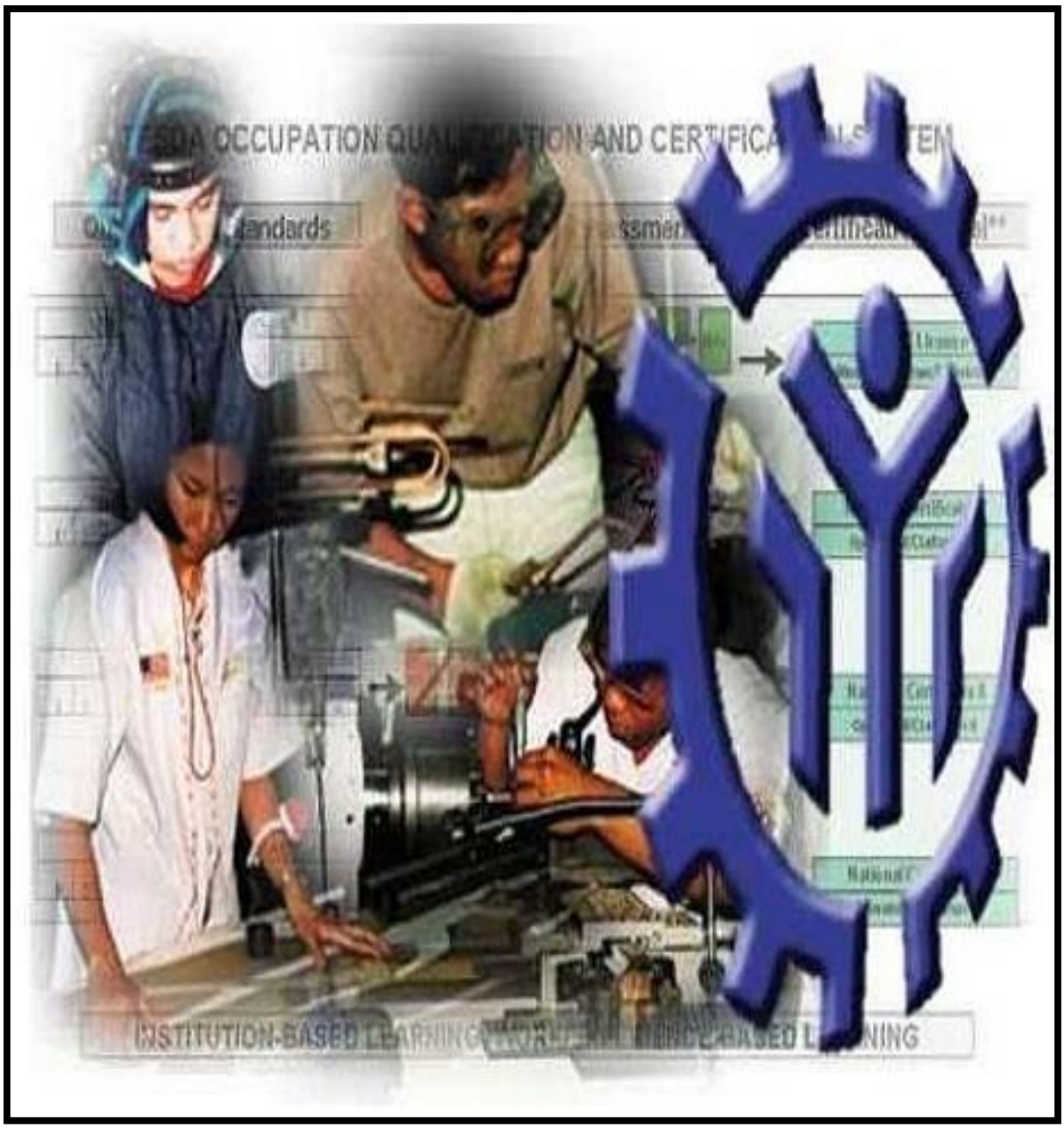
TRAINING REGULATIONS

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

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

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

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TRAINING REGULATIONS FOR

AQUACULTURE (TILAPIA CULTURE) NC II

Section 1 AQUACULTURE (TILAPIA CULTURE) NC II QUALIFICATION

The **AQUACULTURE (TILAPIA CULTURE) NC II** Qualification consists of competencies that a person must achieve to assist in tilapia culture operations, prepare and maintain tilapia culture facilities, operate tilapia hatchery and nursery, and perform tilapia grow-out operations.

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	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	COMMON COMPETENCIES
AFF321201	Apply safety measures in farm operations
AFF321202	Use farm tools and equipment
AFF321203	Perform estimation and basic calculation

Code	CORE COMPETENCIES
AFF622318	Conduct pre-operational aquaculture activities
AFF622319	Operate tilapia hatchery and nursery
AFF622320	Perform tilapia grow-out

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

- **Tilapia Farm Technician**
- **Tilapia Culturist**
- **Tilapia Grower**

SECTION 2 COMPETENCY STANDARDS

This section gives the details of the contents of the basic, common and core units of competency required in **AQUACULTURE (TILAPIA CULTURE) 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 1.8 Basic business writing skills

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.		1.9 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 accurately and legibly.	3.1 Effective verbal and non-verbal communication 3.2 Different modes of communication 3.3 Workplace8 forms and documents	3.1 Completing work-related documents 3.2 Applying operations of addition, subtraction,

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	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.	3.4 Organizational/ Workplace policies 3.5 Communication procedures and systems 3.6 Technology relevant to the enterprise and the individual's work responsibilities	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	1.1Communicating 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

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Work as a team member	3.1 Effective and appropriate forms of communications are used and interactions undertaken with 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.	3.1 Communication Process 3.2 Workplace communication protocol 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	3.1Communicating appropriately, consistent with the culture of the workplace 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	2.1 Current industry hardware and software products and services 2.2 Industry service and helpdesk	2.1 Identifying current industry hardware and software products and services

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	solutions are developed, **documented**, ranked and presented to ***appropriate person*** for decision.	practices, processes and procedures 2.3 Operating systems 2.4 Industry standard diagnostic tools 2.5 Malfunctions and resolutions. 2.6 Root cause analysis	2.2 Identifying services and helpdesk practices, 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	2.1 Basic SWOT analysis 2.2 Strategies to improve one's attitude in the workplace	2.1 Using the basic SWOT analysis as self-assessment strategy

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	teacher feedback are contemplated. 2.2 Progress when seeking and 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.	2.3 Gibbs' Reflective Cycle/Model (Description, Feelings, Evaluation, Analysis, Conclusion, and Action plan)	2.2 Developing reflective practice through realization of 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.	2.1 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

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	2.5 ***Critical inquiry method*** is used to discuss and develop ideas with others.		outside own scope of responsibility 2.4 Communicating ideas for change through small 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 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 organizational values, ethics and codes of conduct
2. Assess gathered data/ information	2.1 Validity of data/ information is assessed. 2.2 Analysis techniques are	2.1 Business mathematics and statistics 2.2 Data analysis techniques/ procedures	2.1 Computing business mathematics and statistics 2.2 Describing data analysis

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	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.	2.3 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	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 Organizational 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 organizational 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	1.1Communication 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	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	2.1Communication skills 2.2 Estimation skills 2.3 Interpersonal skills 2.4 Critical thinking skills 2.5 Observation skills 2.6 Material, tool and equipment

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	workplace policies and procedures. 2.3 Required OSH materials, tools and equipment are arranged/ placed in accordance with OSH work standards.	2.5 Different OSH control measures	identification skills
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	3.1Communication 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.	2.1 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
	2.3 Identified causes of inefficiency and/or ineffectiveness are validated thru established 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. 2.3 Cost-conscious habits in resource	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
	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.	2.1 Uses and functions of tools 2.2 Outfits and how to wear it 2.3 Expiration/shelf life of materials	2.1 Using tools and materials in the workplace 2.2 Wearing of outfits 2.3 Observing expiration/shelf life of materials

