

**LEARNING OUTCOME BASED VOCATIONAL CURRICULUM**

**CLASS 11 & 12**

**SECTOR:  
AGRICULTURE AND  
ALLIED**

**JOB ROLE**  
**SHRIMP FARMER**

**(QUALIFICATION PACK: REF. ID. AGR/Q4902)**



**State Council of Educational Research & Training (SCERT) Kerala**  
(Department of General Education, Government of Kerala)  
Vidhya Bhavan, Poojappura, Thiruvananthapuram





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[www.scert.kerala.gov.in](http://www.scert.kerala.gov.in)



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VOCATIONAL CURRICULUM**

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## FOREWORD

A collaborative initiative for developing learning outcome based vocational curriculum and courseware aimed at integrating both vocational and general qualifications has been implemented by the State Council of Educational Research and Training (SCERT) Kerala and the PSSCIVE Bhopal. This is intended to open up pathways of career progression for students and the SCERT Kerala is developing curricula under the project as an integral part of Vocationalisation of Education under Samagra Shiksha, approved by the Government of Kerala. Decisive improvement in the teaching-learning process and working competencies through learning outcomes that have been judiciously embedded in the vocational subject is expected to be the major impact that will be brought about by the learning outcome based vocational curriculum.

It is a matter of great pleasure to introduce this learning outcome based vocational curriculum as part of the vocational training package for the job role of Shrimp Farmer (AGR/Q 4902). The curriculum has been developed for the higher secondary students of vocational education and is aligned to the National Occupation Standards (NOSs) of a job role identified and approved under the National Skill Qualification Framework (NSQF).

The key aim of the curriculum will be to provide children with employability and vocational skills that would in turn aid occupational mobility and lifelong learning. A major transformation in the teaching process is also aimed at, which will be brought about through interactive sessions in classrooms, practical activities in laboratories and workshops, projects, field visits, and professional experiences.

The curriculum has been meticulously developed and judiciously reviewed by a group of experts and their much-valued contributions are immensely acknowledged. The imminent utility of the curriculum will without doubt, be adjudged by the qualitative improvement that it brings about in teaching-learning. The feedback and suggestions on the content by the teachers and other stakeholders will be of immense value to us in bringing about further enhancement and augmentation to this document.

**Dr. J. Prasad**  
*Director*  
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We are extremely thankful to Dr. RVG Menon, Chairperson, High Power Committee for the implementation of NSQF in Kerala, Dr. Sukesh Kumar, Former Principal, Government Engineering College Palakkad and Sri. G S Unnikrishnan Nair, Former Director State Agricultural Management and Extension Training Institute (SAMETI), Thiruvananthapuram for their mentorship in the process of developing this document. The contributions made by Dr. Vinay Swarup Mehrotra, Professor and Head, Curriculum Development and Evaluation Centre (CDEC), PSSCIVE Bhopal in development of the curriculum are duly acknowledged.

We are grateful to the experts for their earnest efforts and contributions in the development of this learning outcome based vocational curriculum. Their names are acknowledged in the list of contributors.

We are grateful to the Vocational Higher Secondary wing of the Directorate of General Education (DGE) Kerala for extending the support to develop this curriculum document on time by providing the service of its teaching staff.



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## 1. COURSE OVERVIEW

### COURSE TITLE: AGRICULTURE – SHRIMP FARMER

#### GENERAL OBJECTIVES

The Shrimp Farmer course helps the learners to contribute to the agricultural production sector of our country. The course aims at addressing the shortage of skilled personnel in shrimp farming. It also aims at developing potential entrepreneurs in this field. Shrimp aquaculture contributes to a major portion of marine export from India in terms of value and volume. Shrimp farming has immense potential as most of the water bodies are under utilised.

On successful completion of the course the learners are expected to develop skills in various aspects of shrimp farming such as;

- selection of species
- site selection
- design and construction of shrimp farm
- pre-stocking management
- stocking
- feed management
- water quality management
- disease management
- harvesting techniques
- quality analysis of harvested shrimp
- entrepreneurship development in Shrimp Farming
- health and safety at work

#### COURSE OUTCOMES

On completion of the course, students should be able to;

- apply effective oral and written communication skills to interact with people and customers
- identify the principal components of a computer system
- demonstrate the basic skills of using computer
- demonstrate self-management skills
- demonstrate the ability to provide a self-analysis in context of entrepreneurial skills and abilities
- demonstrate the knowledge of importance of green skills in meeting the challenges of sustainable development and environment protection
- identify the commercially important shrimp species of India and its importance in aquaculture

- comply with the Government policies and licensing procedures related to shrimp farming
- identify suitable site for shrimp farming
- design and construct a shrimp farm
- perform pre-stocking management
- identify good quality shrimp seeds and perform stocking
- manage shrimp nutrition and feeding in commercial aquaculture systems
- develop skill in management of water quality in shrimp culture systems
- develop skill in management of shrimp health in commercial aquaculture systems
- schedule the harvest of farmed shrimp
- perform post harvest management
- acquire knowledge in the health and safety measures to be adopted in a shrimp farm

**COURSE REQUIREMENTS:** The learner should have the basic knowledge of science.

**COURSE DURATION: 600 hrs**

Class 11	300 hrs
Class 12	<b>300 hrs</b>
Total	<b>600 hrs</b>

## 2. SCHEME OF UNITS

*The unit-wise distribution of hours and scores for Class 11 is as follows:*

<b>CLASS 12</b>			
	<b>Units</b>	<b>No. of Hours for Theory and Practical =300</b>	<b>Max. scores for Theory and Practical = 100</b>
Part A	<b>Employability Skills</b>		
1.	Communication Skills – III	25	<b>10</b>
2.	Self-management Skills – III	25	
3.	Information and Communication Technology Skills – III	20	
4.	Entrepreneurial Skills – III	25	
5.	Green Skills – III	15	
	<b>Total</b>	<b>110</b>	<b>10</b>
Part B	<b>Vocational Skills</b>		
6.	Introduction to shrimp farming	11	
7.	Selection of species	10	
8.	Site selection	32	
9.	Design and construction of shrimp farm	44	
10.	Pre-stocking management	39	
11.	Stocking	29	
	<b>Total</b>	<b>165</b>	<b>40</b>

<b>Part C</b>	<b>Practical Work</b>		
	Practical Examination	06	15
	Written Test	01	10
	Viva Voce	03	10
	<b>Total</b>	<b>10</b>	<b>35</b>
<b>Part D</b>	<b>Project Work/Field Visit/OJT</b>		
	Practical File/Student Portfolio	10	10
	Viva Voce	05	05
	<b>Total</b>	<b>15</b>	<b>15</b>
	<b>Grand Total</b>	<b>300</b>	<b>100</b>

