



AQUACULTURE

TECHNICAL-PROFESSIONAL

Grade 12

Three-Term Budget Of Work (BOW)
for Learning Competencies

**TECHNICAL-PROFESSIONAL
AGRI-FISHERY BUSINESS AND FOOD INNOVATION
Grade 12**

**Three-Term Budget Of Work
For Learning Competencies**

Please note that each Tech-Pro elective is completed in one term if delivered at Grade 12.

Elective	Aquaculture	
Prerequisite	None	
Performance Standard	The learners perform maintenance of tools, materials and equipment, site selection and pond preparation appropriate to local industry.	
Content Standard	The learners demonstrate an understanding of the principles of aquaculture, use and maintenance of tools and equipment, and factors in site selection and pond preparation.	
Week	Learning Competency	Suggested Activities
1	Discuss the overview of aquaculture	Overview of Aquaculture Learning Activities: - Lecture-discussion on: - Definition and importance of aquaculture - Types of aquaculture (freshwater, brackishwater, marine) - Major cultured species in the Philippines (tilapia, bangus, shrimp) - Video presentation on fish farming operations - Group Activity: Create a concept map of aquaculture systems

Week	Learning Competency	Suggested Activities
		• Short quiz Aquaculture Systems and Practices Learning Activities: • Discussion on culture systems: - o Pond culture - o Cage culture - o Tank systems • Compare extensive, semi-intensive, and intensive systems • Group reporting: Advantages and disadvantages of each system • Reflection: Importance of aquaculture in food security
	• Perform utilization and maintenance of aquaculture tools, materials, and equipment	Aquaculture Tools, Materials, and Equipment • Identification of tools and equipment: - o Nets (cast net, seine net) - o Aerators - o Water pump - o Feeding trays • Demonstration on proper handling and storage • Hands-on: Classify tools according to use • Worksheet activity Maintenance and Safety Practices Learning Activities: • Demonstration: Cleaning nets and equipment • Discussion on preventive maintenance schedule

Week	Learning Competency	Suggested Activities
		- Identify safety hazards in aquaculture farms - Group activity: Prepare maintenance checklist - Practical assessment
2	Perform farm layout and site selection	Site Selection for Aquaculture Learning Activities: - Discussion on factors in site selection: - Water quality - Soil type - Accessibility - Source of fingerlings - Case study analysis: Choose best site among 3 options - Group presentation Farm Layout Planning Learning Activities: - Explain parts of fishpond: - Dikes - Inlet and outlet gates - Nursery pond - Grow-out pond - Drawing activity: Create simple fishpond layout - Peer evaluation of layout designs

Week	Learning Competency	Suggested Activities
	Perform pond preparation	Pond Preparation Procedures Learning Activities: - Discussion on pond preparation steps: - Draining - Drying - Repairing dikes - Liming - Fertilization - Video/demonstration of pond preparation - Sequencing activity: Arrange pond preparation steps Practical Application and Assessment Learning Activities: - Demonstration or simulation of: - Checking pond soil - Computing lime requirement (basic level) - Performance Task: - Identify correct tools - Draw farm layout - Explain pond preparation process - Summative assessment (written + practical)
Performance Standard	The learners perform management of hatchery, and broodstock and spawning in aquaculture following industry practices.	
Content Standard	The learners demonstrate an understanding of the principles in designing aquaculture facilities, record keeping, hatchery operations, and broodstock and spawning management.	

Week	Learning Competency	Suggested Activities
3	Design aquaculture facilities appropriate to the local industry	Facility Design & Record Keeping Introduction to Aquaculture Facility Design Learning Activities: - Lecture-discussion: Types of aquaculture facilities (ponds, cages, tanks, hatcheries) - Show examples of local industry practices - Activity: Identify components of aquaculture facilities from pictures - Group discussion: Advantages of each facility type Site Selection & Layout Planning Learning Activities: - Discuss factors in site selection (water quality, soil type, accessibility, drainage) - Demonstration: Basic aquaculture layout planning - Hands-on Activity: Draw a simple layout of an aquaculture farm suitable for local conditions Detailed Facility Design Exercise Learning Activities: - Group activity: Design aquaculture facility including hatchery, nursery, and grow-out area - Present design and explain rationale - Peer evaluation and feedback