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	2.3 Effectivity/shelf life/expiration of 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.	2.4 Proper disposal of expired materials 2.5 Environmental rules and regulations 2.6 Emergency procedures 2.7 Hazards identification and reporting 2.8 Communication skills 2.9 OSHS	2.4 Disposing of expired materials 2.5 Following emergency procedures 2.6 Identifying and reporting of hazards in workplace area
3. Safe keep /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	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	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

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	with farm procedures. 2.5 Farm equipment is used according to its function. 2.6 Safety procedures are followed.	identification and reporting 2.8 Operation of equipment 2.9 Codes and Regulations on environmental protection 2.10 Safety and keeping of equipment every after use 2.11 Safety measures	2.7 Following safety procedures
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***	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
	mathematical operation. 1.3 Calculate whole fraction, percentage and mixed when are used to complete the instructions. 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 COMPETENCIES

UNIT OF COMPETENCY : CONDUCT PRE-OPERATIONAL AQUACULTURE ACTIVITIES

UNIT CODE : AFF622318

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitude required to prepare tools materials and equipment, prepare aquaculture facilities, secure facilities and install fish cages.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Prepare tools materials and equipment	1.1 ***Tools, materials*** and ***equipment*** are checked and cleaned based on workplace standards 1.2 Defective ***tools*** are repaired following manufacturer's specifications 1.3 ***Equipment*** is calibrated following manufacturer's manual. 1.4 ***Farm inputs*** are prepared according to work requirements 1.5 ***Nets*** are inspected, cleaned and disinfected following industry standards 1.6 Damaged ***nets*** are repaired and replaced according to industry standards.	1.1 Types of tools and equipment 1.2 Types of defects of tools 1.3 Different farm inputs 1.4 Different nets 1.5 Different types of disinfectant 1.6 Damages of nets 1.7 Procedures in inspection and cleaning of tools and equipment 1.8 Procedures in minor repair 1.9 Calibration of equipment 1.10 Inspection, cleaning and disinfection procedures 1.11 Methods of net repair and required materials	1.1 Checking and cleaning tools, materials and equipment 1.2 Repairing defective tools 1.3 Calibrating equipment 1.4 Reading manuals 1.5 Preparing farm inputs 1.6 Computation skills 1.7 Inspecting, cleaning and disinfecting nets 1.8 Practicing GAqP, OSHS and waste management 1.9 Net mending skills 1.10 Simple carpentry skills

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		1.12Computation of required farm inputs 1.13 Computation for required quantities of disinfectants 1.14 GAqP, 1.15 OSHS 1.16 Following manufacture's specifications and manuals 1.17 Preparation of farm inputs 1.18 Proper waste disposal	
2. Prepare aquaculture facilities	2.1 ***Aquaculture facilities*** are inspected following industry standards. 2.2 Biosecurity measures are applied against ***extraneous organisms*** following industry standards. 2.3 Ponds are ***prepared*** in accordance to industry standards. 2.4 Tanks are disinfected following standard procedures. 2.5 Cage set up is maintained according to industry procedures. 2.6 Water need is ***assessed*** following industry procedure. 2.7 ***Water exchange method*** is applied based on industry standards. 2.8 Land is ***prepared*** following industry standards.	2.1 Aquaculture facilities -- water holding capacities --optimum PH of soil and water --presence of extraneous organisms --organic content of soil 2.2 Cage set up 2.3 Depth of pond 2.4 Computation of pond inputs 2.5 Soil analysis 2.6 Water analysis 2.7 Application of lime and fertilizer 2.8 Application piscicide 2.9 Pond draining and drying 2.10 Installation of filter screens and bird scares 2.11 Repair of leaks 2.12 Tanks disinfections 2.13 Cage set up inspection and maintenance 2.14 Land preparation 2.15 GAqP, 2.16 OSHS	2.1 Inspecting aquaculture facilities 2.2 Applying biosecurity measures 2.3 Preparing ponds 2.4 Disinfecting tanks 2.5 Maintaining cage set-up 2.6 Assessing water need 2.7 Preparing land 2.8 Practicing OSHS 2.9 Applying GAqP

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		2.17 Waste management	
3. Secure facilities	3.1 Facilities are checked for trespassers according to 3.2 Trespassers are prevented to enter the aquaculture facilities according to standard operating procedures. 3.3 Support structures are installed during inclement weather condition following standard procedures 3.4 Tools, equipment and farm inputs are stored based on workplace standard procedures.	3.1 Support structures 3.2 Weather forecast 3.3 Types of tools and equipment 3.4 Storage of tools and equipment 3.5 Checking of entrance and exit points 3.6 Installation of support structures 3.7 GAqP, 3.8 OSHS 3.9 Waste management	3.1 Checking facilities 3.2 Preventing trespassers 3.3 Installing support structures 3.4 Storing tools, equipment and farm inputs 3.5 Applying safety measures 3.6 Practicing GAqP 3.7 Applying waste management
4. Install fish cages	4.1 Construction resources including materials and manpower are prepared based on work plan. 4.2 Posts are positioned for fixed cages following plan. 4.3 Frames are attached to floaters for floating cages according to plan. 4.4 Net cages are fabricated according to plan and requirement. 4.5 Fabricated net cages are attached to floaters and sinkers based on the plan. 4.6 Nets are inspected for damage and repaired according to workplace procedures. 4.6 Nets are set-up to fit the frame following installation procedures.	4.1 Carrying capacity of cages 4.2 Water flow rate 4.3 Computation of required number of stocks 4.4 Estimation raw materials and manpower requirements for construction 4.5 Types of cages -Fixed cages -Floating cages 4.6 Positioning of posts 4.7 Attaching of frames to floaters 4.8 Net fabrication 4.9 Attaching of fabricated net to floaters and sinkers 4.10 Net inspection for damages and repair 4.11 Net setting to fit frame 4.5 Required length of mooring lines and weight of mooring blocks 4.6 Disposal of wastes	4.1 Preparing construction materials and manpower requirements 4.2 Estimating flow rate of surface water 4.3 Positioning post for fixed cages 4.4 Attaching frames to floaters for floating cages 4.5 Net fabricating 4.6 Attaching fabricated net cages to floaters and sinkers 4.7 Inspecting nets for damages 4.8 Net mending 4.9 Knot tying 4.10 Simple carpentry and masonry skills 4.11 Reading plan 4.12 Swimming 4.13 Diving 4.14 Practicing safety measures 4.15 Applying GAqP

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	4.7 Mooring system is installed according to depth and bottom type.	4.7 OSHS 4.8 GAqP	4.16 Practicing waste management

RANGE OF VARIABLES

VARIABLE	SCOPE
1. Tools	Tools may include: Measuring device: 1.1 Dissolve oxygen meters 1.2 Laboratory thermometer, 0-100 ^{o}C 1.3 pH meter 1.4 Refractometer 1.5 Calculator 1.6 Secchi disc Construction tools: 1.7 Electrical tools: -plier -screw driver(+, -) -wire stripper 1.8 Masonry tools: -leveling tool -trowel -steel saw 1.9 Carpentry tools: -hammer -wood saw Other tools: 1.10 Rake (as cultivator) 1.11 Plastic pail 1.13 Plastic basin 1.14Flashlights 1.15 Bolo 1.16 Shovel 1.17 Digging blades
2. Materials	Materials may include: 2.1 Floater 2.2 Rubber boots 2.3 Face mask 2.4 Hand gloves 2.5 P.E. rope 2.6 Tape measure 2.7 Nails 2.8 Monofilament line 2.9 Seine net 2.10 Assorted nets 2.11 Formalin solution 2.12 Sodium hypochlorite 2.13 Hydrated lime
3. Equipment	Equipment may include: 3.1 Generator 3.2 Water pump 3.3 Aerators 3.4 Incubators