*The unit-wise distribution of hours and scores for Class 12 is as follows:*

<b>CLASS 12</b>			
	<b>Units</b>	<b>No. of Hours for Theory and Practical =300</b>	<b>Max. scores for Theory and Practical = 100</b>
<b>Part A</b>	<b>Employability Skills</b>		
1.	Communication Skills – IV	25	<b>10</b>
2.	Self-management Skills – IV	25	
3.	Information and Communication Technology Skills – IV	20	
4.	Entrepreneurial Skills – IV	25	
5.	Green Skills – IV	15	
	<b>Total</b>	<b>110</b>	<b>10</b>
<b>Part B</b>	<b>Vocational Skills</b>		
6.	Feed management	32	
7.	Water quality management	34	
8.	Disease management	32	
9.	Harvesting techniques	28	
10.	Quality analysis of harvested shrimp	30	
11.	Entrepreneurship development in Shrimp Farming	04	
12.	Health and safety at work	05	
	<b>Total</b>	<b>165</b>	<b>40</b>
<b>Part C</b>	<b>Practical Work</b>		
	Practical Examination	06	15
	Written Test	01	10
	Viva Voce	03	10
	<b>Total</b>	<b>10</b>	<b>35</b>
<b>Part D</b>	<b>Project Work/Field Visit/OJT</b>		
	Practical File/Student Portfolio	10	10
	Viva Voce	05	05
	<b>Total</b>	<b>15</b>	<b>15</b>
	<b>Grand Total</b>	<b>300</b>	<b>100</b>

### 3. LEARNING OUTCOME BASED ACTIVITIES

Classroom, Laboratory/workshop and field are the key spots where teaching and learning take place. Classroom and laboratory-based teaching and learning facilitate knowledge creation whereas field visits open venues for free interaction with experts and also helps acquaint learners with various tools, materials, equipment procedures and operations in the workplace. While considering these intensified ways of knowledge acquisition, emphasis should also be laid on the occupational safety, health and hygiene of the participants.

#### **Classroom activities**

Classroom activities are mainly interactive lecture sessions, followed by discussions and doubt clarifications. Classes are handled by trained vocational teachers and this is considered as an integral part of the course. The most attractive feature of the class is that the classes are in tune with the outcome-based curriculum. Teaching learning processes are well planned and implemented. Teaching learning materials such as audio-visual materials, colour slides, charts, diagrams, models, exhibits, handouts, on-line teaching materials etc., have been incorporated in accordance with the topic and this may help the teachers to impart the content in an effective manner.

#### **Practical work in Laboratory / Workshop**

Practical work is usually performed to enhance the skills of the learners which are indeed essential for them to become specialized technicians. Practical sessions may include hands on training, simulation training, role-play, case-based studies and exercises. Equipment and other appliances are available for use in abundance. Trained personnel teach and exercise specialized techniques. Practical classes involving laboratory/workshop are well planned with tools, equipment, materials and also other skill acquisition activities. Vocational teachers should submit the plan of laboratory/workshop work in advance to the head of the institution and get it sanctioned prior to use.

#### **Field visits/ Educational Tour**

Field visit is one of the ways and means of learning outside the classroom. It promotes knowledge acquisition by giving opportunity to learners to interact with renowned experts and to make observations of the activities performed by them. An observation check list may help the students to ensure the collection of required information and its analysis for further use. This may be developed with the help of vocational teachers who are in charge of outdoor learning activities. All the field visits are well planned by taking into consideration of the learning requirements, distance to travel, time, health and hygiene. The Principal and teachers should plan to implement at least three field visits within a year by making all necessary arrangements.

**Virtual Field Visits, Expert Interactions and Practical Activities**

With the rapid potentials offered by information technology in digital classrooms, the extent of virtual field visits, online expert interactions and online demonstrations cum practical activities can be worked out. It may be helpful amid the current Covid 19 pandemic scenario. A State level cluster of teachers and experts in the concerned subject can be pooled together for the purpose. The guidelines for such activities can be issued by the concerned SCERTs.

**Suggestive Topics for Expert Interaction**

1. Interaction classes of established shrimp farmers can be arranged at farm site or at class room.
2. Shrimp farm consultants whose professional experience can be shared with students through online platforms.
3. Professionals from feed and drug industry, farm and hatchery consultants.
4. Experts from various Government agencies can be utilised to share their knowledge regarding licensing procedures, rules and regulations pertaining to shrimp farm.
5. Academicians and researchers working in the field of aquaculture can empower the students in the latest developments in shrimp farming.

**4. ASSESSMENT AND CERTIFICATION**

The National Skill Qualification Framework (NSQF) is based on outcomes rather than inputs referred by the National Occupation Standards (NOSs). Learning outcomes, as per the NSQF level descriptors, include the Process, Professional Knowledge, Professional Skills, Core Skills and Responsibility. Knowledge in the job of a learner shall be the basis of assessment. It would also be considered if the learning program undertaken by the learner has delivered the required output. Certification is based on required standards so that the learner and the employer could come to know about the competency attained in the vocational subject/ course. In order to make the assessment reliable, valid, flexible, convenient, cost effective, fair and transparent standardised assessment tools are to be used. Technology assisted assessment process is in vogue now.

**Knowledge Assessment (Theory)**

Knowledge Assessment usually includes two components – Internal Assessment and External Assessment. External assessment includes theory examination conducted by the concerned examination Boards. Tools for assessment contain components for testing the application of knowledge. Knowledge testing can be performed by making use of either objective or short answer type paper-based test. Source of the questions should be the content of the curriculum.

## Written Test

A group, comprising of academicians, experts from existing vocational subject experts / teachers, subject experts from University/ College or from the industry prepare theory question paper for the vocational subjects. A panel of experts for question paper setting and conducting examination should be formed by the respective central / state boards. Written tests allow the learners to demonstrate that they have acquired the necessary knowledge and skill in the given topics.

*The blue print for the question paper may be as follows:*

**Duration: 3 hrs**

**Maximum scores: 50**

No. of Questions					
	Typology of Question	Very Short Answer (1 score)	Short Answer (2 scores)	Long Answer (3 scores)	Scores
1.	Remembering – (Knowledge based simple recall questions, to know specific facts, terms, concepts, principles, or theories; identify, define or recite, information)	3	3	3	18
2.	Understanding – (Comprehension – to be familiar with meaning and to understand conceptually, interpret, compare, contrast, explain, paraphrase, or interpret information)	2	4	3	19
3.	Application – (Use abstract information in concrete situation, to apply knowledge to new situations: Use given content to interpret a situation, provide an example, or solve a problem)	0	2	1	07
4.	High Order Thinking Skills – (Analysis and Synthesis – Classify, compare, contrast, or differentiate between different pieces of information; Organize and/ or integrate unique pieces of information from a variety of sources)	0	2	0	04
5.	Evaluation – (Appraise, judge, and/or justify the value or worth of a decision or outcome, or to predict outcomes based on values)	0	1	0	02
<b>Total</b>		<b>5x1=5</b>	<b>12x2=24</b>	<b>7x3=21</b>	<b>50 (24 questions)</b>



**Skill Assessment (Practical)**

Skill assessment should be done by considering the practical demonstration of skills by the candidate. It is assessed by making use of a competency checklist prepared by experts. The competency checklist should be developed as per the National Occupation Standards (NOSs). This should be in tune with the qualification pack for the Job Role to ensure necessary consistency in the quality of assessment across different sectors and institutions. As per the performance criteria defined in the National Occupation Standards, the students have to demonstrate their competencies in front of the examiners. Assessment will indicate whether they are competent or incompetent. The assessors assessing the skills of the students should possess enough industrial experience and should have undergone a rigorous training in assessment principles and practices. The Sector Skill Councils (SSCs) should ensure that the assessors are given the required training on the assessment of competencies.

