

**VOCATIONAL HIGHER SECONDARY
FIRST YEAR**

**FISHING CRAFT AND GEAR
TECHNOLOGY**

Teachers' Source Book



**Government of Kerala
Department of Education**

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State Council of Educational Research & Training (SCERT)

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Preface

Dear Teachers,

In the context of the changing scenario in the field of education, the role of the teacher is not simply to teach the syllabi. The emerging needs of education calls for a facilitators role from teachers. The learning process has been student centred and activity oriented. Learning activities must enable the student to develop process domain and multiple intelligence skills to their maximum extent.

This sourcebook has been written primarily for the benefit of teachers to teach Fishing craft and gear technology at Vocational Higher Secondary Level. The subject matter has been designed in such a way to help the teacher to provide suitable learning activities for effective learning. This success of the approach depends upon the vision and commitment of teacher. It is also expected that teacher has to seek help from other sources like reference books available in libraries, web sites etc.

Hope that this sourcebook will help the teacher to develop the skills and experience of students resulting in the generation of a lot of self employment in the field of fisheries.

With regards,

Thiruvananthapuram
25-11-2005

Dr E. Valsala Kumar
Director
SCERT, Kerala

CONTENTS

Section I

1. General Approach	05
2. Subject Associated Approach Paper	19
3. Curriculum	22
4. Syllabus	24
5. Evaluation.....	32

Section II

Unit 1 General Introduction	47
Unit 2 Iraditional crafts	53
Unit 3 Mechanisation of Iraditional Craft	58
Unit 4 Types of Mechanised Boats	60
Unit 5 Boat Building Materials	63
Unit 6 Common Fishing Methods	67
Unit 7 Gear Materials	70
Unit 8 Specification and construction of Gear Materials	73
Unit 9 Prperties of Materials	76
Unit 10 Fabrication of webbings	79
Unit 11 Understanding the net.....	82

Section III

Samples Questions	84
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Section I

General Approach

Introduction

The ultimate aim of education is human refinement. Education should enable the learner to formulate a positive outlook towards life and to accept a stand which suits the well being of the society and the individual as well.

The attitude and potential to 'to work' has determined the destiny, progress and cultural development of the human race. As we all are aware, the objective of education to form a society and individuals having a positive work culture. The educational process expected in and outside our formal schools should concentrate upon inculcating concepts, abilities, attitudes and values in tune with these 'work culture.' Hence vocationalised education cannot be isolated from the main stream of education. In another sense, every educational process should be vocationalised. However, due to our inability to utilise the resources wisely, scarcity of job

opportunities is a severe issue of the present society. For overcoming this deep crisis, emergent techniques have to be sorted out and appropriate researches have to be seriously carried out. It is in the sense that the content and methodology of vocational Higher Secondary Education have to be approached.

The Vocational Higher Secondary course was envisaged as a part of the National Policy on Education with the noble idea of securing a job along with education. The relevance of Vocational education is very great in this age of an employment. This education system, which ensures a job along with higher education, stands aloof from other systems of education.

A learning environment which ensures vocational aptitude, vocational training, basic life skills, competencies related to different subjects, appropriate values and attitudes and existential readiness has to be provided here.

The curriculum should be one which recognises the specific personality of the learner and should develop it in a desirable way. It should provide opportunity to imbibe novel ideas to follow a critical approach and for learning through experiences.

The competency to transform one's own resources for the betterment of the society and the individual is to be ensured in each individual. Training in the sense of equality, democratic sense, environmental consciousness and devotion to the constitution is an inseparable factor of the curriculum.

The need of a systematic curriculum is prevailing in vocational subjects. A scientifically structured curriculum incorporating the unique features and peculiarity of Kerala ensuring the possibility of higher education and utilising the national and international possibilities of employment is required.

The new curriculum should be capable of assimilating the life skills, scientific temper, attitude of co-existence, leadership qualities and mental health to face the challenges of life. It should be capable of strengthening the competencies imbibed by the learners up to the tenth class.

A curriculum for selecting vocational areas according to the aptitude of the students, learning it in depth, acquire general awareness in the basic areas and to secure jobs has become the social need of the day. A learner centred, process

oriented, need based vocational curriculum is envisaged.

What is learning?

