

**LEARNING OUTCOME BASED VOCATIONAL CURRICULUM**



**CLASS 11 & 12**

**SECTOR:  
FOOD PROCESSING**

**JOB ROLE**

**FISH AND SEAFOOD  
PROCESSING TECHNICIAN**

**(QUALIFICATION PACK: REF. ID.FIC/Q4001)**



**State Council of Educational Research & Training (SCERT) Kerala**

(Department of General Education, Government of Kerala)

Vidhya Bhavan, Poojappura, Thiruvananthapuram





# LEARNING OUTCOME BASED VOCATIONAL CURRICULUM

JOB ROLE

## **FISH AND SEAFOOD PROCESSING TECHNICIAN**

(QUALIFICATION PACK: REF. ID. FIC/Q4001)

### **SECTOR:FOOD PROCESSING**

Classes 11 and 12



**State Council of Educational Research & Training (SCERT) Kerala**  
(Department of General Education, Government of Kerala)  
Vidhya Bhavan, Poojappura, Thiruvananthapuram  
[www.scert.kerala.gov.in](http://www.scert.kerala.gov.in)



**LEARNING OUTCOME BASED  
VOCATIONAL CURRICULUM**

**April 2021**

**© SCERT 2021**

**<http://www.scert.kerala.gov.in>**

No part of this work may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, microfilming, recording or otherwise, without written permission from the Publisher, with the exception of any material supplied specifically for the purpose of being used by the purchaser of the work.

The views and opinions expressed in this publication are those of the contributors/ authors and do not necessarily reflect the views and policies of SCERT Kerala. SCERT Kerala does not guarantee the accuracy of the data included in this publication and accepts no responsibility for any consequence of their use.



**PUBLISHED BY**

**Dr. J. Prasad**  
Director  
SCERT Kerala  
Vidhya Bhavan  
Poojappura  
Thiruvananthapuram

**COURSE COORDINATOR**

**Renjith Subhash**  
Research officer in  
Vocational Education  
SCERT Kerala  
Vidhya Bhavan  
Poojappura  
Thiruvananthapuram



## 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 Fish and Seafood Processing Technician (FIC/Q4001). 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*  
*SCERT Kerala*  
*Vidhya Bhavan*  
*Poojappura*  
*Thiruvananthapuram*

## **ACKNOWLEDGEMENTS**

We are grateful to the Director, National Council of Educational Research & Training (NCERT) and Prof. Rajesh P Khambayat, Ph.D., Joint Director, PSSCIVE Bhopal for their support and guidance. We also acknowledge the contributions of the officials at the Technical Support Group of Samagra Shiksha, Ministry of Education, National Skill Development Agency (NSDA) and National Skill Development Corporation (NSDC) and Food Industry Capacity and Skill Initiative (FICSI) for their support and cooperation.

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.



<b>CONTENTS</b>		
<b>Sl.No</b>	<b>Title</b>	<b>Page No.</b>
<b>1.</b>	<b>Course Overview</b>	<b>01</b>
<b>2.</b>	<b>Scheme of Units</b>	<b>02</b>
<b>3.</b>	<b>Learning Outcome Based Activities</b>	<b>04</b>
<b>4.</b>	<b>Assessment and Certification</b>	<b>05</b>
<b>5.</b>	<b>Unit Contents</b>	
	<b>CLASS 11</b>	
	<b>Part A Employability Skills</b>	
	Unit 1: Communication Skills – III	<b>09</b>
	Unit 2: Self-management Skills – III	<b>10</b>
	Unit 3: Information and Communication Technology Skills – III	<b>10</b>
	Unit 4: Entrepreneurial Skills – III	<b>11</b>
	Unit 5: Green Skills – III	<b>12</b>
	<b>Part B Vocational Skills</b>	
	Unit 1: Introduction to Fish and Seafood Processing	<b>13</b>
	Unit 2: Fish Spoilage	<b>13</b>
	Unit 3: Preparation and Maintenance of work area for Seafood Processing	<b>14</b>
	Unit 4: Production Planning involved in Seafood Processing	<b>15</b>
	Unit 5: Occupational Health and Safety Issues in Seafood processing industry	<b>16</b>
	<b>CLASS 12</b>	
	<b>Part A Employability Skills</b>	
	Unit 1: Communication Skills – IV	<b>17</b>
	Unit 2: Self-management Skills – IV	<b>17</b>
	Unit 3: Information and Communication Technology Skills – IV	<b>18</b>
	Unit 4: Entrepreneurial Skills – IV	<b>19</b>
	Unit 5: Green Skills – IV	<b>19</b>
	<b>Part B Vocational Skills</b>	
	Unit 1: Fish and Seafood Processing	<b>20</b>
	Unit 2: Machines and Equipment involved in Seafood Processing	<b>22</b>
	Unit 3: Quality Management Systems and Practices in Seafood Industry	<b>22</b>
	Unit 4: Documentation and Record keeping	<b>23</b>
<b>6.</b>	<b>Organisation of Field Visits/On-the-Job Training</b>	<b>24</b>
<b>7.</b>	<b>List of Equipment and Materials</b>	<b>25</b>
<b>8.</b>	<b>List of Contributors</b>	<b>26</b>