The demonstration of knowledge and skill in performing a task of the learners, is the purpose of the practical examination. This include practical examination where hands on experience will be displayed and a viva voce. A team of two evaluators, one a subject teacher and the other an expert from the relevant industry certified by the relevant Board or SSCs concerned can conduct practical examination as well as viva voce.

**Project Work**

Project is an efficient strategy to assess the practical skills acquired along a certain timeline. Project is chosen and given to candidates only on the basis of their capabilities, because it needs specific skills. It is performed step by step and the first and foremost step is classroom discussion and selection of the topic for the project. After fixing the topic and objectives, the methodology of the project work should be decided during the classroom discussions. Monitoring and evaluation should be done at each stage. Proper feedback shall be provided to the learners for improvement and innovation. Field visits can be organized as part of the project work. The data collected may be used for presentations and report writing. Accuracy of the data is to be ensured. The entire project work is maintained as a practical work file or as student's portfolio.

**Student Portfolio**

It is a document that supports the candidate claim of competencies acquired as a part of the teaching learning process. The student portfolio is a compilation of project reports, articles, photos of products prepared by the student.

## Viva Voce

Viva voce provides chance to each candidate to demonstrate communication skills and content knowledge. It is a way of obtaining feedback on the student’s experience, learning, project work and field visit. Audio visual recording of the whole procedure can be done for future reference and documentation. A Board, including external examiners, is constituted as per the norms which in turn should be suitably adapted to the specific requirement of the vocational subjects.

The central/state examination board for secondary education and the respective Sector Skill Councils can certify the competencies of the learner upon the successful completion of the course.

## 5. UNIT CONTENTS

### CLASS 11

#### Part A: Employability Skills

Sl.No.	Units	Duration (hrs)
1.	Communication Skills- III	25
2.	Self-management Skills – III	25
3.	Information and Communication Technology Skills – III	20
4.	Entrepreneurial Skills – III	25
5.	Green Skills – III	15
	<b>Total</b>	<b>110</b>

#### Unit 1: Communication Skill– III

Expected Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (3 hrs)
1. Demonstrate knowledge of various methods of communication	<ul style="list-style-type: none"> <li>➤ Methods of communication                             <ul style="list-style-type: none"> <li>• Verbal</li> <li>• Non-verbal</li> <li>• Visual</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Writing pros and cons of written, verbal and non-verbal communication</li> <li>• Listing do’s and don’ts for avoiding common body language mistakes</li> </ul>	05
2. Identify specific communication styles	<ul style="list-style-type: none"> <li>➤ Communication styles- assertive, aggressive, passive-aggressive, submissive, etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Observing and sharing communication styles of friends, teachers and family members and adapting the best practices</li> <li>• Roleplays on communication styles.</li> </ul>	10

3. Demonstrate basic writing skills	<ul style="list-style-type: none"> <li>➤ Writing skills to the following:                             <ul style="list-style-type: none"> <li>• Sentence</li> <li>• Phrase</li> <li>• Kinds of Sentences</li> <li>• Parts of Sentence</li> <li>• Parts of Speech</li> <li>• Articles</li> <li>• Construction of a Paragraph</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Demonstration and practice of writing sentences and paragraphs on topics related to the subject</li> </ul>	10
<b>Total</b>			<b>25</b>

Unit 2: Self-Management – III			
Expected Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 hrs)
1. Demonstrate impressive appearance and grooming	<ul style="list-style-type: none"> <li>• Describe the importance of dressing appropriately, looking decent and positive body language</li> <li>• Describe the term grooming</li> <li>• Prepare a personal grooming checklist</li> <li>• Describe the techniques of self- exploration</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstration of impressive appearance and groomed personality</li> <li>• Demonstration of the ability to self-explore</li> </ul>	10
2. Demonstrate team work skills	<ul style="list-style-type: none"> <li>• Describe the important factors that influence in team building</li> <li>• Describe factors influencing team work</li> </ul>	<ul style="list-style-type: none"> <li>• Group discussion on qualities of a good team</li> <li>• Group discussion on strategies that are adopted for team building and team work</li> </ul>	10
3. Apply time management strategies and techniques	<ul style="list-style-type: none"> <li>• Meaning and importance of time management – setting and prioritizing goals, creating a schedule, making lists of tasks, balancing work and leisure, using different optimization tools to break large tasks into smaller tasks.</li> </ul>	<ul style="list-style-type: none"> <li>• Game on time management</li> <li>• Checklist preparation</li> <li>• To-do-list preparation</li> </ul>	05
<b>Total</b>			<b>25</b>

<b>Unit 3: Information and Communication Technology – III</b>			
<b>Expected Learning Outcome</b>	<b>Theory (08 hrs)</b>	<b>Practical (12 hrs)</b>	<b>Duration (20 hrs)</b>
1. Create a document on word processor	<ul style="list-style-type: none"> <li>• Introduction to word processing.</li> <li>• Software packages for word processing.</li> <li>• Opening and exiting the word processor.</li> <li>• Creating a document</li> </ul>	<ul style="list-style-type: none"> <li>- Demonstration and practice of the following:</li> <li>• Listing the features of word processing</li> <li>• Listing the software packages for word processing</li> <li>• Opening and exit the word processor</li> <li>• Creating a document</li> </ul>	10
2. Edit, save and print a document in word processor	<ul style="list-style-type: none"> <li>• Editing text</li> <li>• Wrapping and aligning the text</li> <li>• Font size, type and face</li> <li>• Header and Footer</li> <li>• Auto correct</li> <li>• Numbering and bullet</li> <li>• Creating table</li> <li>• Find and replace</li> <li>• Page numbering</li> <li>• Printing document</li> <li>• Saving a document in various formats</li> </ul>	<ul style="list-style-type: none"> <li>- Demonstration and practising the following:</li> <li>• Editing the text</li> <li>• Word wrapping and alignment</li> <li>• Changing font type, size and face</li> <li>• Inserting header and footer</li> <li>• Removing header and footer</li> <li>• Using autocorrect option</li> <li>• Insert page numbers and bullet</li> <li>• Save and print a document</li> </ul>	10
<b>Total</b>			<b>20</b>