- Learning is construction of knowledge and so it is a live and continuous mental process.
- Learning is a process of advancement through adding and correcting in the light of comparing the new issue with the previously learned concepts.
- Learning takes place as a part of the effort to solve problems.
- Learning takes place by assimilating bits of knowledge into one's own cognitive structure.
- Learning is not a linear process. It is a spiral process growing deeper and wider.
- Learning is an intellectual process rather than the mere memorisation of facts. Learning is a conglomeration of a variety of activities like problem analysis, elucidation, critical thinking, rational thinking, finding out co-relations, prediction, arriving at conclusions, applications, grouping for other possibilities and extracting the crux. When opportunities are provided for intellectual processes learning will become effective and intellectual ability will get strengthened.

Theoretical foundations of learning

Education is the best device that can be adopted for creation of a new society. It should be democratic in content and process and should acknowledge the rights of the learner. It should also provide opportunity for better citizenship training. The concept of equality at all areas should get recognition in theory and practice.

There should be conscious programme of action to develop nationality, humanness and love and against the encroachment of the sectarianism of caste and religion.

The learner should be able to take firm steps and deferred against the social crisis like privatisation, liberalisation, globalisation etc and against all kinds of dominations.

They should develop a discrimination to use the acquired learning as a **liberative** weapon.

They should be able to view education and life with the perspective of social well being.

They should get opportunity to recognise that co-operation is better than competition and that co-operation is the key to social life and culture.

A basic awareness of all the subjects needed for life essential for all students.

The remnants of perspectives formed in us during the colonial period still influence our

educational philosophy. The solution to the present day perplexities of the society which approaches education on the basis of competitions and marketisation is only a comprehensive view of life.

It is high time that education was recognised on the basis of the philosophy of human education. The human approach to education has to reflect in its content, learning process and outlook. The perspective of 'learning to be' and learning to live together as expressed by the UNESCO and the concepts of existentialist intelligence intrapersonal and interpersonal intelligence.

The basis of new approaches on curriculum, teaching- learning process are derived from the developments place in the east and west of the world.

When we begin to see the learner at the centre of the learning process, the teaching process has to be changed timely. It is the result of the rapid growth and development of Science and Technology and Pedagogy. If we want to undergo the changing process, we have to imbibe the modern hypothesis regarding learner, they have;

- Great curiosity
- Good imagination
- Numerous other qualities and interests
- Independent individuality

- Interest in free thinking and working in a fearless atmosphere.
- Have interest in enquiring and questioning.
- Ability to reach conclusions after logical thinking.
- ability for manifest and establish freely the conclusions arrived at.
- Interest for recognition in the society.
- Determination to face the interference of society and make components which is a part of social life.

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When we consider the learning system, the domains to be stressed in education according to the modern development becomes relevant.

The **knowledge** domain consists of

- Facts
- Ideas
- Laws
- The temporary conclusions and principles used presently by scientists.

The learning is a process. The continuous procedures we undergo to reach a particular goal is process. The skills which are parts of the process to analyse the collected ideas and proofs and come to a conclusion is called *process skills*. Some important **process skills** are,

the skills;

- To observe
- To collect data and record
- To classify
- To measure and prepare charts
- To experiment
- To predict
- To recognise and control the variables
 - To raise questions
- To generalise
- To form a hypothesis and check.
- To conclude
- To communicate
- To predict and infer
- To use tools.

Observation is the process of acquiring knowledge through the senses. It is purely objective oriented. Learning experiences which provide the opportunity to use all the senses may be used.

The process of grouping is known as **classifying**. Starting from simple groupings of data, it can extend to the level of classification into minute sub-groups.

In addition to this, consider the skills related to *creative domain* also, they are skills:

- To visualize
- To connect facts and ideas in new ways
- To find out new and uncommon uses of objects
- To fantasize
- To dream
- To develop creative isolated thoughts
- **Creativity** is an essential component of process and activities. The element of creativity is involved in finding out problems, formation of hypothesis, finding 'solutions' to problems etc. Through activity oriented learning experiences, opportunities to express creativity can be created.

Again, the following factors consisting in the *Attitudinal domain* are also important as;

- Self confidence
- Love for scientific knowledge
- Attitude to know and value history
- Respect human emotions
- Decide with reasonable present problems
- Take logical decisions regarding personal values

'Hypothesis' is a temporary conclusion drawn using insight. Based on knowledge and experiences relating to the problems the

causes and solutions can be guessed.