## 1. COURSE OVERVIEW

### COURSE TITLE: FISH AND SEAFOOD PROCESSING TECHNICIAN

#### GENERAL OBJECTIVES

The Fish and Seafood Processing Technician course aims to create work force of skilled personnel in the seafood industry. The learner who undergoes the course can ensure the quality of seafood products in a hygiene work environment along with food safety. After completion of the course the learners acquire the competencies to plan, organise, prioritise, calculate and execute orders in the work environment. They may also acquire the ability to prepare and maintain work area, machines and equipment for seafood processing.

On successful completion of this course, the learners are expected to develop skills to;

- process all types of fish and seafood manually or mechanically to achieve the desired quality as set by the organization
- operate the machineries/equipment for processing fish and seafood
- plan, organize, and prioritize production as per schedule
- follow and maintain food safety and hygiene in the work environment.
- prepare documents and records regarding seafood processing
- comprehend the safety measures to be followed in a seafood processing industry

#### 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 the importance of green skills in meeting the challenges of sustainable development and environment protection;
- describe the present status and scope of seafood industry
- identify different types of spoilage in seafood.
- prepare and maintain work area for seafood processing
- schedule production planning involved in sea food processing.
- describe Occupational Health and Safety Issues in Seafood processing industry

- describe various steps involved in fish and seafood processing.
- identify machines and equipment involved in seafood processing.
- describe quality management systems (QMS) and practices in seafood industry.
- perform documentation and record keeping in seafood processing industry.

### COURSE REQUIREMENTS

The learner should have the basic knowledge of science.

### COURSE DURATION: 600 hrs

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

## 2. SCHEME OF UNITS

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

CLASS 11			
	Units	Theory and Practical (300hrs)	Max. scores (100hrs)
Part A	<b>Employability Skills</b>		
1.	Communication Skills – III	25	10
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.	Unit 1: Introduction to Fish and Seafood Processing	15	40
7.	Unit 2: Fish Spoilage	20	
8.	Unit 3: Preparation and Maintenance of work area for Seafood Processing	60	
9.	Unit 4: Production Planning involved in Seafood Processing	65	
10	Unit 5: Occupational Health and Safety Issues in Seafood processing industry	05	
	<b>Total</b>	<b>165</b>	<b>40</b>

## FISH AND SEAFOOD PROCESSING TECHNICIAN

Part C		Practical Work	
	Practical Examination	06	15
	Written Test	01	10
	Viva Voce	03	10
	<b>Total</b>	<b>10</b>	<b>35</b>
Part D		Project Work/Field Visit/ OJT	
	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:

CLASS 12			
	Units	Theory and Practical 300hrs	Max. scores 100
<b>Part A</b>	<b>Employability Skills</b>		
1.	Communication Skills – IV	25	10
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.	Unit 1: Fish and Seafood Processing	70	40
7.	Unit 2: Machines and Equipment involved in Seafood Processing	40	
8.	Unit 3: Quality Management Systems and Practices in Seafood Industry	40	
9.	Unit 4: Documentation and Record keeping	15	
	<b>Total</b>	<b>165</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 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.