<b>Unit 4: Entrepreneurial Skills – III</b>			
<b>Expected Learning Outcome</b>	<b>Theory (10 hrs)</b>	<b>Practical (15 hrs)</b>	<b>Duration (25 hrs)</b>
1. Describe the significance of entrepreneurial values and attitude	<ul style="list-style-type: none"> <li>• Values in general and entrepreneurial values</li> <li>• Entrepreneurial value orientation with respect to innovativeness, independence, outstanding performance and respect for work</li> </ul>	<ul style="list-style-type: none"> <li>• Listing of entrepreneurial values by the students.</li> <li>• Group work on identification of entrepreneurial values and their roles after listing or reading 2-3 stories of successful entrepreneur</li> <li>• Exhibiting entrepreneurial values in Ice breaking, rapport building, group work and home</li> </ul>	10

		assignments	
2. Demonstrate the knowledge of attitudinal changes required to become an entrepreneur	<ul style="list-style-type: none"> <li>• Attitudes in general and entrepreneurial attitudes</li> <li>• Using imagination/intuition</li> <li>• Tendency to take moderate risk</li> <li>• Enjoying freedom of expression and action</li> <li>• Looking for economic opportunities</li> <li>• Believing that we can change the environment</li> <li>• Analyzing situation and planning action</li> <li>• Involving in activity</li> </ul>	<ul style="list-style-type: none"> <li>• Preparing a list of factors that influence attitude in general and entrepreneurial attitude</li> <li>• Demonstrating and identifying own entrepreneurial attitudes during the following micro lab activities like thematic appreciation test</li> <li>• Preparing a short write-up on “who am I”</li> <li>• Take up a product and suggest how its features can be improved</li> <li>• Group activity for suggesting brand names, names of enterprises, etc.</li> </ul>	15
<b>Total</b>			<b>25</b>

Unit 5: Green Skills – III			
Expected Learning Outcome	Theory (07 hrs)	Practical (08 hrs)	Duration (15 hrs)
1. Describe importance of main sector of green economy	<ul style="list-style-type: none"> <li>• Main sectors of green economy- E-waste management, green transportation, renewal energy, green construction, water management</li> <li>• Policy initiatives for greening economy in India</li> </ul>	<ul style="list-style-type: none"> <li>• Preparing a poster on any one of the sectors of green economy</li> <li>• Writing a two-page essay on important initiatives taken in India for promoting green economy</li> </ul>	08
2. Describe the major green Sectors/Areas and the role of various stakeholder in green economy	<ul style="list-style-type: none"> <li>• Stakeholders in green economy</li> <li>• Role of government and private agencies in greening cities, buildings, tourism, industry, transport, renewable energy, waste management, agriculture, water, forests and fisheries</li> </ul>	<ul style="list-style-type: none"> <li>• Preparing posters on green Sectors/Areas: cities, buildings, tourism, industry, transport, renewable energy, waste management, agriculture, water, forests and fisheries</li> </ul>	07
<b>Total</b>			<b>15</b>

**PART B: VOCATIONAL SKILLS**

Sl.No.	Units	Duration (hrs)
1.	Introduction to shrimp farming	11
2.	Selection of species	10
3.	Site selection	32
4.	Design and construction of shrimp farm	44
5.	Pre-stocking management	39
6.	Stocking	29
	<b>Total</b>	<b>165</b>

Unit 1: Introduction to Shrimp Farming			
Expected Learning Outcome	Theory (9 hrs)	Practical (2 hrs)	Duration (11hrs)
1. Explain shrimp farming and its importance in aquaculture	<ul style="list-style-type: none"> <li>Describe Aquaculture</li> <li>Describe Shrimp</li> <li>Explain Shrimp Farming</li> <li>Importance of Shrimp Farming in Aquaculture</li> <li>Present status of shrimp farming in India</li> <li>Types of water bodies available for shrimp farming in India viz. sea water, brackish water, estuary, creeks, etc.</li> <li>Scope of Shrimp farming</li> <li>Role of a Shrimp farmer</li> </ul>	<ul style="list-style-type: none"> <li>Data analysis of shrimp farming in India for the past 5 years (Graph/Bar diagram)</li> </ul>	4
2. Identify commercially important shrimps in India	<ul style="list-style-type: none"> <li>Morphology of a shrimp</li> <li>Familiarize commercially important species such as <i>Penaeus monodon</i>, <i>Fenneropenaeus indicus</i>, <i>Litopenaeusvannamei</i>, <i>Metapenaeusmonoceros</i>, <i>Metapenaeusbrevicornis</i>, <i>Penaeus semisulcatus</i> giving emphasis to <i>Litopenaeusvannamei</i>.</li> <li>Describe the identifying characters of shrimp species viz. <i>Penaeus monodon</i>, <i>Fenneropenaeus indicus</i> and <i>Litopenaeusvannamei</i> which are farmed in India.</li> </ul>	<ul style="list-style-type: none"> <li>Draw and label the morphology of a shrimp</li> <li>Collection of specimens of commercially important species of shrimp.</li> <li>Species identification of</li> <li><i>Penaeus monodon</i>, <i>Fenneropenaeus indicus</i> and <i>Litopenaeusvannamei</i></li> </ul>	3
3. List out the guidelines of Coastal Aquaculture	<ul style="list-style-type: none"> <li>Guidelines of CAA in shrimp farming</li> <li>Coastal Regulation Zones (CRZ)</li> </ul>		1

Authority (CAA) for farming.			
4. Explain the Licensing procedures	<ul style="list-style-type: none"> <li>• Government policies on shrimp farming.</li> <li>• Role of Department of Fisheries,</li> <li>• Government of Kerala</li> <li>• Registration and Licensing</li> </ul> <ul style="list-style-type: none"> <li>• Relevant permission for shrimp farming from local bodies, pollution control board and health department.</li> </ul>	<ul style="list-style-type: none"> <li>• Preparation of flow chart</li> </ul>	3
<b>Total</b>			<b>10</b>

Unit 2: Selection of Species			
Expected Learning Outcome	Theory (8 hrs)	Practical (2 hrs)	Duration (10 hrs)
1. Identify suitable species for farming	<ul style="list-style-type: none"> <li>• Criteria for selection of candidate species for farming such as:</li> <li>• Tolerance to a wide range of environmental parameters like salinity, temperature, dissolved oxygen.</li> <li>• Season suitable for species</li> <li>• Fast growth rate</li> <li>• Efficient Food Conversion Ratio (FCR)</li> <li>• Disease resistance</li> <li>• Acceptance to artificial feed</li> <li>• Availability of seed</li> <li>• Tolerate high stocking density</li> <li>• Yield</li> <li>• Demand and price</li> <li>• Potential of species like <i>Penaeus monodon</i>, <i>Fenneropenaeus indicus</i> and <i>Litopenaeus vannamei</i></li> </ul>	<ul style="list-style-type: none"> <li>• Prepare a chart on various criteria for selection of candidate species.</li> </ul>	8
2. Develop an awareness on suitable weather conditions with respect to species	<ul style="list-style-type: none"> <li>• Selection of species based on climatic conditions (Monsoon, Post Monsoon, Winter, Summer)</li> <li>• Precautions to be taken for the natural calamities like flood, drought, cyclones, thunderstorm.</li> </ul>		2
<b>Total</b>			<b>10</b>