**Suggested
Performance
Task**

- **Individual Task:**
 - Prepare a reflection paper on the benefits of aquaculture in the community.
 - Create a concept map showing aquaculture systems and species cultured.
 - Demonstrate proper handling and cleaning of tools and equipment.
 - Prepare a maintenance checklist for aquaculture equipment.
 - Practice proper storage procedures for tools and materials.
 - Draw a simple farm layout plan.
 - Conduct a survey of possible aquaculture sites in the locality.
 - Prepare a sequential flowchart of pond preparation activities.
 - Sketch an aquaculture facility suitable for local conditions.
 - Identify materials needed for constructing aquaculture facilities.
- **Group Task:**
 - Conduct a group discussion on the status of aquaculture in the local industry.
 - Prepare and present a multimedia presentation about successful aquaculture
 - Conduct a tool and equipment inventory activity.
 - Prepare a scaled farm layout for a small aquaculture project.
 - Conduct field observation and site assessment activities.
 - Conduct an actual or simulated pond preparation activity.
 - Demonstrate proper application of lime and fertilizers.
 - Develop a monitoring checklist for pond preparation.
 - Present proper safety and sanitation practices during pond preparation
 - Create a model or miniature design of an aquaculture facility.
 - Present a proposed facility design suited to local industry needs.

Performance Standard	The learners perform management of hatchery, and broodstock and spawning in aquaculture following industry practices.	
Content Standard	The learners demonstrate an understanding of the principles in designing aquaculture facilities, record keeping, hatchery operations, and broodstock and spawning management.	
Week	Learning Competency	Suggested Activities
3	Discuss the importance of record keeping in managing aquaculture activities	Importance of Record Keeping Learning Activities: - Lecture: Why record keeping is essential (feeding, growth, mortality, water quality, finances) - Show sample record sheets used in small aquaculture operations - Activity: Analyze consequences of poor record keeping Record Keeping Practice Learning Activities: - Hands-on: Fill out sample record sheets for feeding, water quality, and harvest - Group discussion: How records can improve farm decision-making - Short quiz: Types of records and their purposes
4	Perform hatchery operations	Hatchery Operations Introduction to Hatchery Operations Learning Activities:

Week	Learning Competency	Suggested Activities
		• Lecture-discussion: Hatchery function, parts, and equipment • Video demonstration: Basic hatchery operation • Activity: Label parts of a hatchery in diagram form Hatchery Procedures Learning Activities: • Discuss hatchery steps: selection of broodstock, egg collection, incubation, larval rearing • Demonstration/simulation: Handling eggs and larvae • Activity: Sequence hatchery steps in correct order Practical Hatchery Operations Learning Activities: • Hands-on activity or simulation: - o Setting up incubation tanks - o Checking water quality parameters - o Feeding larvae • Performance checklist assessment Review & Record-Keeping Integration Learning Activities: • Review hatchery procedures and integrate record keeping • Activity: Maintain sample hatchery record sheets • Group reflection: Importance of records in tracking survival and growth

Week	Learning Competency	Suggested Activities
5	Perform broodstock and spawning management	Broodstock & Spawning Management Broodstock Management Learning Activities: - Lecture: Selection criteria for broodstock (age, size, health) - Discussion: Conditioning and feeding of broodstock - Activity: Identify healthy broodstock from pictures - Group exercise: Prepare broodstock care plan Spawning Management Learning Activities: - Discuss natural vs induced spawning - Demonstration/simulation: Spawning procedures - Activity: Create step-by-step spawning checklist Practical Application & Assessment Learning Activities: - Performance Task: - Design a simple hatchery layout - Show broodstock handling techniques - Demonstrate steps in spawning (simulation) - Prepare record sheets for broodstock and larvae - Summative assessment (practical + written reflection)
Performance Standard	The learners perform stocking of aquaculture species, feeding management and stock sampling computations	

Week	Learning Competency	Suggested Activities
Content Standard	The learners demonstrate an understanding of the process of stocking aquaculture species, feeding management and stock sampling computations.	
Week	Learning Competency	Suggested Activities
6	Apply the process of stocking aquaculture species	Stocking Aquaculture Species Introduction to Stocking Learning Activities: - Lecture-discussion: Definition and importance of stocking in aquaculture - Types of stocking: fry, fingerlings, juvenile stages - Video: Stocking procedures in ponds or tanks - Activity: Identify local aquaculture species for stocking Stocking Requirements Learning Activities: - Discuss factors to consider before stocking: - Water quality - Stock density - Health status of species - Group activity: Determine suitable stocking densities for different species - Short quiz: Stocking concepts Stocking Procedures Learning Activities: - Demonstration: Acclimatization and gradual release of stock