### Suggested Topics for Expert Interaction

1. The present status and scope of seafood industry, different preservation methods in seafood processing.
2. Seafood spoilage-types of spoilage, factors affecting spoilage and its control measures.
3. Various processing areas in seafood processing plant emphasizing plant layout.
4. Cleaning procedure and cleaning schedule followed in processing plants, cleaning and sanitizing agents used and waste disposal methods followed in processing plants.
5. Product styles of fish, shrimp and cephalopods, yield calculation of product, explain the term FIFO/FEFO, CIP,COP
6. Production planning in seafood processing-calculation of raw materials, manpower calculation, tools and equipment and packing materials required as per production order, Occupational Health and Safety Issues in Seafood processing industry
7. Processing of seafood- handling of raw materials, preprocessing, processing and quality parameters of finished products.
8. Machines and equipment used in seafood processing industry. Maintenance of hygiene of machines and tools, safety precautions to be followed.
9. Quality management systems (QMS) - SOP, SSOP, GMP, HACCP
10. Documentation- preparation of documents regarding raw materials processing and finished products. Trace back/call back procedures.

## 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 (25 hrs)
1. Demonstrate knowledge of various methods of communication	<ul style="list-style-type: none"> <li>➤ Methods of communication</li> <li>• Verbal</li> <li>• Non-verbal</li> <li>• Visual</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>• Role plays on communication styles.</li> </ul>	10
3. Demonstrate basic writing skills	<ul style="list-style-type: none"> <li>➤ Writing skills to the following:</li> <li>• Sentence</li> <li>• Phrase</li> <li>• Kinds of Sentences</li> <li>• Parts of Sentence</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstration and practices of writing sentences and paragraphs on topics related</li> </ul>	10

## FISH AND SEAFOOD PROCESSING TECHNICIAN

	<ul style="list-style-type: none"> <li>• Parts of Speech Articles</li> <li>• Construction of a Paragraph</li> </ul>	to the subject	
<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,</li> <li>• 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</li> <li>• 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 teamwork</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>

### Unit 3: Information and Communication Technology - III

Expected Learning Outcome	Theory (08 hrs)	Practical (12 hrs)	Duration (20 hrs)
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</li> </ul>	<ul style="list-style-type: none"> <li>➤ Demonstration and practice of the following:                             <ul style="list-style-type: none"> <li>• Listing the features of word processing</li> </ul> </li> </ul>	

## FISH AND SEAFOOD PROCESSING TECHNICIAN

	<p>the wordprocessor.</p> <ul style="list-style-type: none"> <li>• Creating a document</li> </ul>	<ul style="list-style-type: none"> <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 practicing the following: <ul style="list-style-type: none"> <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> </li> </ul>	10
<b>Total</b>			<b>20</b>

### Unit 4: Entrepreneurial Skills – III

Expected Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 hrs)
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 assignments</li> </ul>	10
2. Demonstrate the knowledge of attitudinal changes	<ul style="list-style-type: none"> <li>• Attitudes in general and entrepreneurial attitudes</li> </ul>	<ul style="list-style-type: none"> <li>• Preparing a list of factors that influence attitude in general and entrepreneurial attitude</li> </ul>	

## FISH AND SEAFOOD PROCESSING TECHNICIAN

required to become an entrepreneur	<ul style="list-style-type: none"> <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>• 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 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,</li> </ul>	<ul style="list-style-type: none"> <li>○ Preparing posters on green Sectors/Areas: cities, buildings, tourism, industry, transport, renewable energy, waste</li> </ul>	07

## FISH AND SEAFOOD PROCESSING TECHNICIAN

	waste management, agriculture, water, forests and fisheries	management, agriculture, water, forests and fisheries	
<b>Total</b>			<b>15</b>

### PART B: VOCATIONAL SKILLS

Sl.No	Units	Duration (hrs)
1.	Unit 1: Introduction to Fish and Seafood Processing	15
2.	Unit 2: Fish Spoilage	20
3.	Unit 3: Preparation and Maintenance of work area for Seafood Processing	60
4.	Unit 4: Production Planning involved in Seafood Processing	65
5	Unit 5: Occupational Health and Safety Issues in Seafood processing industry	05
<b>Total</b>		<b>165</b>