<b>Unit 3: Site Selection</b>			
<b>Expected Learning Outcome</b>	<b>Theory (14 hrs)</b>	<b>Practical (18 hrs)</b>	<b>Duration (32hrs)</b>
1. Describe suitable site for shrimp farm	<ul style="list-style-type: none"> <li>• Selection criteria viz.</li> <li>• Topography</li> <li>• Tidal amplitude</li> <li>• Climatic conditions</li> <li>• Water characteristics</li> <li>• Soil characteristics</li> <li>• Pollution</li> <li>• Socio economic factors</li> <li>• Existing Rules &amp; Regulations</li> <li>• Power availability</li> <li>• Communication facilities</li> <li>• Transportation facilities</li> <li>• Vicinity to shrimp hatchery, feed mill and Processing plant</li> <li>• Availability of skilled labour</li> </ul>	<ul style="list-style-type: none"> <li>• Assessment on water quality parameters viz. Physical, chemical and biological parameters.</li> <li>• Soil ball test</li> <li>• Assessment on soil characteristics viz. pH, soil type, soil texture and soil composition.</li> <li>• Differentiate silt, sand and clay</li> </ul>	14
2. Develop skill in selection of suitable site for shrimp farming	<ul style="list-style-type: none"> <li>• Detailing in acceptable range of technical criteria</li> <li>• Optimizes the suitability of each criterion for farming</li> <li>• Discussion in suitability of other non technical criteria</li> </ul>	<ul style="list-style-type: none"> <li>• Visit to a proposed farm site.</li> <li>• Work shop on data compiling,</li> <li>• Analysis, interpretation and optimization of suitability on criteria for shrimp farming</li> <li>• Report presentation</li> </ul>	18
<b>Total</b>			<b>32</b>

<b>Unit 4: Design and Construction of Shrimp Farm</b>			
<b>Expected Learning Outcome</b>	<b>Theory (17 hrs)</b>	<b>Practical (27 hrs)</b>	<b>Duration (44hrs)</b>
1. Explain various shrimp culture systems	<ul style="list-style-type: none"> <li>• Traditional system</li> <li>• Extensive culture system</li> <li>• Semi intensive culture system</li> <li>• Intensive culture system</li> <li>• Super intensive system</li> </ul>		1
2. Differentiate among types of culture methods based on medium of culture	<ul style="list-style-type: none"> <li>• Water exchange method</li> <li>• Probiotic culture method</li> <li>• Biofloc culture method</li> </ul>		1
3. Identify	<ul style="list-style-type: none"> <li>• Selection of appropriate</li> </ul>	<ul style="list-style-type: none"> <li>• Draw sluice and</li> </ul>	19



components of a farm	<p>system or culture method based on availability / extend of land</p> <ul style="list-style-type: none"> <li>• Define dugout pond and embankment pond.</li> <li>• Define circular pond and rectangular pond.</li> <li>• Components of a farm like bunds, feeder canal, drainage canal, inlet/outlet structures (sluice, monk, cat walk).</li> <li>• Reservoir</li> <li>• Treatment pond</li> <li>• Settling pond</li> <li>• Culture ponds</li> <li>• Central Drainage</li> </ul> <ul style="list-style-type: none"> <li>• Effluent treatment ponds</li> <li>• Outer bund/Master bund –Significance with Flooding</li> </ul>	<p>monk</p> <ul style="list-style-type: none"> <li>• Draw and label cross section of bund</li> <li>• Model preparation of Sluice gate</li> </ul>	
4. Plan and sketch the farm components	<ul style="list-style-type: none"> <li>• Area allocation to various ponds.</li> <li>• Site clearing, pegging, excavation, soil compaction, pond lining.</li> <li>• Detailing of bund and canals</li> <li>• Familiarization of fencing materials. Positioning of accessories</li> </ul>	<ul style="list-style-type: none"> <li>• Preparation of sketch showing various ponds with area allocation.</li> <li>• Familiarization of fencing and lining materials.</li> </ul>	9
5. Identify machineries, tools and materials used for construction of ponds	<ul style="list-style-type: none"> <li>• Excavation equipments (tiller and roller)</li> <li>• Construction materials</li> <li>• Generators</li> <li>• Electrical installations viz. Plug/socket, power plug, socket and switch</li> <li>• board, ELCB (Earth Leakage Circuit Breaker), MCB (Miniature Circuit Breaker)</li> <li>• Security and surveillance</li> </ul>	<ul style="list-style-type: none"> <li>• Familiarization of machineries and tools</li> </ul>	4
6. Select suitable pumps, installation of aerators	<ul style="list-style-type: none"> <li>• Water pumps</li> <li>• Submersible pumps</li> <li>• Paddle wheel aerators</li> </ul>	<ul style="list-style-type: none"> <li>• Chart preparation on positioning of aerators and pumps</li> </ul>	4
7. Develop skill in design of farm	<ul style="list-style-type: none"> <li>• Illustrate the components of a model shrimp farm</li> </ul>	<ul style="list-style-type: none"> <li>• Lay out preparation drawings</li> </ul>	6
<b>Total</b>			<b>44</b>

<b>Unit 5: Pre-stocking management</b>			
<b>Expected Learning Outcome</b>	<b>Theory (15hrs)</b>	<b>Practical (25hrs)</b>	<b>Duration (39hrs)</b>
1. Describe the pre-stocking management procedures	<ul style="list-style-type: none"> <li>• Removal of organic matter</li> <li>• Eradication of weeds and weed fishes ( in case of water logged ponds)</li> <li>• Drying of pond</li> <li>• Ploughing</li> <li>• Lime application</li> <li>• Fencing</li> <li>• Water filling</li> <li>• Chlorination and dechlorination</li> <li>• Fertilizer / Pre-biotics application</li> <li>• Application of soil probiotics / water probiotics / bioflocinoculum</li> </ul>	<ul style="list-style-type: none"> <li>• Identification of weeds and weed fishes</li> <li>• Calculation of weedicides and fish toxicants</li> <li>• Identification of liming materials. Calculation of liming dosage.</li> <li>• Identification and dosage calculation of bleaching powder.</li> <li>• Identification, preparation and dosage calculation of fertilizers / Pre-biotics / pro-biotics / bioflocinoculums</li> <li>• Qualitative and quantitative analysis of plankton.</li> </ul>	36
2. Develop skill in executing the pre-stocking procedures	<ul style="list-style-type: none"> <li>• Detailing in schedule of pre-stocking steps</li> <li>• Significance in sequence of executing the pre-stocking procedures</li> <li>• Schedule the steps involved in Pre-stocking management</li> </ul>	<ul style="list-style-type: none"> <li>• Flow chart preparation on steps involved in prestocking management</li> </ul>	3
<b>Total</b>			<b>39</b>