4. Farm inputs	Farm inputs may include: 4.1 Fertilizer 4.2 Lime 4.3 Pesticides
5. Nets	Nets may include: 5.1 Finemesh nets (hapa) 5.2 Conditioning nets 5.3 Scoop nets 5.4 Seine nets 5.5 Grading nets or screen
6. Aquaculture facilities	Agriculture facilities may include: 6.1 Dikes 6.2 Frames 6.3 Water Supply and Drainage system 6.4 Ponds 6.5 Tanks 6.6 Cage set - up 6.6.1 Cage frames 6.6.2 Net cages 6.6.3 Floats 6.6.4 Mooring lines 6.6.5 Mooring blocks or anchors 6.7 Oxygen tank with regulator 6.8 Water Gates and pipes 6.9 Store room 6.10 Waste management facilities
7. Extraneous organisms	Extraneous organisms may include: 7.1 Birds 7.2 Frogs 7.3 Man 7.4 Snapping Turtles 7.5 Snakes 7.6 Predatory fish 7.7 Monitor lizard 7.8 Rats
8. Pond preparation	Pond preparation may include: 8.1 Liming 8.2 Fertilization 8.3 Tilling 8.4 Drying 8.5 Pest eradication
9. Water assessment	Water assessment includes: 9.1 Quantity of water level 9.2 Quality of water
10. Method of water exchange	Method of water exchange may include: 10.1 Flow-through 10.2 Drain and fill
11. Land preparation	Land preparation includes: 11.1 Draining 11.2 Leveling 11.3 Drying

EVIDENCE GUIDE

1. Critical Aspects of Competency	**Assessment requires evidence that the candidate:** 1.1. Prepared tools, materials and equipment 1.2. Prepared aquaculture facilities 1.3. Secured facilities 1.4. Installed fish cages 1.5 Practiced safety measures
2. Resource Implications	**The following resources MUST be provided:** 2.1 Actual or simulated workplace 2.2 Tools, supplies, materials and equipment needed to perform the required tasks 2.3 References and manuals 2.4 PPEs
3. Method of Assessment	Competency in this unit must be assessed through: 3.1 Demonstration/direct observation with oral questioning 3.2 Written exam
4. Context of Assessment	4.1 Competency may be assessed in actual workplace or at the designated TESDA Accredited Assessment Center.

UNIT OF COMPETENCY : OPERATE TILAPIA HATCHERY AND NURSERY

UNIT CODE : AFF622319

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitude required to select and condition broodstock, produce fry, prepare hormone treated feed for sex reversal, perform nursery operation and carry-out dispersal of fingerlings. ,

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Select and condition broodstock	1.1 Sexing of breeders is performed following established industry practices 1.2 Prophylactic measures are applied based on industry standards. 1.3 Pairing of breeders is performed following recommended sex ratio and stocking density. 1.3 Feeding and maintenance of breeders are conducted based on GAqP	1.1 Sexual dimorphism 1.2 Criteria for broodstock selection 1.3 Inbreeding 1.4 Phenotype 1.5 Nutrient requirements of breeder and fry optimum sex ratio 1.6 Conditioning 1.7 Extruded and non extruded 1.8 Procedures in feed and water quality management 1.9 Computaion of sex ratio/stocking per unit area 1.10 GAqP 1.11 OSHS 1.12 Wastes management	1.1 Performing sexing of breeders 1.2 Performing pairing of breeders 1.3 Applying prophylactic measures 1.4 Feeding and maintaining breeders 1.5 Mathematical skills 1.6 Practicing GAqP 1.7Applying safety measures
2. Produce fry	2.1 Hatchery ***scheme*** is performed following established industry procedure 2.2 Eggs are collected and incubated following industry standards. 2.3 Swim-ups are collected and reared in nursery following industry practice. 2.4 Fry is collected and graded for pond based system according to industry practices.	2.1 Procedure in egg incubation 2.2 Egg development stages 2.3 Procedure in fry collection and grading 2.4 Use of fungicide 2.5 Recommended 2.6 Standard grading size 2.7 GAqP 2.8 OSHS 2.9 Waste management	2.1 Performing hatchery scheme 2.2 Collecting and incubating eggs 2.3 Collecting and rearing swim-ups 2.4 Collecting and grading fry 2.5 Using sorting nets 2.6 Practicing GAqP 2.7 Applying safety

3. Prepare hormone treated feed for sex reversal	3.1 Feeds and hormones are weighed according to standard dosage. 3.2 Alcohol is measured according to amount of feed to be treated. 3.3 Stock solution is prepared following recommended concentration. 3.4 Feed is treated with stock solution and air dried following established industry practices 3.5 Treated feeds are packed, labelled and stored following industry procedures 3.6 Safety practices are applied following OSHS	3.1 Hormone dosage required 3.2 Optimum volume of alcohol as solvent and as medium for dispersing hormone 3.3 Substitute chemicals 3.4 Rate of inclusion 3.5 Pond vs. tank 3.6 Rate per unit 3.7 Alcohol and hormone 3.8 Feed treatment 3.9 Packing, labelling and storage of treated feeds 3.10 Withdrawal period 3.11 Waste water treatment GAqP 3.12 OSHS	3.1 Weighing feeds and hormones 3.2 Measuring alcohol 3.3 Preparing stock solution 3.4 Treating feed 3.5 Packing, labelling and storing treated feeds 3.6 Applying safety practices 3.7 Practicing GAqP 3.8 Mathematical skills
4. Perform nursery operation	4.1 Fry is ***stocked*** in following recommended stocking density 4.2 Fry is ***fed*** according to market requirements 4.3 Fry is graded according to ***standard sizes*** 4.4 Visual inspection of diseases are done based on ***appearance and behavioral patterns.***	4.1 Proper stocking density based on ecosystem and culture intensity 4.2 Proper feeding schedule based on fry size and market requirements 4.3 Proper handling and grading of fry based on standard sizes 4.4 Identification of diseases and symptoms based on visual examination and fish behavior 4.5 Culling 4.6 GAqP 4.7 OSHS	4.1 Stocking fry 4.2 Feeding fry 4.3 Grading fry 4.4 Performing visual inspection of diseases 4.5 Mensuration skills 4.6 Applying OSHS 4.7 Practicing GAqP
5. Carry-out dispersal of fingerlings	5.1 ***Conditioning*** of fingerlings is done following established industry practices 5.2 ***Packing materials*** are prepared following established industry procedure 5.3 Number of fingerlings are estimated by volume and by weight	5.1 Loading density/ size/distance 5.2 Prophylactic agent 5.3 Biological requirements of fingerlings 5.4 Measures to reduce stress and metabolic rate of fingerlings while in transit 5.5 Types of packing materials	5.1 Handling , conditioning, and transporting fingerlings 5.2 Estimating ETD and ETA based on existing logistics 5.3 Preparing packing materials 5.4 Packing fingerlings

	5.4 Fingerlings are packed with reference to ***industry practices*** 5.5 Transport condition is monitored according to established industry practices 5.6 ***Transport equipment*** are sourced-out based on requirement.	5.6 Transport condition 5.7 Sourcing of transport equipment 5.8 Maintenance of transport equipment 5.9 Types of transport equipment 5.10 Packing procedures 5.11 Rate of stocking 5.12 Application rate 5.13 GAqP 5.14 OSHS 5.15Waste management	5.5 Monitoring transport condition skills 5.6 Sourcing out transport equipment 5.7 Employing GAqP 5.8 Practicing OSHS 5.9 Applying waste management

RANGE OF VARIABLES

VARIABLE	RANGE
1. Hatchery scheme	Hatchery scheme may include: 1.1 Egg incubation scheme 1.2 Fry collection scheme
2. Stocking	Stocking may include: 2.1 Stocking of fry in hapa, 2.2 Stocking in tanks
3. Feeding	Feeding includes: 3.1 Feeding for sex reversed tilapia 3.2 Feeding for normal tilapia
4. Standard sizes	Standard sizes may include: 4.1 Size #24 4.2 Size #22 4.3 Size #20 4.4 Size #17 4.5 Size #14
5. Appearance and behavioral patterns	**Appearance may include:** 5.1 Pale 5.2 Dark 5.3 Presence of parasites 5.4 Number of mortalities **Behavior pattern may include:** 5.5 Lethargic swimming 5.6 Abnormal swimming orientation 5.7 Gasping 5.8 Non-reactive to stimulus
6. Conditioning	Conditioning includes: 6.1 Fasting 6.2 Prophylaxis
7. Packing materials	Packing materials may include: 7.1 Plastic bags 7.2 Rubber band