#### Unit 1: Introduction to Fish & Sea Food Processing

Expected Learning Outcome	Theory (6 hrs)	Practical (9 hrs)	Duration (15 hrs)
1. Explain Fish and sea food	<ul style="list-style-type: none"> <li>• Define Fish and Seafood</li> <li>• Importance of seafood in daily diet</li> </ul>	<ul style="list-style-type: none"> <li>• Familiarise with commercially important fishes and Shell fishes.</li> </ul>	9
2. Explain the fish processing industry	<ul style="list-style-type: none"> <li>• Define fish processing</li> <li>• Present status and scope of fish processing Industry in India</li> </ul>	<ul style="list-style-type: none"> <li>• Familiarise Fish Processing Plant activities through video/field visit</li> </ul>	6
<b>Total</b>			<b>15</b>

#### Unit 2: Fish Spoilage

Expected Learning Outcome	Theory (9hrs)	Practical (11hrs)	Duration (20 hrs)
1. Explain different types of spoilage in seafood.	<ul style="list-style-type: none"> <li>• Types of spoilage in fish.</li> <li>• Enzymatic (belly bursting, Black spot formation)</li> <li>• Biochemical (rancidity)</li> <li>• Bacterial</li> </ul>	<ul style="list-style-type: none"> <li>• Determination of extent of spoilage by preparing score sheet using scoring indicators.</li> <li>• Chart Preparation-comparison of fresh and spoiled fish</li> </ul>	10

## FISH AND SEAFOOD PROCESSING TECHNICIAN

2. Identify different types of pathogenic bacteria and bacteria affecting fish spoilage.	<ul style="list-style-type: none"> <li>• Pathogenic and non pathogenic bacteria</li> <li>• Types of pathogenic bacteria viz. <i>Staphylococcus</i>, <i>V. Cholera</i>, <i>V. Paraheamolyticus</i>, <i>Salmonella</i>, and <i>E.coli</i>.</li> <li>• Explain different sources of bacterial Contamination</li> <li>• Significance of Time-Temperature control, unhygienic handling, high moisture content, protein and lipid content</li> </ul>	<ul style="list-style-type: none"> <li>• Identification of bacterial colony using specific colony characters</li> </ul>	7
3. List out factors affecting spoilage and its control measure			3
<b>Total</b>			<b>20</b>

Unit 3: Preparation and maintenance of work area for seafood processing			
Expected Learning Outcome	Theory (22 hrs)	Practical (38 hrs)	Duration (60hrs)
1. Explain various processing area in fish processing plants	<ul style="list-style-type: none"> <li>• Explain the layout of a fish processing plant.</li> <li>• List out various sections</li> </ul>	<ul style="list-style-type: none"> <li>• Prepare a layout of model fish processing plant</li> </ul>	18
2. Identify approved cleaning and sanitizing agents	<ul style="list-style-type: none"> <li>• Explain cleaning agents</li> <li>• Explain sanitizing agents</li> <li>• Dosage of various cleaning and sanitizing agents</li> </ul>	<ul style="list-style-type: none"> <li>• Identification of cleaning and sanitizing agents used in fish processing industry.</li> <li>• Calculation of dosage of various cleaning and sanitizing agents</li> </ul>	16
3. Explain cleaning procedure and importance of cleaning schedule	<ul style="list-style-type: none"> <li>• Explain different steps involved in cleaning procedure.</li> <li>• Explain cleaning schedule</li> <li>• Explain prevention of cross contamination</li> </ul>	<ul style="list-style-type: none"> <li>• Prepare a flow chart of cleaning procedures</li> <li>• Prepare a chart on cleaning schedule</li> </ul>	12
4. Identify the equipment used to maintain hygiene, pest control and prevent contamination in work area	<ul style="list-style-type: none"> <li>• Describe window screens, air curtains, fly catchers and rodent traps.</li> </ul>	<ul style="list-style-type: none"> <li>• Identification of equipment used in food industry to maintain hygiene, pest control and prevent contamination in work area.</li> </ul>	8
5. Explain waste	<ul style="list-style-type: none"> <li>• Solid waste and liquid</li> </ul>	<ul style="list-style-type: none"> <li>• Schematic diagram</li> </ul>	