<b>Unit 6: Stocking</b>			
<b>Expected Learning Outcome</b>	<b>Theory (12hrs)</b>	<b>Practical (17hrs)</b>	<b>Duration (29hrs)</b>
1. Identify good quality shrimp seed	<ul style="list-style-type: none"> <li>• Procurement of seed from CAA certified hatcheries by observing its colour, activity, feeding, counter current swimming ability, microscopic examination for external fouling, pathogens etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Visual observation of seed</li> <li>• Microscopic Observation of seed</li> <li>• Stress test (Formalin and Fresh water)</li> <li>• Counter current swimming test</li> <li>• Analysis of a seed testing</li> </ul>	9

	<ul style="list-style-type: none"> <li>Stress test using formalin and fresh water.</li> <li>Virus diseases and PCR test</li> <li>Definition of SPF seed.</li> </ul>	report	
2. Estimate stocking density based on culture system	<ul style="list-style-type: none"> <li>Stocking density and farming.</li> <li>Effect of suitable stocking density and overstocking</li> </ul>	<ul style="list-style-type: none"> <li>Calculation of Pond area</li> <li>Estimation of actual number of seed required for stocking.</li> </ul>	7
3. Appraise packing specifications and seed transportation	<ul style="list-style-type: none"> <li>Method of seed transportation</li> <li>Duration and ideal time for transportation</li> <li>Role of temperature in transportation</li> <li>Suitable packing density per bag.</li> <li>Anaesthetics used in seed transportation</li> </ul>	<ul style="list-style-type: none"> <li>Familiarization of packing materials</li> <li>Demonstration of packing</li> </ul>	7
4. Develop skill in acclimatization and stocking of seeds	<ul style="list-style-type: none"> <li>Stocking of seed and ideal time of stocking.</li> <li>Effect of physical and chemical parameters of water during stocking.</li> <li>Hapa</li> <li>Nursing</li> <li>Survival rate of seed.</li> </ul>	<ul style="list-style-type: none"> <li>Demonstration on Acclimatization of seed,</li> <li>Releasing of seed in to the pond. Estimation of survival rate.</li> </ul>	6
<b>Total</b>			<b>29</b>

**CLASS 12**

**Part A: Employability Skills**

Sl.No.	Units	Duration (hrs)
1.	Communication Skills- IV	25
2.	Self-management Skills – IV	25
3.	Information and Communication Technology Skills – IV	20
4.	Entrepreneurial Skills – IV	25
5.	Green Skills – IV	15
	<b>Total</b>	<b>110</b>

<b>Unit 1: Communication Skills – IV</b>			
<b>Expected Learning Outcome</b>	<b>Theory (10 hrs)</b>	<b>Practical (15 hrs)</b>	<b>Duration (25 hrs)</b>
1. Describe the steps to active listening skills	<ul style="list-style-type: none"> <li>• Importance of active listening at workplace</li> <li>• Steps to active listening</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstration of the key aspects of becoming active listener</li> <li>• Preparing posters of steps for active listening</li> </ul>	10
2. Demonstrate basic writing skills	- Writing skills to the following: <ul style="list-style-type: none"> <li>• Sentence</li> <li>• Phrase</li> <li>• Kinds of Sentences</li> <li>• Parts of Sentence</li> <li>• Parts of Speech</li> <li>• Articles</li> <li>• Construction of a Paragraph</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstration and practice of writing sentences and paragraphs on topics related to the subject</li> </ul>	15
<b>Total</b>			<b>25</b>

<b>Unit 2: Self-Management Skills – IV</b>			
<b>Expected Learning Outcome</b>	<b>Theory (10 hrs)</b>	<b>Practical (15 hrs)</b>	<b>Duration (25 hrs)</b>
1. Describe the various factors influencing self-motivation	<ul style="list-style-type: none"> <li>• Finding and listing motives (needs and desires);</li> <li>• Finding sources of motivation and inspiration (music, books, activities);expansive thoughts; living fully in the present moment; dreaming big</li> </ul>	<ul style="list-style-type: none"> <li>• Group discussion on identifying needs and desire</li> <li>• Discussion on sources of motivation and inspiration</li> </ul>	10
2. Describe the basic personality traits, types and disorders	<ul style="list-style-type: none"> <li>• Describe the meaning of personality</li> <li>• Describe how personality influence others</li> <li>• Describe basic personality traits</li> <li>• Describe common personality disorders- paranoid, antisocial, schizoid, borderline, narcissistic, avoidant, dependent and obsessive</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate the knowledge of different personality types</li> </ul>	15
<b>Total</b>			<b>25</b>

<b>Unit 3: Information and Communication Technology Skills – IV</b>			
<b>Expected Learning Outcome</b>	<b>Theory (06 hrs)</b>	<b>Practical (14 hrs)</b>	<b>Duration (20 hrs)</b>
1. Perform tabulation using spreadsheet application	<ul style="list-style-type: none"> <li>• Introduction to spreadsheet application</li> <li>• Spreadsheet applications</li> <li>• Creating a new worksheet</li> <li>• Opening workbook and entering text</li> <li>• Resizing fonts and styles</li> <li>• Copying and moving</li> <li>• Filter and sorting</li> <li>• Formulas and functions</li> <li>• Password protection.</li> <li>• Printing a spreadsheet.</li> <li>• Saving a spreadsheet in various formats.</li> </ul>	<p>- Demonstration and practice on the following:</p> <ul style="list-style-type: none"> <li>• Introduction to the spreadsheet application</li> <li>• Listing the spreadsheet applications</li> <li>• Creating a new worksheet</li> <li>• Opening the workbook and enter text</li> <li>• Resizing fonts and styles</li> <li>• Copying and move the cell data</li> <li>• Sorting and Filter the data</li> <li>• Applying elementary formulas and functions</li> <li>• Protecting the spreadsheet with password</li> <li>• Printing a spreadsheet</li> <li>• Saving the spreadsheet in various formats.</li> </ul>	<b>10</b>
2. Prepare presentation using presentation application	<ul style="list-style-type: none"> <li>• Introduction to presentation</li> <li>• Software packages for presentation</li> <li>• Creating a new presentation</li> <li>• Adding a slide</li> <li>• Deleting a slide</li> <li>• Entering and editing text</li> <li>• Formatting text</li> <li>• Inserting clipart and images</li> <li>• Slide layout</li> <li>• Saving a presentation</li> <li>• Printing a presentation document.</li> </ul>	<p>- Demonstration and practice on the following:</p> <ul style="list-style-type: none"> <li>• Listing the software packages for presentation</li> <li>• Explaining the features of presentation</li> <li>• Creating a new presentation</li> <li>• Adding a slide to presentation.</li> <li>• Deleting a slide</li> <li>• Entering and edit text</li> <li>• Formatting text</li> <li>• Inserting clipart and images</li> <li>• Sliding layout</li> <li>• Saving a presentation</li> <li>• Printing a presentation document</li> </ul>	<b>10</b>
<b>Total</b>			<b>20</b>