	7.3 Filled Oxygen tank 7.4 Ice 7.5 Styropore box 7.6 Currogated cardboard box
8. Industry practices on packing	Industry practices on packing may include: 8.1 Consideration of fingerling size 8.2 Travel time 8.3 Time of packing 8.4 Mode of transport
9. Transport equipment	Transport equipment may include: 9.1 Hauling tank 9.2 Aeration facilities 9.3 Live boat

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Selected and conditioned broodstock 1.2 Produced fry 1.3 Prepared hormone treated feed for sex reversal 1.4 Performed nursery operation 1.5 Carried-out dispersal of fingerlings 1.6 Practiced safety measures
2. Resource Implications	**The following resources MUST be provided:** 2.1 Actual or simulated workplace 2.2 Tools, supplies, materials and equipment needed to perform required tasks during hatchery and nursery operations of aquaculture farms. 2.3 References and manuals 2.4 PPE
3. Method of Assessment	Competency in this unit must be assessed through: 3.1 Written examination 3.2 Demonstration/Direct observation with oral questioning 3.3 Production output
4. Context of Assessment	4.1 Competency may be assessed in actual workplace or at the designated TESDA Accredited Assessment Center.

UNIT OF COMPETENCY : PERFORM TILAPIA GROW OUT

UNIT CODE : AFF622320

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitude required to stock fingerlings, stock sampling, perform feeding operations, maintain good water quality, perform common disease diagnosis and treatment and perform harvesting and primary post harvesting activities.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Stock fingerlings	1.1Condition of fingerlings is monitored following established industry practices 1.2Counts are validated by sampling 1.3 Acclimation is performed prior to stocking 1.4 Stocking is performed based on ***culture intensity***	1.1 Monitoring of fingerlings' condition 1.2Osmoregulation 1.3 Carrying capacity 1.4 Recirculation 1.5 Filtration 1.6 Static or flow through 1.7 Total stock based on area and stocking density 1.8 Sampling procedures 1.8 Mortality allowance 1.9 Culture intensity 1.10 GAqP 1.11 OSHS 1.12 Waste management	1.1 Monitoring condition of fingerlings 1.2 Validating counts by sampling 1.3 Acclimating tilapia fingerlings 1.4 Sampling skill 1.5 Computation skills 1.6 Applying stocking procedures 1.7Applying GAqP 1.8 Practicing OSHS 1.9 Applying waste management
2. Stock sampling	2.1 Samples are collected for feeding adjustment 2.2 Samples are weighed to determine average body weight (ABW) 2.3 Record keeping is done following workplace procedures.	2.1 Typical Growth Curve 2.2 Minimum sample size required 2.3 Importance of random sample 2.4 Average body weight (ABW) 2.5 Record keeping 2.6 Using a weighing scale 2.7 GAqP 2.8 OSHS 2.9 Waste management	2.1 Collecting samples 2.2 Weighing samples 2.3 Record keeping 2.4 Using cast net or seine for sampling 2.5 Computing ABW 2.6 Mensuration and computation skills (weighing) 2.7 Practicing GAqP 2.8 Applying OSHS 2.9 Practicing waste management
3.Perform feeding operations	3.1 Daily feed ration is calculated based on estimated biomass 3.2 Feeding frequency is determined based on	3.1 Nutrient requirements of stocks 3.2 Feeding ration recommended feed management based	3.1 Estimating feed consumption 3.2 Computing feed ration 3.3 Determining feeding frequency

	growth stage and consumption 3.3 Feed consumption is monitored following GAqP 3.4 Total amount of feed consumed and feed conversion ratio FCR is computed for the entire growing cycle 3.5 ***Physical property*** of feeds are checked based on industry standards 3.6 Actual amount of feeds given is recorded following workplace standard procedures.	on different ecosystem and culture methods 3.3 Daily feed ration 3.4 Feeding schedule 3.5 Feeding strategies 3.6 Satiation feeding 3.7 Ad libitum 3.8 Delayed feeding 3.9 Use of mechanical feeders 3.10 Basic mathematical operation 3.11 Systems and units of measurement 3.12 PNS on aquaculture feeds (tilapia) 3.13 GAqP 3.14 OSHS 3.15 Waste management	3.4 Monitoring feeding consumption 3.5 Monitoring feeding behavior 3.5 Mensuration and computation skills 3.6 Applying GAqP 3.7 Practicing OSHS 3.8 Applying waste management
4. Maintain good water quality	4.1 ***Water quality parameters*** are monitored following industry procedures 4.2 Optimum water quality is maintained by water exchange and ***other interventions*** 4.3 Fertilizer dressing is applied based on secchi disc reading.	4.1 Temperature, pH, DO, Ammonia relationship 4.2 DO Saturation rate 4.3 Recommended optimal range of water quality 4.4 Probiotics 4.5 Flow through 4.6 Procedure in maintaining optimal water quality 4.7 Other interventions for water quality maintenance 4.8 Fertilizing dressing 4.9 GAqP 4.10 OSHS 4.11Waste management	4.1 Using monitoring instruments such as secchi disk, pH meter and DO meter 4.2 Monitoring water quality parameters 4.3 Maintaining optimum water quality 4.4 Applying fertilizer dressing 4.5 Mensuration skills 4.6 Practicing GAqP 4.7 Applying OSHS 4.8 Practicing waste management
5. Perform common disease diagnosis and treatment	5.1 Visual inspection of diseases are done based on ***appearance and behavioral patterns*** 5.2 Infected fish is sampled for laboratory diagnosis as required 5.3 ***Primary treatment and prevention*** is identified and	5.1 Identification/ Classification of diseases 5.2 Procedure in preparation of specimens for laboratory diagnosis 5.3 Knowledge on the origin/occurrence of particular disease 5.4 Prophylaxis treatment and	5.1 Performing visual inspection of diseases 5.2 Sampling infected fish 5.3 Identifying and implementing primary treatment and prevention 5.4 Disposing mortality 5.5 Practicing safety measures

	implemented according to GAqP 5.4 Disposal of mortality is carried out following GAqP 5.5 Safety practices are applied following OSHS	preventive options for a particular disease (baths, dips, UV treatment) 5.5 GAqP 5.6 OSHS 5.7 Waste management	5.6 Applying GAqP 5.7 Managing wastes
6. Perform harvesting and primary post harvesting activities	6.1 Pond is partially drained and seined based on industry practice 6.2 Net cages are partially lifted to crowd the fish in one corner 6.3 Crowded fish are scooped and transferred to harvesting container 6.4 Sorted fishes are bulk weighed and recorded according to industry standard procedures. 6.5 Fish for live market are placed in live tank and transported with aeration/oxygenation 6.6 Fish for chilled market are iced and placed in fish ***container*** according to industry standards. 6.7 Safety practices are applied following OSHS	6.1 Harvesting methods based on different ecosystem 6.2 Draining 6.3 Seining 6.4 Partial lifting of net in net cages 6.5 Primary Post harvesting methods 6.6 Sorting and weighing procedure 6.7 Procedure for icing or live transport 6.8 Types of fish containers 6.9 OSHS 6.10 Waste management 6.11 GAqP	6.1 Using the following during harvesting: • catch basins • fish pumps • grader • crowder • traps 6.2 Draining and seining ponds 6.3 Crowding fish 6.4 Scooping and transferring crowded fish 6.5 Weighing and recording fish harvest 6.6 Placing fish on live tank 6.7 Transporting fish with aeration/ oxygenation 6.8 Sorting by size 6.9 Handling live fish 6.10 Icing and packing 6.11 Computing and recording FCR, Survival, ABW 6.12 Determining efficiency of culture 6.13 Applying safety measures 6.14 Practicing GAqP 6.15 Managing wastes