## FISH AND SEAFOOD PROCESSING TECHNICIAN

disposal in sea food processing	waste formed during processing. <ul style="list-style-type: none"> <li>• Handling of solid and liquid waste.</li> <li>• Effluent Treatment Plant (ETP)</li> </ul>	preparation of ETP	6
<b>Total</b>			<b>60</b>

### Unit 4: Production planning involved in seafood processing

Expected Learning Outcome	Theory (30hrs)	Practical (35hrs)	Duration (65hrs)
1. Develop skill in Planning and production as per production order and availability of raw material	<ul style="list-style-type: none"> <li>• Detailing of production order particulars viz., Species to be processed, Product style, Quantity,</li> <li>• Packaging requirements, Labeling requirements.</li> <li>• Different product styles and it's yield</li> <li>• FIFO /FEFO</li> </ul>	<ul style="list-style-type: none"> <li>• Calculation of the required quantity of raw material for executing a production order.</li> <li>• Preparation of different product styles(fish, shrimp and cephalopod)</li> <li>• Yield calculation of different product styles of fishes and shell fishes</li> </ul>	19
2. Develop skill in Planning and prioritization of raw material to ensure smooth production	<ul style="list-style-type: none"> <li>• Describe the grouping of raw material ensuring smooth production and utilization of maximum capacity of machinery</li> <li>• Prioritization of process, based on production order.</li> <li>• 3.Explain the advantage of avoiding Clean In Place (CIP)</li> </ul>		10
3. Develop Skill in Production planning	<ul style="list-style-type: none"> <li>• Explain machineries, equipment and manpower required to carry out production.</li> <li>• Procedures to be followed to safeguard quality of raw material during the break down of machine</li> </ul>	<ul style="list-style-type: none"> <li>• Calculation of batch size, machinery, tools and equipment to carry out production.</li> <li>• Calculation of manpower.</li> </ul>	18
4. Develop skill in arranging packing materials	<ul style="list-style-type: none"> <li>➤ Packaging materials used in seafood processing <ul style="list-style-type: none"> <li>a. Polythene bags</li> <li>b. Duplex cartons</li> <li>c. Master cartons</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Identification of suitable packaging material</li> <li>• Estimation of quantity of packing</li> </ul>	10

## FISH AND SEAFOOD PROCESSING TECHNICIAN

	<p>d. Pouches/Retort pouches e. Styrofoam boxes etc.</p>	<p>material</p> <ul style="list-style-type: none"> <li>• Sample label preparation</li> </ul>	
5. Explain storage procedures for raw material and processed food	<ul style="list-style-type: none"> <li>• Standard Operating Procedures(SOP) to be followed in storage for frozen products and chilled storage for raw material</li> </ul>	<ul style="list-style-type: none"> <li>• Prepare Do's and Don'ts in cold storage</li> </ul>	8
<b>Total</b>			<b>65</b>

Unit 5: Occupational Health and Safety Issues in Seafood processing industry			
Expected Learning outcome	Theory (2 hrs)	Practical (3 hrs)	Duration (5 hrs)
1. Describe the occupational health and safety issues in seafood processing plant.	<ul style="list-style-type: none"> <li>➤ Define occupational health and safety</li> <li>➤ Explain various health and safety issues in seafood industry viz:                             <ul style="list-style-type: none"> <li>• Physical</li> <li>• Chemical</li> <li>• Biological</li> <li>• Heat and Cold</li> <li>• Confined Space-cold storage</li> <li>• Noise and Vibrations</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• List out various safety issues in seafood industry</li> </ul>	2
2. Describe the various methods used to prevent various occupational health and safety issues	<ul style="list-style-type: none"> <li>➤ Explain Safety precautions in                             <ul style="list-style-type: none"> <li>• Processing area</li> <li>• Freezers</li> <li>• Chemical room</li> <li>• cold storage</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• List out various safety equipment used to avoid occupational safety issues in seafood industry</li> <li>• Prepare a poster on prevention of safety hazards</li> </ul>	3
<b>Total</b>			<b>5</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	<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>	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>