As regards the *application domain* the important factors are the ability to:

- observe in daily life examples of ideas acquired.
- take the help of scientific process to solve the problems of daily life.
- choose a scientific life style
- connect the ideas acquired with other subjects.
- integrate the subjects with other subjects.

Some basic stands have to be taken on the new scientific knowledge about intelligence learning and teaching. When such basic concepts are accepted changes are required in the following factors.

- The vision, approach, structure and content of the curriculum.
- The vision, approach, structure and content of the textbooks.
- Role of the teacher and the learner.
- Learner atmosphere, learning materials and learning techniques.

Some scientific perspectives accepted by modern world in educational psychology are given below.

Constructivism

This approach puts forward the concept that the learner constructs knowledge. New knowledge is constructed when ideas are examined and practiced in new situations relating them with the previously acquired knowledge and experience. That is assimilated into the cognitive structure of one's knowledge. This method which gives priority to critical thinking and problem solving provides opportunity for self motivated learning.

Social Constructivism

Social constructivism is a sub section of constructivism. Knowledge is formed, spread and imbibed and it becomes relevant in a social environment. Interactive learning, group learning, co-operative participatory learning, all these are concepts put forward by social constructivism.

The main propounders of constructivism are piaget, vygotsky and Bruner.

Discovery learning and interactive learning have prime importance. Learning takes place as a part of the attempt for problem solving. The activities of a learner who confronts cognitive disequilibrium in a learning situation when he tries to overcome it leads to the renewal of cognitive structure. It is through this process construction of new knowledge and the assimilation of them that learning takes place. Observation and enquiry are unavoidable factors. The learner advances towards new areas of acquisition of knowledge where he tries to

compare his new findings with the existing conceptions.

Learning is a live mental process. Rather than the ability for memorisation of facts cognitive process has to be given emphasis. The process of problem analysis, elucidation, critical thinking, rational thinking, finding out co-relation, prediction, hypothesis formation, application, probing for other possibilities, extracting the crux and other processes are of critical importance in learning.

Constructivism gives greater predominance to co-operative learning. Social and cultural factors influence learning. Sharing of knowledge and experience among learners, collective enquiry, assessment and improvement, group activity and collaborative learning, by sharing responsibilities with the objective of public activity, provide opportunity for effective learning.

In learning internal motivation is more important than external motivation. The learner should have interest and initiative in learning. Learning situation should be capable of forming a sense of ownership in of the learner regarding the learning process.

Learning is not a linear process. It progresses in a spiralled way advancing deeper and wider.

Learner-his nature and features

The learners in standard XI has undergone a learner centered and process oriented learning

experience up to X standard. He is adequately competent to select vocational subjects according to his aptitude and interest and to acquire higher education and profession as he wishes. The aspirations about future life is framed in this particular age foreseeing national and international job opportunities. Some of the peculiarities of the learner at this stage are:

- Physical, intellectual and emotional planes are intensive changes during this age and their reflections can be observed.
- Ability to enquire, discover and establish cause-effect relationship between phenomena.
- Readiness to undertake challenges.
- Capacity to shoulder leadership roles.
- Attempt to interpret oneself.
- Susceptibility to different pressures.
- Doubts, anxieties and eagerness about sex.
- Longing for social recognition.

Needs of the learner

- To make acquaintance with a job through vocational education.
- To acquire more knowledge in the concerned area through higher education.
- To recognise and encourage the peculiar personality of the later adolescent period.

- To enable him to defend against the unfavourable circumstances without any help

Role of the Learner

- Active participant in the learning process.
- Acts as a researcher
- Sharer of information
- Sharer of responsibilities
- Collects information
- Takes leadership
- Involves in group work
- Acts as a co-participant
- Observes his environment
- Experiments and realises
- Makes interpretations and draws inferences.

Role of the Teacher

The teacher should;

- consider the 'Stress and strain' of the teenagers
- understand the socio-economic and cultural background of the students.
- promote and motivate the students to construct knowledge.
- arrange proper situations to interact in and outside of the classroom.