Week	Learning Competency	Suggested Activities
		- Hands-on simulation: Stocking fry or fingerlings (model or tank-based) - Activity: Prepare step-by-step stocking procedure checklist Stocking Record Management Learning Activities: - Discuss documentation: stocking date, quantity, source, size - Activity: Fill out sample stocking records - Reflection: Importance of accurate stocking records
7	Perform feeding management in accordance with industry practices	Feeding Management Introduction to Feeding Practices Learning Activities: - Lecture: Importance of feeding in aquaculture - Feed types: commercial pellets, formulated feeds, natural feed - Discussion: Feeding frequency and ration - Activity: Identify suitable feeds for different species Feeding Techniques Learning Activities: - Demonstration: Proper feed distribution - Practice: Feed calculation based on biomass - Activity: Prepare feeding schedule based on industry standards

Week	Learning Competency	Suggested Activities
		Feeding Observation & Adjustments Learning Activities: • Monitor feed consumption in ponds/tanks • Discuss signs of overfeeding and underfeeding • Group activity: Adjust feeding schedule according to observations • Quiz: Feeding management principles Feeding Records and Monitoring Learning Activities: • Demonstration: Keeping daily feeding logs • Activity: Record feed type, quantity, and consumption in sample log sheet • Group discussion: How feeding records affect farm productivity
Suggested Performance Tasks	• Individual Task: • Identify different types of aquaculture records. • Prepare sample daily production and feeding records. • Analyze simple aquaculture data from sample records. • Prepare a checklist of hatchery operational procedures. • Observe and document hatchery practices. • Demonstrate proper broodstock handling techniques. • Prepare a feeding and care schedule for broodstock. • Compute stocking density based on pond or tank size. • Demonstrate proper acclimatization techniques. • Prepare a stocking activity checklist.	

	• Compute feed requirements and feeding rates. • Demonstrate proper feed storage and handling. • Group Task • Create a record book template for aquaculture operations. • Conduct a mock recording of aquaculture farm activities. • Conduct a simulated hatchery operation activity. • Demonstrate proper handling of eggs, larvae, or fry • Conduct a mock broodstock selection activity. • Demonstrate spawning management procedures. • Conduct an actual or simulated stocking activity. • Demonstrate proper transport and release of fry or fingerlings. • Create a flowchart of the stocking process. • Conduct a feeding demonstration activity. • Compare natural and commercial feeds used in aquaculture. • Develop a feeding management plan for a selected species.	
Performance Standard	The learners perform stocking of aquaculture species, feeding management and stock sampling computations	
Content Standard	The learners demonstrate an understanding of the process of stocking aquaculture species, feeding management and stock sampling computations.	
Week	Learning Competency	Suggested Activities
8	• Perform stock sampling computations in feeding stocks	Stock Sampling and Computation Introduction to Stock Sampling Learning Activities: • Lecture: Purpose of stock sampling (growth monitoring, feed computation) • Discuss sampling tools (nets, cages, weighing scale)

Week	Learning Competency	Suggested Activities
		- Activity: Identify proper sampling techniques for small/large stocks Sampling Procedures Learning Activities: - Demonstration: Measuring weight and counting sample fish - Hands-on: Collect sample data for biomass calculation - Activity: Calculate total biomass from sample Stocking Computation for Feeding Learning Activities: - Lecture: Computing feed ration based on biomass (percentage body weight) - Activity: Solve sample problems: feeding rate computation - Group exercise: Prepare feeding plan for 1-week stock Practical Application and Assessment Learning Activities: - Performance Task: - Apply proper stocking procedures (simulation or model) - Conduct stock sampling and compute biomass - Prepare feed plan and feeding schedule - Summative assessment (written + practical) - Reflection: Importance of proper stocking and feeding in aquaculture productivity