Unit 3: Information and Communication Technology Skills - IV			
Expected Learning Outcome	Theory (06 hrs)	Practical (14 hrs)	Duration (20 hrs)
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>	<ul style="list-style-type: none"> <li>➤ Demonstration and practice on the following:                             <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 Spreadsheet with password</li> <li>• Printing a Spreadsheet</li> <li>• Saving the Spreadsheet in various formats.</li> </ul> </li> </ul>	10
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>	<ul style="list-style-type: none"> <li>➤ Demonstration and practice on the following:                             <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 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> </li> </ul>	10
<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 (15hrs)</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</li> <li>• 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,</li> <li>• public transport and energy conservation,</li> <li>• Green jobs in water</li> </ul>	<ul style="list-style-type: none"> <li>• Listing of green jobs and preparation of posters on green job profiles</li> </ul>	15

## FISH AND SEAFOOD PROCESSING TECHNICIAN

	<ul style="list-style-type: none"> <li>conservation</li> <li>• Green jobs in solar and wind power, waste</li> <li>• reduction, reuse and recycling of wastes,</li> <li>• Green jobs in green tourism</li> <li>• Green jobs in building and construction</li> <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>	<ul style="list-style-type: none"> <li>• Prepare posters on green jobs.</li> </ul>	
<b>Total</b>			<b>15</b>

### Part B–Vocational Skills

Sl.No.	Units	Duration (hrs)
1.	Unit 1: Fish and Seafood Processing	70
2.	Unit 2: Machines and Equipments involved in Seafood Processing	40
3.	Unit 3: Quality Management Systems and Practices in Seafood Industry	40
4.	Unit 4: Documentation and Record keeping	15
<b>Total</b>		<b>165</b>

#### Unit 1: Fish and seafood processing

Expected Learning Outcome	Theory (28 hrs)	Practical (42 hrs)	Duration (70 hrs)
1. Explain different types of preservation methods in seafood processing	<ul style="list-style-type: none"> <li>• Icing</li> <li>• Chilling</li> <li>• Freezing</li> <li>• Canning</li> <li>• Drying</li> <li>• Freeze-drying</li> </ul>	<ul style="list-style-type: none"> <li>• Identification of various preserved seafood products</li> </ul>	5
2. Develop Skill in handling of raw	<ul style="list-style-type: none"> <li>• Organoleptic evaluation criteria like colour, odour, texture,</li> </ul>	<ul style="list-style-type: none"> <li>• Organoleptic evaluation of raw materials</li> </ul>	24

material	<ul style="list-style-type: none"> <li>appearance</li> <li>Raw material receiving quality viz: check temperature, free of sand, foreign particles &amp; flies, freezer burn(for frozen rawmaterial)</li> <li>Live fish quality-check movement and broken limbs for crustaceans</li> <li>Check Condition of carriage</li> <li>De-icing and Weighing, Washing, sorting of raw materials (species wise, size wise and quality wise),re-icing</li> </ul>	<ul style="list-style-type: none"> <li>Calculation of count(shrimp)</li> <li>Demonstration of grading</li> </ul>	
3. Develop skill in Variouspre-processing activities	<ul style="list-style-type: none"> <li>Explain various steps in pre- processing like Dressing, gutting, spooning, deheading, filleting, peeling, grading and weighing</li> </ul>	<ul style="list-style-type: none"> <li>Demonstration of filleting / dressing/peeling/ deheading/ deveining</li> </ul>	14
4. Develop skill in various processing activities	<ul style="list-style-type: none"> <li>Explain various steps followed in process like, thawing (for frozen raw material), treatment for moisture retention and quality enhancement, temperature control in cookline, weighing, freezer tray setting, adding glaze water, maintain conveyer belt speed in blast freezer (IQF) etc.</li> <li>Explain types of freezers and its operation</li> <li>Horizontal plate freezer</li> <li>Blast freezer (IQF and Tunnel freezer)</li> <li>Glazing of frozen material</li> </ul>	<ul style="list-style-type: none"> <li>Preparation of flow chart on processing in horizontal plate freezer.</li> <li>Demonstration of freezer tray setting, freezingand packing.</li> </ul>	22
5. Develop skill in monitoring of various quality parameters of finished product and Cleaning Out of Place(COP)	<ul style="list-style-type: none"> <li>Describe finished product quality parameters like core temperature, freezer burn, Discolouration, Packing, labeling</li> <li>Post process cleaning of work areas, machines and equipment</li> <li>Maintenance of all machines as per manual</li> </ul>	<ul style="list-style-type: none"> <li>Determination of quality parameters of finished product.</li> <li>Identification of freezer burn.</li> </ul>	5