RANGE OF VARIABLES

VARIABLE	RANGE
1. Culture intensity	Culture intensity includes: 1.1 Intensive system (full feeding, stocking density 10 pcs & above/sq m) 1.2 Semi-intensive system (fertilization with supplemental feeding, stocking density 4-8pcs/sq m) 1.3 Extensive system (fertilization, stocking density 3pcs & below/sq m)
2. Physical property	Physical property may include: 2.1 Stability 2.2 Fines 2.3 Hardness 2.4 Particle size
3. Water quality parameters	Water quality parameters may include: 3.1 Fish behavior 3.2 Use of measuring instruments dissolved oxygen 3.3 pH 3.4 Temperature 3.5 Secchi disc visibility 3.6 Ammonia level
4. Other interventions for optimum water quality	Other interventions for optimum water quality may include: 4.1 Pumping 4.2 Aeration 4.3 Feeding reduction 4.4 Skip feeding 4.5 Application of probiotics 4.6 Mechanical intervention
5. Physical appearance and behavioral patterns	Physical appearance and behavioral patterns may include: 5.1 Swirling 5.2 Swimming at surface 5.3 Non-feeding 5.4 Lethargic 5.5 Cottony growth 5.6 Lesions 5.7 Septicemia 5.8 Over production of mucus 5.9 Presence of external parasites
6. Primary Treatment and prevention	Primary treatment and prevention may include: <u>Cage</u> 6.1 For fresh water: Saline water bath 6.2 For salt water: fresh water bath 6.3 Mild formalin solution bath <u>Pond</u> 6.4 Application of salt 6.5 Freshening of water <u>Tank</u> 6.6 Freshening of water

	6.7 For fresh water: Saline water bath 6.8 For salt water: fresh water bath 6.9 Mild formalin solution bath
7. Container	Container may include: 7.1 Styropore box 7.2 Insulated box 7.3 Plastic crates

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Stocked fingerlings 1.2 Stocked sampling 1.3 Performed feeding operations 1.4 Maintained good water quality 1.5 Performed common disease diagnosis and treatment 1.6 Performed harvesting and post harvesting activities 1.7 Applied safety measures
2. Resource Implications	**The following resources MUST be provided:** 2.1 Actual or simulated workplace 2.2 Tools, supplies, materials and equipment needed to perform required tasks during tilapia grow-out operations of aquaculture farms. 2.3 References and manuals 2.4 PPEs
3. Method of Assessment	Competency in this unit will be assessed through: 3.1 Written Examination 3.2 Demonstration/Direct observations with oral questioning 3.3 Third party report
4. Context of Assessment	4.1 Competency may be assessed in actual workplace or at the designated TESDA Accredited Assessment Center.

SECTION 3 TRAINING ARRANGEMENTS

These guidelines are set to provide the Technical and Vocational Education and Training (TVET) providers with information and other important requirements to consider when designing training programs for **AQUACULTURE (TILAPIA CULTURE) NC II.**

3.1. CURRICULUM DESIGN

Course Title: **AQUACULTURE (TILAPIA CULTURE)** NC Level: **NC II**

Nominal Training Duration:	37	Hours (Basic Competencies)
	72	Hours (Common Competencies)
	580	Hours (Core Competencies)
	689	Hours
	80	Supervised Industry Learning (SIL)
	769	**TOTAL HOURS**

Course Description:

This course is designed to enhance the knowledge, desirable skills and attitudes of Aquaculture (Tilapia Culture) NCll in accordance with industry standards. It covers core competencies in conducting pre-operational aquaculture activities, operating tilapia hatchery and nursery and performing tilapia grow-out.

To accomplish the above, all units prescribed for this qualification must be achieved.

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

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

	1.2 Perform duties following workplace instructions	• Read:
		  ○ Written notices and instructions
		  ○ Workplace interactions and procedures
		• Read instructions on work related forms/documents
		• Perform workplace duties scenario following workplace nstructions
			• Group discussion
			• Lecture
			• Demonstration
				• Oral evaluation
				• Written examination
				• Observation
					2 Hours

	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:
			• 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
		○ workplace meetings and discussions scenario • Perform workplace duties scenario following simple written notices • Follow simple spoken language • Identify the different Non-verbal communication • 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

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

	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
3. Solve/address routine problems	3.1 Identify routine problems	• Determine 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	• 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
		• Analyze routine/procedural problems			
	3.2 Look for solutions to routine problems	• Determine 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
	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

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
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 • Share experiences that show confidence, and resilience in the face of setbacks and frustrations and other negative emotions and unpleasant situations in the workplace	• 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
	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	• Interactive Lecture • Appreciative Inquiry • Demonstration	• Psychological and behavioral Interviews • Performance Evaluation	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• 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	• Group work	• 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	
	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	• 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.	1 Hour

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• Demonstrate basic skills in data analysis		• Standardized assessment of character strengths and virtues applied	
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

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

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	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
	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	• Case Study • 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 the preservation, optimization and judicious use of workplace resources	• Interview • Lecture/ Discussion	• Case Study • Written Test • Interview	2 Hours

COMMON COMPETENCIES
<u>72</u> 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

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• Identify appropriate tools, materials and outfits to be used	• Lecture • Discussion • Incomplete worksheet • Power point presentation • Video presentation	• Written examination • Interview • Oral questioning • Demonstration	2 hrs
		• 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

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• Discuss topics on effectivity, shelf life and expirations of materials to be used	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning	1 hr
		• 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	• Written examination • Interview • Oral questioning • Demonstration	2 hrs

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
			• Hands-on		
		• Wear personal protective equipment	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration	• Written examination • Interview • Oral questioning • Demonstration	0.5 hr
		• 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	• Written examination • Interview • Oral questioning	(Total – 6 hrs) 1 hr

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
			• Incomplete worksheet		
		• 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 • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning	1 hr
		• 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	• Written examination • Interview	1 hr

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

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
			• Incomplete worksheet • Demonstration		
		• 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 • Incomplete worksheet • Demonstration • Hands-on	• Written examination • Interview • Oral questioning • Demonstration	1 hr
		• Use tools and equipment relating to manufacturer's manual	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration	• Written examination • Interview • Oral questioning • Demonstration	2 hrs

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
			• Hands-on		
	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 • Incomplete worksheet	• Written examination • Interview • Oral questioning	1 hr
		• Identify different types of faults in farm equipment	• 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
		• 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
		• Read manufacturer's manual	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning • Demonstration	1 hr

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
			• Demonstration		
		• 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 • Incomplete worksheet • Demonstration • Hands-on • Field visit	• Written examination • Interview • Oral questioning • Demonstration	8 hrs

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• 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 • Video presentation	• Written examination • Interview • Oral questioning •	1 hr

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
			• 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	• Written examination • Interview • Oral questioning • Demonstration	1 hr

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

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• 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
580 Hours

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
1 Conduct pre-operational aquaculture activities	1.1 Prepare tools materials and equipment	1.1 Discuss the following: • Types of tools and equipment • Types of defects of tools • Different farm inputs • Different nets • Different types of disinfectant • Damages of nets • Procedures in inspection and cleaning of tools and equipment • Procedures in minor repair • Calibration of equipment • Inspection, cleaning and disinfection procedures • Methods of net repair and required materials • Computation of required farm inputs • Computation for required quantities of disinfectants • GAqP, • OSHS • Following manufacture's specifications and manuals	• Lecture-discussion • Demonstration • Film viewing • Power point presentation	• Written examination • Demonstration • Oral questioning	100 hours

		• Preparation of farm inputs • Proper waste disposal 1.2 Prepare tools, materials and equipment			
	2. Prepare aquaculture facilities	2.1 Explain the following: • Aquaculture facilities ➢ water holding capacities ➢ optimum PH of soil and water ➢ presence of extraneous organisms ➢ organic content of soil • Cage set up • Depth of pond • Computation of pond inputs • Soil analysis • Water analysis • Application of lime and fertilizer • Application piscicide • Pond draining and drying • Installation of filter screens and bird scares • Repair of leaks • Tanks disinfections • Cage set up inspection and maintenance • Land preparation • GAqP, • OSHS • Waste management 2.2 Prepare aquaculture facilities	• Lecture-discussion • Demonstration • Film viewing • Power point presentation	• Written examination • Demonstration • Oral questioning	

