

Syllabus for Pearl Farmer

Course Name	Pearl Farmer
Course Code	AGR/2025/PEFA/436
Level	4
Sector	Agriculture
Occupation	Pearl Farmer
Job Description	This job is responsible for overseeing all aspects of pearl cultivation including collection, implantation and post-operative care as well as managing water and soil quality to ensure optimal growth conditions. The candidates are also involved in supervising pond culture operations, conducting efficient harvesting and strategizing marketing efforts to promote cultivated pearls.
Course Duration	Total Duration 390 Hrs (T-90, P-180, OJT-60 and ES-60)
Trainees' Entry Qualification	• Completed 1st year of UG OR • Pursuing 1st year of UG and continuous education OR • Pursuing 3rd year of 3-year diploma after 10th and continuous education OR • Completed 3-year diploma after 10 OR • Completed 2nd year of 2 year diploma after 12th OR • Pursuing 2nd year of 2- year diploma after 12 and continuous education OR • Previous relevant Qualification of NSQF Level 3.5 and with minimum education as 8th Grade pass with 3 year relevant experience OR • Previous relevant Qualification of NSQF Level 4 and with minimum education as 8th Grade pass with 1.5 year relevant experience
Trainers Qualification	Bachelor in Fishery Science (B.F.Sc) OR B. Sc. (Aquaculture)/B.Sc. (IFF) with 6 months experience

Structure of Course:

Module No.	Module name	Outcome	Theory (Hrs)	Practical (Hrs)	Total (Hrs) [Multiple of 30]
1	Introduction of pearl and its history with economy	Describe how pearl cultivation and trade have influenced economies from past to present.	10	20	30
2	Pearl culturing freshwater oyster and different types of bids	Identify the process of culturing freshwater pearls and distinguish between various types of pearl bids.	30	60	90
3	Post operative care and pond culture	Perform Post operative care and pond culture procedure.	30	60	90
4	Harvesting and marketing	Execute harvesting techniques along with marketing	20	40	60
5.	OJT	Work in real job situation with special emphasis on basic safety and hazards in this domain (OJT).	--	60	60
6.	Employability Skill	As per guided curriculum	60	--	60
TOTAL:			150	240	390

SYLLABUS:**Module 1:** Introduction of pearl and its history with economy**Outcome:** Describe how pearl cultivation and trade have influenced economies from past to present.**Theory content:**

- Historical importance of Pearls
- Revolution of Pearl culturing
- Economic impact of Pearl

Practical content:

- Identify Pearl type
- Identify steps of pearl cultivation
- Explore the economic impact by identifying the local communities involve in pearl culture
- Identify market trends in pearl prices, trade and consumer demand to understand economic value

Module 2: Pearl culturing freshwater oyster and different types of bids

Outcome: Identify the process of culturing freshwater pearls and distinguish between various types of pearl bids.

Theory Content:**Collection and Sourcing of Oysters**

- Introduction to Pearl Oysters
- Natural and Farmed Collection.
- Overview of techniques like diving, using nets, or harvesting from farm structures.
- Factors to consider when sourcing oysters including health, age and location.
- Environmental Impact

Types of Nucleuses (Beads) and Their Making

- Overview of the role of nuclei in pearl formation and the importance of size, shape, and material.
- Types of Nuclei: Beads (Artificial Nuclei) and Tissue Nuclei
- Nucleus Material Sources
- Overview of the process, including shaping, polishing, and sterilizing nuclei.

Water Quality Parameters and Management:

- pH: Optimal pH levels for pearl culture typically range between 7.5 to 8.5. pH affects the solubility of essential minerals and ions necessary for pearl formation.
- Alkalinity: Maintaining alkalinity levels within the range of 100-300 mg/L as CaCO₃ ensures stable water conditions for pearl oysters.
- Hardness: Water hardness influences shell development and overall health of pearl oysters. Ideal hardness ranges from 200-400 mg/L as CaCO₃.
- Dissolved Oxygen (DO): Adequate DO levels (6-8 mg/L) are crucial for the respiration and metabolism of pearl oysters. Insufficient DO can lead to stress and mortality.
- Carbon Dioxide (CO₂): CO₂ levels should be maintained below 10 mg/L to prevent adverse effects on pearl oysters' physiology and shell formation.
- Salinity: Pearl oysters thrive in fresh water with salinity levels ranging from 7-8 ppt and salinity levels ranging from 30-35 ppt for brackish water. Fluctuations in salinity can disrupt osmoregulation and growth.