<b>Total</b>	<b>70</b>
--------------	-----------

Unit 2: Machines and Equipment involved in seafood processing			
Expected Learning Outcome	Theory (16 hrs)	Practical (24 hrs)	Duration (40 hrs)
1. Identify different machines used in seafood processing.	<ul style="list-style-type: none"> <li>➤ Machines and equipment required in fish processing viz:</li> <li>a. Grading machine</li> <li>b. Filth washing machine</li> <li>c. Cooking line</li> <li>d. Labeling machines</li> <li>e. Freezers</li> <li>f. Packing machine</li> <li>g. Metal detectors</li> <li>h. Glaze hardening unit</li> <li>i. Chlorine dozer</li> </ul>	<ul style="list-style-type: none"> <li>• Identification of various machines and equipment used in processing plant</li> </ul>	<b>22</b>
2. Develop skill in maintenance of hygiene in machineries and utensils	<ul style="list-style-type: none"> <li>• Describe the maintenance of hygiene in machine, tools and utensils</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstration of cleaning of machines and tools</li> </ul>	<b>9</b>
3. Develop skill in minor repair and troubleshooting of machineries	<ul style="list-style-type: none"> <li>• Describe the basic trouble shooting tips as per the equipment manual</li> </ul>	<ul style="list-style-type: none"> <li>• Record the minor trouble shooting tips as per catalogue from the manufacturer of equipments and tools.</li> </ul>	<b>9</b>
<b>Total</b>			<b>40</b>

Unit 3: Quality Management Systems(QMS) and Practices in Seafood Industry			
Expected Learning Outcome	Theory (16 hrs)	Practical (24 hrs)	Duration (40 hrs)
1. Explain various quality management systems followed in seafood industry	<ul style="list-style-type: none"> <li>➤ Explain the basic concepts of</li> <li>• SOP/SSOP</li> <li>• GMP</li> <li>• HACCP</li> <li>• FSSAI</li> </ul>	<ul style="list-style-type: none"> <li>• Model work sheet preparation of HACCP</li> </ul>	<b>17</b>
2. Explain pest control management	<ul style="list-style-type: none"> <li>• Describe pest control management systems and its importance in seafood processing</li> <li>• Explain various pest control equipment like rodent trap, Insect trap, glue pads etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Making a model location sketch of pest control equipment</li> </ul>	<b>02</b>



## FISH AND SEAFOOD PROCESSING TECHNICIAN

3. Develop skill in Identifying personal safety equipment	<ul style="list-style-type: none"> <li>List out personal safety equipment such as fire extinguisher, first aid kit, eye wash station, etc.</li> </ul>	<ul style="list-style-type: none"> <li>Identify personal safety equipment</li> </ul>	<b>03</b>
4. Explain the methods to be followed to prevent cross contamination in seafood industry	<ul style="list-style-type: none"> <li>High risk and low risk areas in plant</li> <li>Importance of colourcoding.</li> <li>Storage and issue procedures of chemicals, pesticides etc.</li> </ul>	<ul style="list-style-type: none"> <li>Preparing a model layout of a factory showing low risk and high risk areas.</li> </ul>	<b>14</b>
5. Explain the final inspection before shipment	<ul style="list-style-type: none"> <li>Inspection before shipment of product such as organoleptic evaluation, appearance of package and label</li> <li>Explain the importance of FIFO and FEFO</li> </ul>	<ul style="list-style-type: none"> <li>Prepare pre-shipment inspection report</li> </ul>	<b>04</b>
<b>Total</b>			<b>40</b>

