sanitation	Prevent and fight fire
Comply with Quality and Ethical Standards	Perform mensuration and calculations	Maintain tools and equipment	Apply food safety and sanitation	Prevent and fight fire
Provide first aid treatment on board	Protect marine environment	Comply with emergency procedures	Apply safety measures in farm and nursery operations	Use farm and nursery tools and equipment
Develop and update industry knowledge				

CORE COMPETENCIES

Apply deckhand skills aboard a fishing vessel	Load and unload goods / cargo	Assemble and repair damaged netting	Operate a vessel of up to 3.0 GT	Monitor condition and seaworthiness of a vessel
Perform routine maintenance tasks on a small coastal vessel	Operate and troubleshoot low powered marine engines	Apply weather information when navigating a vessel	Contribute to safe navigation	Apply basic food handling and safety practices
Supervise unloading and loading of net	Evaluate net mending	Administer and monitor net mending	Unload and load fish and fish products	Classify fish and fish products
Operate Seaweed Nursery	Grow-out seaweed	Produce raw dried seaweed	Market seaweed	Conduct site selection and pond preparation
Perform nursery operations	Produce aquaculture commodities	Carry out post production activities	Conduct pre-operational aquaculture activities	Operate tilapia hatchery and nursery
Perform tilapia grow-out	Conduct preparatory activities	Produce natural foods	Conduct broodstock management and spawning	Manage feeding and maintain good health of stock
Complete hatchery operation				

GLOSSARY OF TERMS

Artificial Incubation System	a system used for artificial incubation of eggs.
Breeder	the fish kept for propagation
Broodstock	the fish used for breeding
Egg	fertilized or unfertilized eggs release by the fish in the breeding process.
Fin Clip	is the basic method for marking fish, used for identifying a small number or large group of fish.
Fingerlings	a fish larger than a fry but not of marketable table size. Fingerlings of different fish species varies in sizes.
Fry	newly hatched fish exhibiting the external characteristics of the adults
Hapa	an inverted mosquito net like structure where fish can be spawned, temporarily stocked.
Natural foods	live foods
Pond	an area of water that is surrounded by land where fish can be bred, spawned and grown.
Tank	a relatively small chamber. It may be round, rectangular, square or another shape.

TRAINING REGULATIONS (TR)
DOCUMENT REVISION HISTORY

Qualification Title: **Aquaculture (Hatchery Operation) NC II**
Qualification Code: **AFFAHO220**

Revision No.	Document Types*	Qualification Title	TESDA Board Resolution No./ Date	Deployment Circular (TESDA Circular/ Implementing Guidelines)
00	Document Created	Aquaculture NC II	TBR No. 2004-21/ 12/09/2004	Not applicable
	Document Superseded	Aquaculture NC II	TBR No. 2004-21/ 12/09/2004	Not applicable
00	Document Amended	Aquaculture (Hatchery Operation) NC II	TBR No. 2020-23/ 06/09/2020	TESDA Circular No. 106 series of 2020
00	Document Amended	Aquaculture (Grow-out Operation) NC II	TBR No. 2020-24/ 06/09/2020	TESDA Circular No. 101 series of 2020
00	Document Amended	Aquaculture (Tilapia Culture) NC II	TBR No. 2020-25/ 06/09/2020	TESDA Circular No. 107 series of 2020

Legend: ***Description Types**
- **Document Created**
- **Document Amended**
- **Document Superseded**

ACKNOWLEDGEMENTS

The Technical Education and Skills Development Authority (TESDA) would like to recognize the commitment of industry stakeholders who shared their time and expertise for the development of this Training Regulations. This TR is also dedicated in memory of Engr. George Q. Canapi, a member of technical expert panel.

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