Soil Quality Parameters and Management:

- Soil pH: Ideal soil pH for pearl culture ranges from 7.5 to 8.5, ensuring optimal nutrient availability and microbial activity.
- Organic Carbon: Organic carbon content influences soil fertility and microbial diversity. Balancing organic matter levels promotes healthy soil ecosystems.
- Nitrogen and Phosphate: Adequate levels of nitrogen and phosphate support robust pearl oyster growth and shell formation. Monitoring and supplementing these nutrients as needed are essential.

Pond Preparation

- Site Selection and Pond Design
- Pond Preparation Steps
 - Cleaning and Disinfection
 - Substrate Preparation
 - Liming and Fertilization
- Managing Pond Ecosystem

Practical Content:

- Hands-on preparation of bead nuclei—cutting, shaping, polishing, and sterilizing.
- Setting up and following a water quality monitoring schedule.
- Collect water and soil samples from pearl culture sites.
- Use pH meters or pH pens to measure water and soil pH levels.
- Conduct tests for alkalinity, hardness, DO, CO₂, and salinity using appropriate analysis kits.
- Determine soil organic carbon, nitrogen, and phosphate content through standardized laboratory procedures.
- Compare measured values with ideal ranges for pearl culture and identify any deviations requiring corrective actions.
- Practical steps in clearing and disinfecting the pond area.
- Setting up oyster racks or beds within the pond for easy access and growth.

Tools & Equipment needed:

pH meter or pH pen and different soil and water analysis kits

Module No. 3: Pre and post operative care and pond culture system

Outcome: Perform Post operative care and pond culture procedure.

Theory Content:**Oyster Pre-Operative Care**

- Criteria for selecting healthy oysters suitable for pearl cultivation, including species, size, and age.
- Prepare oysters for the operation by placing them in clean seawater with optimal salinity, temperature and nutrient conditions to enhance their resilience.
- Ensure all equipment, including hands and tools, is thoroughly sterilized to minimize the risk of infection or disease during the procedure.
- Understand the signs of healthy oysters versus stressed or sick oysters

Different Types of Pearl Making Operation

- Nucleation Process
- Types of Pearls Produced
- Overview of grafting procedures required for different types of pearls, including implanting the nucleus and tissue graft correctly.

Post Operative Care

- Procedure for Handling Post-Operation Stress
- Details overview of the ideal water parameters, including salinity, temperature, pH and nutrient levels, to ensure optimal recovery and pearl development.
- Monitoring for Infection
- Factors influencing pearl quality, such as the oyster's health and environmental conditions.

Hanging and Open Culture System

Overview of suspending oysters in the water column using nets or baskets to protect them from predators and improve growth.

- Explain the procedure of placing oysters directly on the seabed for natural growth.

- Comparison of both hanging and open culture system, including environmental suitability, labour requirements and pearl quality impacts.
- Environmental Conditions and Maintenance procedure

Different Types of Diseases and Cure of Oysters

- Common Diseases in Oysters: Bacterial Infections, Parasitic Infestations, Shell Diseases
- Disease Prevention and Control
- Different types of treatments, including antibiotics for bacterial infections, anti-parasitic treatments, and natural treatments like UV sterilization.

Practical Content:

- Select oysters based on their health and size
- Set up acclimatization tanks and adjust water parameters
- Practice sterilizing tools and workspace using approved disinfectants.
- Demonstration of various collection techniques in a controlled environment.
- Emphasis on safety measures and ethical considerations during collection.
- Demonstrate pre-conditioning tasks including cleaning, sorting, and grading of bivalve seeds.
- Demonstrations of proper handling techniques to minimize stress on seeds.
- Illustrate mantle tissue and mantle cavity implantation methods using simulation models.
- Identify different types of implants and tools.

Tools & Equipment needed:

Scissors, Forceps, Scalpel, Spatula, Knife, refractor, Shell speculum, different design bids, KMnO₄ solution, Post operative care unit, ropes and bamboo for mussel hanging

Module No. 4: Harvesting and marketing

Outcome: Execute harvesting techniques along with marketing

Theory Content:

1. Harvesting Techniques:

- Overview of various methods including diving, dredging and farming.
- Explanation of each method's advantages, disadvantages and suitability based on the type of pearl being harvested.

2. Time to Harvest:

- Identify and analyze the timing of harvesting such as maturity of the pearls, environmental conditions and market demand.
- Determine the optimal time to harvest based on these factors.

3. Care During Harvesting:

- Importance of gentle handling to prevent damage to pearls.
- Techniques for careful extraction from oysters or mussels to maintain pearl quality.
- Proper storage methods to preserve freshness and luster.