	3. Secure facilities	3.1 Discuss the following: • Support structures • Weather forecast • Types of tools and equipment • Storage of tools and equipment • Checking of entrance and exit points • Installation of support structures • GAqP, • OSHS • Waste management 3.2 Secure facilities	• Lecture-discussion • Demonstration • Film viewing • Power point presentation	• Written examination • Demonstration • Oral questioning	

	4. Install fish cages	4.1 Explain the following:
		• Carrying capacity of cages
		• Water flow rate
		• Computation of required number of stocks
		• Estimation raw materials and manpower requirements for construction
		• Types of cages
		  ○ Fixed cages
		  ○ Floating cages
		• Positioning of posts
		• Attaching of frames to floaters
		• Net fabrication
		• Attaching of fabricated net to floaters and sinkers
		• Net inspection for damages and repair
			• Lecture-discussion
			• Demonstration
			• Film viewing
			• Power point presentation
				• Written examination
				• Demonstration
				• Oral questioning	

		• Net setting to fit frame • Required length of mooring lines and weight of mooring blocks • Disposal of wastes • OSHS • GAqP 4.2 Install fish cages			
2. Operate tilapia hatchery and nursery	1. Select and condition broodstock	1.1 Discuss the following: • Sexual dimorphism • Criteria for broodstock selection • Inbreeding • Phenotype • Nutrient requirements of breeder and fry optimum sex ratio • Conditioning • Extruded and non extruded • Procedures in feed and water quality management • Computaion of sex ratio/stocking per unit area • GAqP • OSHS • Waste management 1.2 Select and condition broodstock	• Lecture-discussion • Demonstration • Film viewing • Power point presentation	• Written examination • Demonstration • Oral questioning	320 hours
	2. Produce fry	2.1 Explain the following: • Procedure in egg incubation • Egg development stages	• Lecture-discussion • Demonstration • Film viewing	• Written examination • Demonstration	

		• Procedure in fry collection and grading • Use of fungicide • Recommended • Standard grading size • GAqP • OSHS • Waste management 2.2 Produce fry	• Power point presentation	• Oral questioning	
	3. Prepare hormone treated feed for sex reversal	3.1 Discuss the following: • Hormone dosage required • Optimum volume of alcohol as solvent and as medium for dispersing hormone • Substitute chemicals • Rate of inclusion • Pond vs. tank • Rate per unit • Alcohol and hormone • Feed treatment • Packing, labelling and storage of treated feeds • Withdrawal period • Waste water treatment • GAqP • OSHS 3.2 Prepare hormone treated feed for sex reversal	• Lecture-discussion • Demonstration • Film viewing • Power point presentation	• Written examination • Demonstration • Oral questioning	
	4.Perform nursery operation	4.1 Explain the following:	• Lecture-discussion • Demonstration	• Written examination • Demonstration	

		• Proper stocking density based on ecosystem and culture intensity • Proper feeding schedule based on fry size and market requirements • Proper handling and grading of fry based on standard sizes • Identification of diseases and symptoms based on visual examination and fish behavior • Culling • GAqP • OSHS 4.2 Perform nursery operation	• Film viewing • Power point presentation	• Oral questioning	
	5. Carry-out dispersal of fingerlings	5.1 Discuss the following: • Loading density/ size/distance • Prophylactic agent • Biological requirements of fingerlings • Measures to reduce stress and metabolic rate of fingerlings while in transit • Types of packing materials • Transport condition • Sourcing of transport equipment • Maintenance of transport equipment • Types of transport equipment • procedures	• Lecture-discussion • Demonstration • Film viewing • Power point presentation	• Written examination • Demonstration • Oral questioning	

		• Rate of stocking • Application rate • GAqP • OSHS • Waste management 5.2 Carry-out dispersal of fingerlings			
3. Perform tilapia grow-out	1. Stock fingerlings	1.1 Discuss the following: • Monitoring of fingerlings' condition • Osmoregulation • Carrying capacity • Recirculation • Filtration • Static or flow through • Total stock based on area and stocking density • Sampling procedures • Mortality allowance • Culture intensity • GAqP • OSHS • Waste management 1.2 Stock fingerlings	• Lecture-discussion • Demonstration • Film viewing • Power point presentation	• Written examination • Demonstration • Oral questioning	160 hours

	2. Stock sampling	2.1 Explain the following: • Typical Growth Curve • Minimum sample size required • Importance of random sample • Average body weight (ABW) • Record keeping • Using a weighing scale • GAqP • OSHS • Waste management 2.2 Stock sampling	• Lecture-discussion • Demonstration • Film viewing • Power point presentation	• Written examination • Demonstration • Oral questioning	
	3. Perform feeding operations	3.1 Discuss the following: • Nutrient requirements of stocks • Feeding ration recommended feed management based on different ecosystem and culture methods • Daily feed ration • Feeding schedule • Feeding strategies • Satiation feeding • Ad libitum • Delayed feeding • Use of mechanical feeders • Basic mathematical operation • Systems and units of measurement • PNS on aquaculture feeds (tilapia) • GAqP	• Lecture-discussion • Demonstration • Film viewing • Power point presentation	• Written examination • Demonstration • Oral questioning	

		• OSHS • Waste management 3.2 Perform feeding operations			
	4.Maintain good water quality	4.1 Discuss the following: • Temperature, pH, DO, Ammonia relationship • DO Saturation rate • Recommended optimal range of water quality • Probiotics • Flow through • Procedure in maintaining optimal water quality • Other interventions for water quality maintenance • Fertilizing dressing • GAqP • OSHS • Waste management 4.2 Maintain good water quality	• Lecture-discussion • Demonstration • Film viewing • Power point presentation	• Written examination • Demonstration • Oral questioning	
	5. Perform common disease diagnosis and treatment	5.1 Explain the following: • Identification/ Classification of diseases • Procedure in preparation of specimens for laboratory diagnosis • Knowledge on the origin/occurrence of particular disease Prophylaxis treatment and preventive options for a	• Lecture-discussion • Demonstration • Film viewing • Power point presentation	• Written examination • Demonstration • Oral questioning	

		particular disease (baths, dips, UV treatment) • GAqP • OSHS • Waste management 5.2 Perform common disease diagnosis and treatment			
	6. Perform harvesting and primary post harvesting activities	6.1 Explain the following: • Harvesting methods based on different ecosystem • Draining • Seining • Partial lifting of net in net cages • Primary Post harvesting methods • Sorting and weighing procedure • Procedure for icing or live transport • Types of fish containers • OSHS • Waste management • GAqP 6.2 Perform harvesting and primary post harvesting activities	• Lecture-discussion • Demonstration • Film viewing • Power point presentation	• Written examination • Demonstration • Oral questioning	

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.

    - Distance learning may employ correspondence study, audio, video, computer technologies 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.

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

3.3 TRAINEE ENTRY REQUIREMENTS

Trainees or students who would like to enroll in this course should possess the following requirements:

- Able to read and write
- Ability to communicate, both oral and written
- Able to perform simple computations

This list does not include specific institutional requirements such as educational attainment, appropriate work experience, and others that may be required of the trainees by the school or training center delivering the TVET program.