- guide the students by explanations, demonstrations etc.
- promote opportunity for co-operative learning and collaborative learning.
- facilitate interpersonal and intra-personal interactions.
- act as a democratic leader.
- act as a problem solver
- effectively guide the students for the selection and conduct of various continuous evaluation elements.
- continuously evaluate the progress of the learners.
- gives scaffolding/support wherever necessary.
- motivate for learning
- promote divergent thinking.
- act as a democratic group leader.
- act as a co-learner
- gives variety of learning experiences.
- be a constant student
- facilitate for reference/data collection
- have a clear understanding about the age, needs, peculiarities, abilities, nature, aptitude etc. of the learner.
- have the ability to motivate the learner in order to acquire and enrich their knowledge.
- be a guide to the learner in developing insights and creating responses on current affairs.
- be capable to lead the learner into a variety of learning methods and process based on curricular objectives.
- be a link between school and community.
- be a good organiser, guide, friend, philosopher and co-learner.
- have an inter disciplinary approach in learning activities.
- be able to guide the learner in his/her career prospects based on his interest aptitude and ability.
- be impartial and democratic.
- provide ample experiences to attain the basic values and objectives of the curriculum.

New Concepts of Learning

1. Discovery Learning-

The teacher has to create a motivating atmosphere for the learner to discover concepts and facts, instead of listening always. Creating occasion to progress towards discovery is preferred. Instead of telling everything before and compelling to initiate the models, situations are to be created to help the children act models as themselves.

2. Learning by discussion

That discussion leads to learning is Burner's theory. Here discussion is not opposing each other. It is a sharing on the plane of ideas. New ideas are arrived at by seeking explanations, by mutual giving and taking of ideas and by problem solving.

3. Problem solving and learning

Only when the learner feels that some thing is a problem to be solved that he takes the responsibility of learning it. It is an inborn tendency to act to solve a problem that causes cognitive disequilibrium in a particular area. It is also needed to have confidence that one is capable of doing it. The problems are to be presented in consideration of the ability and level of attainment of the learner.

4. Collaborative learning

This is the learning in which the responsibilities are distributed among the members of the group keeping common learning objectives. The common responsibility of the group will be successful only if each member discharges his duties. All the members will reach a stage of sharing the result of learning, equally through the activity with mutual understanding. The teachers who arrange collaborative learning will have to make clear the responsibilities to be discharged. This is possible through the discussion with the learners. Collaborative learning will help

to avoid the situations of one person working for the whole group.

5. Co-operative learning

This is the learning in which the learners help one another. Those who have more knowledge, experience and competency, will help others. By this exchange of resources the learners develop a plane of social system in learning also. As there are no high ups and low ones according to status among the learners they can ask the fellow students doubts and for helps without any hesitation or in hesitation Care should be taken not to lead this seeking of help to mechanical copying. It should be on the basis of actual needs. So even while encouraging this exchange of ideas among the members of the group cautions acceptance is to be observed as a convention. There should be an understanding that satisfactory responses should come from each member and that the achievement of the group will be assessed on the basis of the achievement of all the members

6 Zone of Proximal Development

Vygotsky observes that these is a stage of achievement where a learner can reach by himself and another higher zone where he can reach with the help of his teachers and peers and elders. Even though some can fulfil the learning activity by themselves there is the possibility of a higher

excellence. If appropriate help is forth covering every learner can better himself.

7 Scaffolding

It is natural that the learner may not be able to complete his work if he does not get support at the proper time. The learner may require the help of the teacher in several learning activities. Here helping means to make the learner complete the activity taking responsibility by himself. The teacher has to keep in mind the objective of enabling the learner to take the responsibility and to make it successful.

8 Learning: a live mental process

Learning is a cognitive process, only a teacher who has an awareness as to what the cognitive process is alone can arrange learning situations to the learner to involve in it. Learning can be made effectively and intellectual sharpness can be improved by giving opportunity for the cognitive processes like reminding, recognising compromising , co- relating, comparing, guessing, summarising and so on. How is cognitive process considered in language learning? Take guessing and prediction for example.

- Guessing the meaning from the context.
- Guessing the content from the heading.
- Predicting the end of the story.