4. Marketing Techniques and Potentiality:

- Understanding the target market demographics and preferences.
- Utilizing online platforms, auctions, and specialized pearl markets for marketing.
- Strategies for branding and differentiation to capture consumer interest.
- Exploring niche markets and luxury segments for premium pearl sales.
- Analysis of domestic and international markets with a focus on regions known for high demand for pearls.

Practical Content:

- Demonstrate various harvesting techniques
- Handle pearls during harvesting to minimize damage.
- Demonstrate proper cleaning and storage procedures post-harvest.
- analysis of market opportunity

Tools & Equipment needed: Diving mask, Snorkel, Wetsuit, Fins, Weight belt, Dive knife, Underwater flashlight, Dredging vessel, dredge pumps, suction hoses, dredging buckets, life jackets, helmets, safety harnesses, Pearl farming racks, Oyster or mussel spat, Feeding apparatus, pH meters, dissolved oxygen meters, Oyster shucking knife, Protective gloves, Trays, Soft cloths, Soft brushes.

Module No. 5: OJT

Outcome: Work in real job situation with special emphasis on basic safety and hazards in this domain

Practical Content:

Assessor will check report prepared for this component of Practical training of the course and assess whether competency has been developed to work in the real job situation with special emphasis on basic safety and hazards in this domain. (The trainee is expected to undertake work in actual workplace under any supervisor / contractor for 60 Hours.)

Module No. 8: Employability Skills (60 Hrs)**Key Learning Outcomes****Introduction to Employability Skills**

Duration: 1.5 Hours

After completing this programme, participants will be able to:

1. Discuss the Employability Skills required for jobs in various industries
2. List different learning and employability related GOI and private portals and their usage

Constitutional values - Citizenship

Duration: 1.5 Hours

3. Explain the constitutional values, including civic rights and duties, citizenship, responsibility towards society and personal values and ethics such as honesty, integrity, caring and respecting others that are required to become a responsible citizen
4. Show how to practice different environmentally sustainable practices.

Becoming a Professional in the 21st Century

Duration: 2.5 Hours

5. Discuss importance of relevant 21st century skills.
6. Exhibit 21st century skills like Self-Awareness, Behavior Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn etc. in personal or professional life.
7. Describe the benefits of continuous learning.

Basic English Skills

Duration: 10 Hours

8. Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone

9. Read and interpret text written in basic English
10. Write a short note/paragraph / letter/e -mail using basic English

Career Development & Goal Setting

Duration: 2 Hours

11. Create a career development plan with well-defined short- and long-term goals

Communication Skills

Duration: 5 Hours

12. Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette.
13. Explain the importance of active listening for effective communication
14. Discuss the significance of working collaboratively with others in a team

Diversity & Inclusion

Duration: 2.5 Hours

15. Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PwD
16. Discuss the significance of escalating sexual harassment issues as per POSH act.

Financial and Legal Literacy

Duration: 5 Hours

17. Outline the importance of selecting the right financial institution, product, and service
18. Demonstrate how to carry out offline and online financial transactions, safely and securely
19. List the common components of salary and compute income, expenditure, taxes, investments etc.
20. Discuss the legal rights, laws, and aids

Essential Digital Skills

Duration: 10 Hours

21. Describe the role of digital technology in today's life
22. Demonstrate how to operate digital devices and use the associated applications and features, safely and securely
23. Discuss the significance of displaying responsible online behavior while browsing, using various social media platforms, e-mails, etc., safely and securely
24. Create sample word documents, excel sheets and presentations using basic features
25. utilize virtual collaboration tools to work effectively

Entrepreneurship

Duration: 7 Hours

26. Explain the types of entrepreneurship and enterprises
27. Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan
28. Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement
29. Create a sample business plan, for the selected business opportunity

Customer Service

Duration: 5 Hours

30. Describe the significance of analyzing different types and needs of customers
31. Explain the significance of identifying customer needs and responding to them in a professional manner.
32. Discuss the significance of maintaining hygiene and dressing appropriately

Getting Ready for apprenticeship & Jobs

Duration: 8 Hours

33. Create a professional Curriculum Vitae (CV)
34. Use various offline and online job search sources such as employment exchanges, recruitment agencies, and job portals respectively
35. Discuss the significance of maintaining hygiene and confidence during an interview
36. Perform a mock interview
37. List the steps for searching and registering for apprenticeship opportunities