<b>Unit 4: Entrepreneurial Skills – IV</b>			
<b>Expected Learning Outcome</b>	<b>Theory (10 hrs)</b>	<b>Practical (15 hrs)</b>	<b>Duration (25 hrs)</b>
1. Identify the general and entrepreneurial behavioural competencies	<ul style="list-style-type: none"> <li>Barriers to becoming entrepreneur</li> <li>Behavioural and entrepreneurial competencies – adaptability/decisiveness, initiative/perseverance, interpersonal skills, organizational skills, stress management, valuing service and diversity</li> </ul>	<ul style="list-style-type: none"> <li>Administering self-rating questionnaire and score responses on each of the competencies</li> <li>Collect small story/ anecdote of prominent successful entrepreneurs</li> <li>Identify entrepreneurial competencies reflected in each story and connect it to the definition of behavioural competencies</li> <li>Preparation of competencies profile of students</li> </ul>	10
2. Demonstrate the knowledge of self-assessment of behavioural competencies	<ul style="list-style-type: none"> <li>Entrepreneurial competencies in particular: self-confidence, initiative, seeing and acting on opportunities, concern for quality, goal setting and risk taking, problem solving and creativity, systematic planning and efficiency, information seeking, persistence, influencing and negotiating, team building</li> </ul>	<ul style="list-style-type: none"> <li>Games and exercises on changing entrepreneurial behaviour and development of competencies for enhancing self-confidence, problem solving, goal setting, information seeking, team building and creativity</li> </ul>	15
<b>Total</b>			<b>25</b>

<b>Unit 5: Green Skills – IV</b>			
<b>Expected Learning Outcome</b>	<b>Theory (05 hrs)</b>	<b>Practical (10 hrs)</b>	<b>Duration (15 hrs)</b>
1. Identify the role and importance of green jobs in different sectors	<ul style="list-style-type: none"> <li>Role of green jobs in toxin-free homes,</li> <li>Green organic gardening, public transport and energy conservation,</li> <li>Green jobs in water conservation</li> <li>Green jobs in solar and wind power, waste reduction, reuse and recycling of wastes,</li> <li>Green jobs in green tourism</li> <li>Green jobs in building and construction</li> </ul>	<ul style="list-style-type: none"> <li>Listing of green jobs and preparation of posters on green job profiles</li> <li>Prepare posters on green jobs.</li> </ul>	15

	<ul style="list-style-type: none"> <li>• Green jobs in appropriate technology</li> <li>• Role of green jobs in Improving energy and raw materials use</li> <li>• Role of green jobs in limiting greenhouse gas emissions</li> <li>• Role of green jobs minimizing waste and pollution</li> <li>• Role of green jobs in protecting and restoring ecosystems</li> <li>• Role of green jobs in support adaptation to the effects of climate change</li> </ul>		
<b>Total</b>			<b>15</b>

**Part B–Vocational Skills**

Sl.No	Units	Duration (hrs)
1.	Feed management	32
2.	Water quality management	34
3.	Disease management	32
4.	Harvesting techniques	28
5.	Quality analysis of harvested shrimp	30
6.	Entrepreneurship development in Shrimp Farming	04
7.	Health & Safety at workplace	05
	<b>Total</b>	<b>165</b>

<b>Unit 1: Feed management</b>			
Expected Learning Outcome	Theory (14 hrs)	Practical (18 hrs)	Duration (32 hrs)
1. Explain nutritional requirements of shrimp	<ul style="list-style-type: none"> <li>• Composition of shrimp feed</li> <li>• Raw materials and its protein content.</li> <li>• Types of Feeds viz. Starter, Grower, Finisher</li> <li>• Feed storage</li> <li>• Nutrient requirement for different species</li> <li>• Feed additives</li> </ul>	<ul style="list-style-type: none"> <li>• Sample collection of raw material</li> <li>• Sample collection of different types of feeds viz. Starter, Grower, Finisher</li> </ul>	12
2. Identify good quality shrimp feed	<ul style="list-style-type: none"> <li>• Parameters of good quality feed viz. protein content, water stability, odour, texture, palatability.</li> <li>• Food Conversion Ratio (FCR )</li> </ul>	<ul style="list-style-type: none"> <li>• Calculations on FCR</li> </ul>	10

3. Develop skill in feed management	<ul style="list-style-type: none"> <li>• Feed calculation– Biomass calculation,</li> <li>• Feeding chart</li> <li>• Climate and other factors</li> <li>• Feeding adjustments using check tray</li> <li>• Feeding schedule</li> <li>• Feeding method</li> <li>• Feed storage</li> </ul>	<ul style="list-style-type: none"> <li>• Feeding chart preparation</li> <li>• Mock feeding and check tray analysis</li> </ul>	10
<b>Total</b>			<b>32</b>

<b>Unit 2: Water quality management</b>			
<b>Expected Learning Outcome</b>	<b>Theory (12 hrs)</b>	<b>Practical (22 hrs)</b>	<b>Duration (34 hrs)</b>
1. Develop skill in measurement and analysis of water quality parameters	<ul style="list-style-type: none"> <li>• Measurement of physical, chemical and biological parameters.</li> <li>• Optimum range of physical, chemical and biological parameters.</li> <li>• Analysis of physical, chemical and biological parameters.</li> </ul>	<ul style="list-style-type: none"> <li>• Measurement of water quality parameters</li> <li>• Analysis of water quality parameters</li> </ul>	<b>18</b>
2. Develop skill in water quality management	<ul style="list-style-type: none"> <li>• Addition of nutrients, fertilizers and probiotics.</li> <li>• Water exchange                             <ul style="list-style-type: none"> <li>○ Liming and its importance</li> <li>○ Probiotics - role and importance</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Calculation required quantity of lime, fertilizers and probiotics.</li> <li>• Application of lime, fertilizers and probiotics in simulated FRP tanks.</li> <li>• Documentation</li> </ul>	<b>16</b>
<b>Total</b>			<b>34</b>

<b>Unit 3: Disease management</b>			
<b>Expected Learning Outcome</b>	<b>Theory ( 12 hrs)</b>	<b>Practical ( 20 hrs)</b>	<b>Duration (32hrs)</b>
1. Identify various shrimp diseases	<ul style="list-style-type: none"> <li>• Symptoms of bacterial, viral, fungal, protozoan and parasitic diseases</li> </ul>	<ul style="list-style-type: none"> <li>• Disease identification with specimens/slides</li> </ul>	8
2. Perform Better Management Practices (BMP) to prevent diseases	<ul style="list-style-type: none"> <li>• Prophylactic measures.</li> <li>• Bio security</li> <li>• Water treatment systems</li> <li>• Disinfection of</li> </ul>	<ul style="list-style-type: none"> <li>• Chart preparation on bio security measures.</li> <li>• Disinfection procedures of equipments and</li> </ul>	16



	<p>equipments and utensils.</p> <ul style="list-style-type: none"> <li>• Optimum stocking density and maintenance of water quality parameters(emphasis on Dissolved oxygen)</li> <li>• Disease control measures.</li> <li>• Good quality feed.</li> <li>• Quarantining</li> </ul>	utensils.	
3. Develop skill in disease treatment	<ul style="list-style-type: none"> <li>• Therapeutic measures and therapeutic agents</li> <li>• Comparison of prophylactic and therapeutic measures</li> </ul>	<ul style="list-style-type: none"> <li>• Slide preparation of common diseases viz., Monodon Bacculo Virus(MBV), Systemic Ectodermal and Mesodermal Bacculo Virus (SEMBV / White spot virus), Vibriosis,</li> <li>• loose/soft shell, gill infection and</li> <li>• parasitic infections</li> </ul>	8
<b>Total</b>			32