### Unit 4: Documentation and Record Keeping

Expected Learning Outcome	Theory (06 hrs)	Practical (09 hrs)	Duration (15hrs)
1. Develop skill in preparing raw material inventory	<ul style="list-style-type: none"> <li>List the particulars in raw material receiving register such as items, receiving date, expiry date, supplier details, quality parameters</li> <li>Mention ERP (Enterprise Resource Planning)</li> <li>Document creation in raw material used, yield in each stage, wastage etc.</li> </ul>	<ul style="list-style-type: none"> <li>Prepare a model inventory of raw material</li> <li>Prepare a document of yield calculation in each stage of production</li> </ul>	5
2. Develop skill in preparing document regarding process	<ul style="list-style-type: none"> <li>List the particulars in in-process register such as product details, process sequence, equipment and machinery operating details (viz, freezer temp and time of operation etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Prepare an inventory / Document with respect to Process</li> </ul>	5
3. Develop skill in preparing document regarding finished product	<ul style="list-style-type: none"> <li>List the particulars in finished product register such as batch number, time of packing, date of manufacture, date of expiry, primary and secondary packaging materials for all finished products, storage conditions</li> </ul>	<ul style="list-style-type: none"> <li>Prepare a model inventory of finished product</li> </ul>	3

4. Explain the Trace back (Callback) procedure	<ul style="list-style-type: none"> <li>Describe the various procedure to be followed to trace out the details from the retailer to the source of origin of raw material</li> </ul>	<ul style="list-style-type: none"> <li>Prepare a mock recall document</li> </ul>	2
<b>TOTAL</b>			<b>15</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 Seafood Processing Plant. Teachers and students should visit Seafood Processing Unit to observe and practice various aspects of Raw material handling, Pre-processing, Processing, Packing and Exporting. During the visit, students should obtain the following information from the Plant manager or supervisor of Seafood Processing Unit:

1. Raw material receiving activities
2. Pre-processing of Seafood
3. Processing of various Seafood items
5. Cooking/ Freezing/Canning
6. Packing and labelling activities
7. Managing cold storage
8. Documentation
9. Familiarization of Quality Management Systems (QMS) documents
10. In-house Laboratory activities
11. Waste management
12. Challenges and opportunities of Seafood Industry

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. Electronic weighing balance | 7. Knives               |
| 2. Kitchen balance             | 8. Scissors             |
| 3. Refrigerator                | 9. Tweezers             |
| 4. Sealing machine             | 10. Chopping board      |
| 5. LPG stove                   | 11. Digital thermometer |
| 6. Mixer grinder               | 12. Analog thermometer  |

## FISH AND SEAFOOD PROCESSING TECHNICIAN

13. Can opener
14. Cans with lid
15. Gum boots
16. White coat
17. Apron
18. Plastic bucket
19. Plastic strainer
20. Plastic basin
21. Mop
22. Floor wipes
23. Freezer trays
24. Polythene bags
25. Duplex cartons
26. Master cartons
27. Pouches
28. Styrofoam boxes
29. Maps of India
30. MPEDA Chart showing commercially important fishes, shell fishes and molluscs
31. Chart showing bacterial characters
32. First aid box

## 8. LIST OF CONTRIBUTORS

1. **Mr. Anilkumar P**  
Joint Director  
Department of Fisheries, Govt. of Kerala
  
2. **Mr. Laureatte S**  
DGM - R&D and  
Production Amalgam  
Foods, Willingdon Island  
Kochi, Kerala
  
3. **Mr. Sreekumar K N**  
Vocational Teacher in  
Fisheries GVHSS, Vaikom  
West
  
4. **Mr.Regimon A K**  
Vocational Teacher in  
Fisheries GVHSS, Poovar.
  
5. **Mr. Deepak D**  
Vocational Teacher in  
Fisheries GVHSS,  
Kadamakudy
  
6. **Mrs. Jouharathu Shafeena M**  
Vocational Instructor in Fisheries  
Dr.VVVKAM GRFTVHSS, Karunagappally