Learning Outcome – Assessment Criteria

Module No.	Outcome	Assessment Criteria
1	Describe how pearl cultivation and trade have influenced economies from past to present.	After completion of this module students will be able to: 1.1 Describe Historical importance and economic impact of Pearls. 1.2 Identify Pearl type and its cultivation steps. 1.3 Identify market trends in pearl prices, trade and consumer demand to understand economic value.
2	Identify the process of culturing freshwater pearls and distinguish between various types of pearl bids.	After completion of this module students will be able to: 2.1 Describe oyster collection methods, nucleus types and water and soil quality parameters. 2.2 Describe the role of nuclei in pearl formation and the importance of size, shape and material. 2.3 Demonstrate the processes of shaping, polishing and sterilizing nuclei. 2.4 Perform tests for pH, alkalinity, hardness, DO, CO₂, salinity, organic carbon, nitrogen and phosphate accurately. 2.5 Analyze test results and compare them against ideal ranges for pearl culture. 2.6 Identify deviations and proposing corrective actions. 2.7 Prepare pond and manage ecosystem effectively. 2.8 Set up and maintain oyster racks or beds for optimal growth.
3	Perform Post operative care and pond culture procedure.	After completion of this module students will be able to: 3.1 Evaluate oyster selection based on health, size and species suitability. 3.2 Demonstrate proper setup and maintenance of acclimatization tanks. 3.3 Perform sterilization of tools, equipment and workspace effectively. 3.4 Execute pre-conditioning tasks such as cleaning, sorting and grading oysters. 3.5 Apply proper implantation techniques using

Module No.	Outcome	Assessment Criteria
		mantle tissue and cavity simulation models. 3.6 Identify and handle different types of implants and tools accurately. 3.7 Monitor and maintain post-operative water parameters for optimal recovery. 3.8 Demonstrate mussels hanging process in a pond environment 3.9 Diagnose common oyster diseases and suggest appropriate treatments.
4	Execute harvesting techniques along with marketing	After completion of this module students will be able to: 4.1 Demonstrate various pearl harvesting techniques. 4.2 Handle pearls carefully to minimize damage during extraction. 4.3 Perform cleaning and storage procedures post-harvest. 4.4 Analyze factors affecting the timing of harvest for optimal results. 4.5 Identify and evaluate market opportunities for pearl.
5	OJT	Assessor will check report prepared for this component of Practical training of the course and assess whether competency has been developed to work in the real job situation with special emphasis on basic safety and hazards in this domain. (The trainee is expected to undertake work in actual workplace under any supervisor / contractor for 60 Hours.)
6	Employability Skill	As per guided curriculum

List of Tools, Equipment & materials needed for 30 Trainees (Practical)

Sl No	Items Name	Specification	Qty
1	pH meter		8
2	pH paper		8
3	different soil and water analysis kits		5
4	Scissors		32
5	Spatula		32
6	Knife		32
7	Shell speculum		32
8	different design bids	90000 Designer 10000 Round	100000
9	Oyster		45000
10	KMnO ₄		200 gm

Sl No	Items Name	Specification	Qty
11.	Mercurochrome		2 Ltr
12	Antibiotics		30 Strips
13	Soft cloths		64 Pcs
7	Niddle	2 mm	35 Pcs
8	Tray		60
9	Magnifying glass		35
10	Surgical Gloves		100 pairs
11	Spirulina/Moringa powder		10 kg
12	Post operative care unit, ropes and bamboo for mussel hanging		As per required
13	Diving mask		30
14	Wetsuit		30
15	Fins		30 pairs
16	Weight belt		30
17	Dive knife		30
18	Underwater flashlight		30
19	dredge pumps		30
20	suction hoses		30
21	dredging buckets		30
22	life jackets		30
23	helmets		30
24	safety harnesses		30
25	Pearl farming racks		90
26	Oyster or mussel spat		90
27	Feeding apparatus		90
28	pH meters		8
29	dissolved oxygen meters		8
30	Oyster shucking knife		30
31	Protective gloves		30
32	Soft brushes		30

Marks Distribution

Outcome	Outcome Code	Total Th marks	Total Pr marks	Total OJT marks
Describe how pearl cultivation and trade have influenced economies from past to present.	AGR/0280/OC1	20	120	0
Identify the process of culturing freshwater pearls and distinguish between various types of pearl bids.	AGR/0280/OC2	50	190	0
Perform Post operative care and pond culture procedure.	AGR/0280/OC3	50	190	0
Execute harvesting techniques along with marketing	AGR/0280/OC4	30	150	0
Work in real job situation with special emphasis on basic safety and hazards in this domain (OJT).	AGR/0280/OC5	0	0	150
Employability Skills – 60 Hrs	DGT/VSQ/N0102	50	0	0