3.4 LIST OF TOOLS, EQUIPMENT AND MATERIALS

AQUACULTURE (Tilapia Culture) NCII

Recommended list of tools, equipment and materials for the training of 15 trainees for Aquaculture (Tilapia Culture) 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**
2 pcs	Dissolve Oxygen meters
5 pcs	Laboratory thermometer, 0-100 C
10 pcs	Shovel
10 pcs	Digging blades
2 sets	Electrical tools: -plier -screw driver(+, -) -wire stripper
2 sets	Masonry tools:
	-leveling tool
	-trowel
	-steel saw
2 sets	Carpentry tools: -hammer -wood saw
5 pcs	Cultivator / rake
10 pcs	Pail, plastic, 20L capacity
5 pcs	Secchi disc
5 pcs	pH meter
2 pcs	refractometer
5 pcs	Calculator, ordinary
5 pcs	Plastic pail with cover, 50L
5 pcs	Plastic basin, white (batya), 50cm in diameter
10 pcs	Crates, plastic, 25 kg capacity
5 pcs	Bolo
5 sets	Basic dissecting kit: -scalpel -forceps -scissors
2 pcs	Flashlights
1 roll	Hapa net, 1mm mesh, 90m
3 sets	Scoop net, various mesh size(#17,#22 ,#32)
5 pcs	Kitchen strainer, 5cm diameter

EQUIPMENT	
QTY	**DESCRIPTION**
1 unit	Generator, 1hp (7,500watts)
1unit	Microscope
1 unit	Water pump, centrifugal, 1hp
1 unit	Water pump, submersible, 1hp
10 units	Incubator, 4 L
2 units	Filled oxygen tank with regulator
2 units	Weighing scale, 20K
2 units	Weighing scale, 1K
2 units	Aerators

MATERIALS	
QTY	**DESCRIPTION**
15 pcs	Notebooks
15 pcs	Pen
15 pcs	Floater
15 pairs	Rubber boots
15 pcs	Face mask
15 pairs	Hand gloves, disposable/ plastic
15 pairs	Hand gloves, cotton
2 rolls	P.E. rope, 10mm x 200m
15 pcs	Pencil
5 pcs	Tape measure, 5m
1 kilo	Nails, 2 inches
1 kilo	Monofilament line, (80 pounds)
1 gal	Formalin solution
15 pcs	Netting needle
10 Kl	Salt, coarse
1 gal	Sodium hypochlorite
1 gal	70% Ethyl Alcohol
1 sack each	Fertilizer: -16-20 -21-00
2 sacks	Hydrated lime, 50K/sack
1 kl	Soap (detergent)
10 grams	Hormone 17-alpha MT
10,000 pcs	Fingerlings, assorted sizes
100 pcs	Breeders (male)
300 pcs	Breeders (female)
1box	Slides with cover, 20pcs/box
5pcs	Beaker, 500ml
5pcs	Beaker, 1L
15 pcs	Marker
1000 pcs	Plastic bags, 30 x 60cm, .002mil
5 packs	Rubber band
15 pcs	Condiment saucer(standard size, white color)
100 kilos	Tea seed powder *all colored blue, place in materials)
5 pcs	Styropor boxes, 60x30cm

15 pcs	Polyethylene plastic bag (30X60cm)
1 tank	Oxygen
250 ml	Methylene blue
3 rolls	Packaging tape
4 pcs	Corrugated cardboard box
10 kg	Ice
1 sack/ feeds type	Feeds (various):
	-fry booster
	-fry mash
	-starter
	-grower
	-finisher
	-high-protein for broodstock (e.g. shrimp feed)
2 units	Seine net, (17 mesh)
2 m/ mesh size	Assorted nets:
	-mesh 32
	-mesh 24
	-mesh 22
	-mesh 20
	-mesh 17
	-mesh 14

B. PER COC

COC 1 PERFORM TILAPIA HATCHERY AND NURSERY OPERATION

TOOLS	
QTY	**DESCRIPTION**
2 pcs	Dissolve Oxygen meters
5 pcs	Laboratory thermometer, 0-100 C
10 pcs	Shovel
10 pcs	Digging blades
2 sets	Electrical tools: -plier -screw driver(+, -) -wire stripper
2 sets	Masonry tools:
	-leveling tool
	-trowel
	-steel saw
2 sets	Carpentry tools: -hammer -wood saw
5 pcs	Cultivator / rake
10 pcs	Pail, plastic, 20L capacity
5 pcs	Secchi disc
5 pcs	pH meter
2 pcs	refractometer
5 pcs	Calculator, ordinary

5 pcs	Plastic pail with cover, 50L
5 pcs	Plastic basin, white (batya), 50cm in diameter
10 pcs	Crates, plastic, 25 kg capacity
5 pcs	Bolo
5 sets	Basic dissecting kit: -scalpel -forceps -scissors
2 pcs	Flashlights
1 roll	Hapa net, 1mm mesh, 90m
3 sets	Scoop net, various mesh size(#17,#22 ,#32)
5 pcs	Kitchen strainer, 5cm diameter

EQUIPMENT	
QTY	**DESCRIPTION**
1 unit	Generator, 1hp (7,500watts)
1unit	Microscope
1 unit	Water pump, centrifugal, 1hp
1 unit	Water pump, submersible, 1hp
10 units	Incubator, 4 L
2 units	Filled oxygen tank with regulator
2 units	Weighing scale, 20K
2 units	Weighing scale, 1K
2 units	Aerators

MATERIALS	
QTY	
15 pcs	Notebooks
15 pcs	Pen
15 pcs	Floater
15 pairs	Rubber boots
15 pcs	Face mask
15 pairs	Hand gloves, disposable/ plastic
15 pairs	Hand gloves, cotton
2 rolls	P.E. rope, 10mm x 200m
15 pcs	Pencil
5 pcs	Tape measure, 5m
1 kilo	Nails, 2 inches
1 kilo	Monofilament line, (80 pounds)
1 gal	Formalin solution
15 pcs	Netting needle
10 Kl	Salt, coarse
1 gal	Sodium hypochlorite
1 gal	70% Ethyl Alcohol
1 sack each	Fertilizer: -16-20 -21-00
2 sacks	Hydrated lime, 50K/sack
1 kl	Soap (detergent)

10 grams	Hormone 17-alpha MT
10,000 pcs	Fingerlings, assorted sizes
100 pcs	Breeders (male)
300 pcs	Breeders (female)
1box	Slides with cover, 20pcs/box
5pcs	Beaker, 500ml
5pcs	Beaker, 1L
15 pcs	Marker
1000 pcs	Plastic bags, 30 x 60cm, .002mil
5 packs	Rubber band
15 pcs	Condiment saucer(standard size, white color)
100 kilos	Tea seed powder *all colored blue, place in materials)
5 pcs	Styropor boxes, 60x30cm
15 pcs	Polyethylene plastic bag (30X60cm)
1 tank	Oxygen
250 ml	Methylene blue
4 rolls	Packaging tape
4 pcs	Corrugated cardboard box
1 sack/ feeds type	Feeds (various):
	-fry booster
	-fry mash
	-high-protein for broodstock (e.g. shrimp feed)
2 units	Seine net, (17 mesh)
2 m/ mesh size	Assorted nets:
	-mesh 32
	-mesh 24
	-mesh 22
	-mesh 20
	-mesh 17
	-mesh 14

COC 2 PERFORM TILAPIA GROW-OUT OPERATION

TOOLS	
QTY	**DESCRIPTION**
2 pcs	Dissolve Oxygen meters
5 pcs	Laboratory thermometer, 0-100 C
10-pcs	Shovel
10 pcs	Digging blades
2 sets	Electrical tools: -plier -screw driver(+, -) -wire stripper
2 sets	Masonry tools:
	-leveling tool
	-trowel
	-steel saw
2 sets	Carpentry tools: -hammer -wood saw

5 pcs	Cultivator / rake
10 pcs	Pail, plastic, 20L capacity
5 pcs	Secchi disc
5 pcs	pH meter
2 pcs	refractometer
5 pcs	Calculator, ordinary
5 pcs	Plastic pail with cover, 50L
5 pcs	Plastic basin, white (batya), 50cm in diameter
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5 pcs	Bolo
2 pcs	Flashlights
1 roll	Hapa net, 1mm mesh, 90m
3 sets	Scoop net, various mesh size(#17,#22 ,#32)
5 pcs	Kitchen strainer, 5cm diameter