Performance Standard	The learners perform monitoring of water quality parameters, health management practices, harvest and post-harvest activities, and marketing of aquaculture products.	
Content Standard	The learners demonstrate an understanding of the principles of water quality management, health management, harvest and post-harvest activities, and marketing of aquaculture products.	
Week	Learning Competency	Suggested Activities
8	Perform water quality management in accordance with the industry practices	Water Quality Management Introduction to Water Quality in Aquaculture Learning Activities: - Lecture-discussion: Importance of water quality in fish/shrimp growth and survival - Identify water quality parameters: pH, temperature, DO, ammonia, nitrites, salinity - Group Activity: Observe and record water parameters from a sample pond/tank - Short quiz: Water quality concepts Monitoring Water Quality Learning Activities: - Demonstration: Using simple water testing tools (thermometer, pH meter, DO kit) - Hands-on: Take water samples and measure parameters - Activity: Record and interpret readings - Group discussion: How poor water quality affects productivity Corrective Actions and Maintenance Learning Activities:

Week	Learning Competency	Suggested Activities
		• Discuss aeration, water exchange, and liming • Activity: Plan water management schedule for a sample pond • Simulation: Adjust water parameters to optimal conditions Water Quality Record Keeping Learning Activities: • Hands-on: Maintain water quality logs • Discuss frequency of monitoring and importance for farm decision-making • Activity: Analyze a week of sample water data and recommend actions
9	• Apply health management to prevent or treat aquaculture species	Health Management & Harvesting Introduction to Health Management Learning Activities: • Lecture: Common diseases in aquaculture (bacterial, fungal, viral, parasitic) • Identify clinical signs of sick fish/shrimp • Activity: Match disease with symptoms using pictures Preventive Health Management Learning Activities: • Discuss biosecurity measures, vaccination, proper handling, and sanitation • Demonstration: Disinfecting tanks and tools • Activity: Prepare a preventive health schedule for a farm

Week	Learning Competency	Suggested Activities
		- Quiz: Health management concepts Treatment of Diseases Learning Activities: - Lecture: Safe use of approved medicines and organic alternatives - Activity: Case study – Identify problem and propose corrective action - Group discussion: Importance of proper treatment to avoid mortality
	Perform harvest and post-harvest activities	Harvesting Procedures Learning Activities: - Discuss timing, methods, and handling during harvest - Demonstration: Harvesting using nets and baskets (simulation) - Activity: Prepare a step-by-step harvesting checklist - Reflection: How careful harvesting reduces post-harvest losses Post-Harvest & Marketing Post-Harvest Handling Learning Activities: - Lecture: Cleaning, grading, packaging, and storage - Demonstration: Proper handling to maintain quality - Hands-on Activity: Package harvested products for local market

Week	Learning Competency	Suggested Activities
		Product Grading and Quality Control Learning Activities: - Discuss grading by size, weight, and appearance - Group activity: Practice grading fish/shrimp samples (simulation or images) - Record results and discuss importance for pricing
10	Perform selling of aquaculture products using different marketing strategies	Marketing Strategies Learning Activities: - Lecture: Marketing channels – wet markets, supermarkets, online platforms - Discuss strategies: direct selling, cooperatives, value-added products - Group Activity: Develop a sample marketing plan for aquaculture products Practical Application & Assessment Learning Activities: - Performance Task: - Measure water quality and propose corrective actions - Identify sick fish/shrimp and recommend preventive/treatment measures - Demonstrate harvesting and post-harvest handling - Prepare marketing plan and sales strategy - Summative assessment: written + practical demonstration + group presentation

Suggested Performance Tasks	• Individual Task: • Compute average body weight and feeding requirements. • Record and analyze stock sampling data. • Demonstrate proper handling of fish during sampling. • Demonstrate proper use of water testing tools. • Record daily water quality readings. • Demonstrate proper sanitation and disinfection procedures. • Prepare a simple treatment and monitoring guide. • Demonstrate sorting, grading, and handling procedures. • Prepare a checklist for post-harvest handling activities. • Create promotional materials for aquaculture products. • Practice customer interaction and selling techniques. • Group Task • Conduct an actual or simulated stock sampling activity. • Compute biomass and daily feed ration as a group. • Prepare a sampling report based on gathered data • Conduct water quality testing activities. • Create a monitoring schedule for water quality management. • Present methods of improving pond or tank water quality. • Develop a water quality management plan for an aquaculture facility. • Conduct a role-play on disease outbreak management. • Create posters on biosecurity and disease prevention • Conduct a simulated harvesting activity. • Demonstrate proper packaging and storage techniques • Conduct a mock selling activity or market simulation. • Develop a marketing plan for aquaculture products.
------------------------------------	--