<b>Unit 4: Harvesting Techniques</b>			
<b>Expected Learning Outcome</b>	<b>Theory ( 12 hrs)</b>	<b>Practical ( 16 hrs)</b>	<b>Duration (28 hrs)</b>
1. Perform sampling of shrimp to determine average weight	<ul style="list-style-type: none"> <li>• Cast net operation</li> <li>• Biomass</li> </ul>	<ul style="list-style-type: none"> <li>• Cast net operation for sampling.</li> <li>• Biomass Calculation</li> </ul>	16
2. Schedule harvesting process	<ul style="list-style-type: none"> <li>• Moults/pre-moults periods in shrimp and timing of harvest.</li> <li>• Price and demand of Shrimp</li> <li>• Mobilization of labour, harvesting equipments and accessories</li> <li>• Partial and complete harvest</li> <li>• Harvesting methods</li> <li>• Icing and storage procedures</li> </ul>	<ul style="list-style-type: none"> <li>• Chart preparation on lunar periodicity and moulting of shrimps.</li> <li>• Market survey for demand and supply</li> <li>• Slide preparation of various types of harvesting nets.</li> </ul>	12
<b>Total</b>			<b>28</b>

<b>Unit 5: Quality analysis of harvested shrimp</b>			
<b>Expected Learning Outcome</b>	<b>Theory ( 12hrs)</b>	<b>Practical ( 18 hrs)</b>	<b>Duration (30 hrs)</b>
1. Arrange samples of harvested shrimp to lab for testing antibiotics and heavy metals.	<ul style="list-style-type: none"> <li>• Shrimp sample testing in certified laboratory</li> <li>• List of banned antibiotics</li> </ul>		2
2. Develop skill in sorting, grading icing and packing the cleaned shrimp	<ul style="list-style-type: none"> <li>• Killing and washing procedures.</li> <li>• Sorting and grading according to size and quality.</li> <li>• Icing</li> <li>• Storage</li> </ul>	<ul style="list-style-type: none"> <li>• Grading of shrimps</li> <li>• Count determination</li> <li>• Icing of shrimps</li> </ul>	14
3. Develop skill in marketing the harvested shrimp	<ul style="list-style-type: none"> <li>• Transportation systems.</li> <li>• Importance of Cold chain</li> <li>• Seafood trade fares</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstration of icing</li> <li>• Prepare a flow chart on cold chain</li> </ul>	14
<b>Total</b>			<b>30</b>

<b>Unit 6: Entrepreneurship development in Shrimp Farming</b>			
<b>Expected Learning Outcome</b>	<b>Theory (2hrs)</b>	<b>Practical ( 2 hrs)</b>	<b>Duration (4 hrs)</b>
1. List the infrastructural facilities required for shrimp farm	<ul style="list-style-type: none"> <li>• Fixed cost (Land lease, machineries/equipments, etc.)</li> <li>• Variable cost (Salary, seed, feed, electricity etc.)</li> <li>• Profit and Loss analysis</li> </ul>	<ul style="list-style-type: none"> <li>• Visit to a shrimp farm and collect data for economic analysis</li> </ul>	2
2. Identify the agencies which promote shrimp farming	<ul style="list-style-type: none"> <li>• Marine Products Export Development Authority (MPEDA)</li> <li>• National Fisheries Development Board (NFDB)</li> <li>• Department of Fisheries, Government of Kerala</li> <li>• Project Report (DPR)</li> </ul>	<ul style="list-style-type: none"> <li>• Prepare a project proposal for establishing a shrimp farm</li> </ul>	2
<b>Total</b>			<b>4</b>

<b>Unit 7 : Health &amp; safety at Workplace</b>			
<b>Expected Learning Outcome</b>	<b>Theory (2hrs)</b>	<b>Practical ( 3 hrs)</b>	<b>Duration (5 hrs)</b>
1. Describe the health and safety measures to be adopted in a shrimp farm	<ul style="list-style-type: none"> <li>• Usage of protective gears like mask and gloves while handling chemicals, antibiotics, probiotics etc.</li> <li>• Operational knowledge in basic electric circuits of switches, ELCB, MCB, generators, pumps, aerators etc.</li> <li>• Dress code with full body overalls, mask, gloves and head cap while sampling and handling of live shrimp</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate the use of protective gears</li> <li>• Operate electrical equipment and accessories like switch boards, ELCB, MCB, generator, pumps and aerators</li> </ul>	05
<b>Total</b>			<b>5</b>

## 6. ORGANISATION OF FIELD VISITS/ON-THE-JOB TRAINING

In a year, at least 3 field visits/educational tours should be organised for the students to expose them to the activities in the workplace. Teachers and students should visit farms to observe and practice various aspects of farming, including the following: Location, Site, Office building, Store, Nurserypond, Treatment pond, Reservoir pond, Water tank/Tube well, Gate and fencing. During the visit, students should obtain the following information from the owner or the supervisor of the Farm:

1. Location and area of farm
2. Type of culture adopted
3. Shrimp species cultured
4. Number of crops raised annually
5. Production per hectare
6. Day to day activities of farm
7. Harvest and marketing
8. Economics of shrimp farming
9. Total annual income
10. Profit/Loss (Annual)
11. Challenges faced by the farmers

On-the-job training of at least 80 hours is to be organised by the institution to provide hands-on training to the students.

## 7. LIST OF EQUIPMENT AND MATERIALS

The list given below is suggestive and an exhaustive list should be prepared by the vocational teacher. Only basic tools, equipment and accessories should be procured by the Institution so that the routine tasks can be performed by the students regularly for practice and acquiring adequate practical experience.

- |                                     |                      |
|-------------------------------------|----------------------|
| 1. Specimen collection bottles      | 17. Ekman dredge     |
| 2. Measuring tape                   | 18. Water level      |
| 3. Secchi disc                      | 19. Water line tube  |
| 4. Thermometers                     | 20. Screen meshes    |
| 5. pH indicator solution            | 21. Basin            |
| 6. pH pen                           | 22. Bucket           |
| 7. Saline refractometer             | 23. Mug              |
| 8. DO kit                           | 24. Scoop net        |
| 9. Ammonia kit                      | 25. Hapa             |
| 10. Hardness kit                    | 26. Feed check tray  |
| 11. Alkalinity kit                  | 27. Weighing balance |
| 12. Water sample collection bottles | 28. FRP container    |
| 13. Plankton net                    | 29. Cast net         |
| 14. Plankton counting cell          | 30. Bag net          |
| 15. Microscope                      | 31. Soil pH meter    |
| 16. Sieve                           |                      |

## 8. LIST OF CONTRIBUTORS

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