EQUIPMENT	
QTY	**DESCRIPTION**
1 unit	Generator, 1hp (7,500watts)
1unit	Microscope
1 unit	Water pump, centrifugal, 1hp
1 unit	Water pump, submersible, 1hp
10 units	Incubator, 4 L
2 units	Filled oxygen tank with regulator
2 units	Weighing scale, 20K
2 units	Weighing scale, 1K
2 units	Aerators

MATERIALS	
QTY	
15 pcs	Notebooks
15 pcs	Pen
15 pcs	Floater
15 pairs	Rubber boots
15 pcs	Face mask
15 pairs	Hand gloves, disposable/ plastic
15 pairs	Hand gloves, cotton
2 rolls	P.E. rope, 10mm x 200m
15 pcs	Pencil
5 pcs	Tape measure, 5m
1 kilo	Nails, 2 inches
1 kilo	Monofilament line, (80 pounds)
1 gal	Formalin solution
15 pcs	Netting needle
10 Kl	Salt, coarse
1 gal	Sodium hypochlorite
1 gal	70% Ethyl Alcohol
1 sack each	Fertilizer: -16-20 -21-00

2 sacks	Hydrated lime, 50K/sack
1 kl	Soap (detergent)
10 grams	Hormone 17-alpha MT
10,000 pcs	Fingerlings, assorted sizes
100 pcs	Breeders (male)
300 pcs	Breeders (female)
1box	Slides with cover, 20pcs/box
5pcs	Beaker, 500ml
5pcs	Beaker, 1L
15 pcs	Marker
1000 pcs	Plastic bags, 30 x 60cm, .002mil
5 packs	Rubber band
15 pcs	Condiment saucer(standard size, white color)
100 kilos	Tea seed powder *all colored blue, place in materials)
5 pcs	Styropor boxes, 60x30cm
15 pcs	Polyethylene plastic bag (30X60cm)
1 tank	Oxygen
250 ml	Methylene blue
4 rolls	Packaging tape
4 pcs	Corrugated cardboard box
10 kg	Ice
1 sack/ feeds type	Feeds (various):
	-starter
	-grower
	-finisher
	-high-protein for broodstock (e.g. shrimp feed)
2 units	Seine net, (17 mesh)
2 m/ mesh size	Assorted nets:
	-mesh 32
	-mesh 24
	-mesh 22
	-mesh 20
	-mesh 17
	-mesh 14

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 (TILAPIA CULTURE) NC II

The size of the tilapia culture must be suited on the requirements of the competencies. The class size of 15 students/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)			**119**
• Student/Trainee Working Space	2.00 x 2.00 per student/trainee	4.00 per student	60.00
• Learning Resource Center	3.00 x 5.00	15.00	15.00
• Wash area/comfort room (male & female, PWD)	2.5 x 4	10	10
• Facilities/ Equipment/ Circulation Area (30% of teaching accommodation)		0	18
• Store Room	4.00 x 4.00	16.00	16.00
B. Tilapia Culture Farm:			**2,570.00**
- Breeding pond	25X20	500	500
- Grow-out with broodstock pond	30X50	1,500	1,500
- Hatchery	10X25	250	250
- Nursery	10X25	250	250
-*incubation area	5X4	20	20
-*packing area(*roofed and cemented flooring)	5X10	50	50
	GRAND TOTAL AREAS		**2,689**

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

3.6 TRAINER'S QUALIFICATIONS FOR AGRICULTURE, FORESTRY AND FISHERY SECTOR

AQUACULTURE (TILAPIA CULTURE) NC II

- Must be a holder of NTTC Level I in Aquaculture (Tilapia Culture) NC II
- Must have at least 2 years industry experience within the last 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.

COC 1: PERFORM TILAPIA HATCHERY AND NURSERY OPERATION

- Conduct pre-operational aquaculture activities
- Operate tilapia hatchery and nursery

COC 2: PERFORM TILAPIA GROW-OUT OPERATION

- Conduct pre-operational aquaculture activities
- Perform tilapia grow-out

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 (TILAPIA CULTURE) 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	Conduct pre-operations aquaculture activities	Prepare and maintain aquaculture facilities	Operate fish nursery	Perform fish or shrimp grow-out operations	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

Acclimation	refers to adjusting the prevailing water condition of fish in an environment from lower to higher temperature to optimal temperature, from tower or higher salinity to optimal salinity (like from freshwater to salt water environment), etc.
Average Body Weight	is the total weight of fish over the number of fish
AD-Libitum	refers to the mode of providing unlimited fish feeds to fish
AFMA	Agriculture and Fisheries Modernization Act
BFAR	Bureau of Fisheries and Aquatic Resources
BOD	Biological Oxygen Demand
Brackish Water	refers to the mixture of freshwater and sea water naturally occurring in estuaries.
Breeder	Sexually mature fish that are used for breeding
Conditioning of Breeders	a method wherein the breeders are pampered by providing them nutritious feeds and optimum water conditions to effect the maturity of the fish
D.O. (Dissolved Oxygen)	refers to a quantity of oxygen dissolved with water in the process of photosynthesis and the action of air current. The unit of the D.O. is commonly expressed in part per million (ppm).
FCR	Food Conversion Ratio is the Total amount of Feeds consumed over the Net Weight of Fish.
Egg Fertilization	the process of mixing the fish eggs with fish milt either by natural or artificial method.
Filamentous algae	green or blue-green algae that grows in strands
Fish Nursery	refers to smaller unit areas of confinement wherein small fish larvae or fish fry are reared. It may either be in ponds, cages, tanks, etc
Fish Pond	an aquaculture facility with an earthen bottom surrounded by dikes, with water inlets and drain outlets.
Fish Cage	an aquaculture facility made of frames, net enclosures, mooring rope, anchors or poles installed in open waters like lakes, dams, rivers and sea-water coves, lagoons, impoundments etc.

Fish Pen	aquaculture facility in inland areas such as lakes, rivers, dams
Fry	early stage of fish which is not yet fully pigmented and with scales that are not yet fully formed
Grow out	refers to bigger unit areas of confinement where fingerlings are stocked and grown to marketable size. It may either be in ponds, cages and fish pens.
Hapa Net	an enclosure made of fine mesh net for fry
Hatchery Operation	refers to a large production of larvae/fry
Hormones	are substances, (synthetically or naturally produced) used to hasten growth, induce ovulation or to effect sex reversal in fish.
Incubator	are hatching facilities where fertilized eggs are hatched.
Liming	application of lime in ponds to elevate soil pH of acidic ponds
Mature Breeders	fishes that are gravid (female) or with milt (male)
OHS	Operating Health Standard for workers
Optimum	refers to the best environmental and physiological condition provided to the fish to effect maximum production
Pathogenic Bacteria	disease causing bacteria
pH Meter	instrument used to measure the hydrogen ions concentration of soil or water
Phytoplankton	unicellular microscopic algae suspended in water
Satiation feeding	refers to the feeding method wherein the fish is fed until the gut is full as indicated by slowing down of the feeding frenzy.
Sea-Water	refers to waters with at east 32 ppt salinity
Seine Net	a type of fishing gear made up of nets, ropes, floats and sinkers used to harvest fish by crowding.
Spawner	mature female fish used for breeding.
Spawning	propagation method through environment and nutritional manipulation to hasten and optimize the maturity of the eggs and trigger spawning

Stress	a response to negative environmental condition caused by biological, physical or chemical factors affecting the health, growth and well-being of fish
Tanks	a culture facility that is made up of cement, glass or plastic of different shapes for water containment
Viable	a state or condition where an undertaking or venture in aquaculture results to good performance as to technical and economic profitability of a project
Water Quality	refers to the over-all physical, chemical and biological parameters of the water
Zooplankton	small aquatic animals that drifts with the water movement

TRAINING REGULATIONS (TR)
DOCUMENT REVISION
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Revision No.	Document Types*	Qualification Title	TESDA Board Resolution No./ Date	Deployment Circular (TESDA Circular/ Implementing Guidelines)
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