- Guessing the incident, story from the picture.
- Guessing the facts from indications.
- and other such activities can be given the following activities can be given for the cognitive process of summarisation.
- Preparation of blue print.
- Preparation of list.
- Preparation of flow chart.
- Epitomising in one word.
- Giving titles and so on.
- Symbols, performance of characters indications, lines of a poem, tables, pictures, concepts, actions, body language and such things can be given for interpretation. Process based language given for interpretation. Process based language learning has to give prime importance to the cognitive process.

9 Internal motivation

Internal motivation is given more importance than external motivation. The teacher has to arouse the internal motivation of the learner, A person internally motivated like this alone can immerse in learning and own its responsibility. How motivating is each of the activities is to be assessed.

10 Multiple intelligence

The Theory of Multiple Intelligence put

forward by Howard Gardener has created a turning point in the field of education. The National curriculum document has recommended that the curriculum is to be designed taking into consideration of this theory.

Main factors of the intellect :

1. Verbal/linguistic Intelligence -

Ability to read and write, making linguistic creations , ability to lecture competence effective a communication , all these come under this . This can be developed by engaging in language games and by teaching others.

2. Logical /mathematical Intelligence

Thinking rationally with causes and effect relation and finding out patterns and relations come under this area, finding out relations and explaining things sequential and arithmetical calculations are capable of developing this area of intelligence.

3. Visual /spatial Intelligence

In those who are able to visualise models and bringing what is in the imagination into visual form and in philosophers, designers and sculptors this area of intelligence is developed. The activities like modelling using clay and pulp, making of art equipments, sculpture, and giving illustrations to stories can help the development of this ability.

4 Bodily Kinaesthetic Intelligence

The activities using body language come under this. This area of intelligence is more developed in dancers and actors who are able to express ideas through body movements and in experts in sports, gymnastics etc.

5 Musical Intelligence

This is an area of intelligence which is highly developed in those who are able to recognise the different elements of music in musicians and in those who can here and enjoy songs. Playing musical instruments, initiating the songs of musicians, listening silently to the rhythms and activities like this are capable of developing this area of intelligence.

6 Interpersonal Intelligence

Those in whom this area of intelligence is developed show qualities of leadership and behave with others in a noble manner. They are capable of understanding the thought of others and carrying on activities like discussion successfully.

7 Intrapersonal Intelligence

This is the ability to understand oneself. These people can recognise their own abilities and disabilities. Writing diaries truthfully and in an analysing way and assessing the ideas and activities of others will help developing this areas of intelligence

8 Naturalistic Intelligence

A great interest in the flora and fauna of the nature, love towards fellow beings interest in spiritual and natural factors will be capable of developing this area.

9. Existential Intelligence

The ability to see and distinguish our own existence as a part of the universe, ability to distinguish the meaning and meaninglessness of life, the ability to realise the ultimate nature of mental and physical existences, all these are the peculiarities of this faculty of intelligence.

Emotional Intelligence

The concept of emotional intelligence put forward by **Daniel Golman** was used in framing the new curriculum. The fact that one's **Emotional Quotient (E.Q)** is the greatest factor affecting success in life is now widely accepted. The teacher who aims to focus on improving the emotional intelligence of students need to concentrate on the following.

i) Ability to take decisions

Rather than imposing decision on students while planning and executing activities, the students may be allowed to take part in the decision making process. Taking decisions through open discussion in the class, inviting students suggestions on common problems etc. are habits to be cultivated.

ii) Ability to reach consensus

- When different opinions, ideas and positions arise the students may be given the responsibility to reach a consensus.
- Imaging what would be the course of action in some situations, allowing to intervene in a healthy way in problems between individuals.

iii) Problem solving

- Developing the idea that there is reason and solution to any problem.
- Training in finding reasons for problems.
- Suggesting solutions through individual or group efforts.
- Discussing social problems.
- Analysing the shortcomings in methods to solve problems.

Whether plastic can be banned within school premises can be given as a problem. Group discussion will provide reasons and solutions. Problems which can influence classroom learning and for which the learner can actively contribute solutions need to be posed.

- Self criticism, evaluation
- Ability to face problem-situation in life
- Thinking what one would do if placed in the situation of others, how one would respond to certain experiences of others -

All these foster the growth of emotional intelligence.

iv) Life skills

Life skills need to be given a prominent place in education. W.H.O. has listed ten skills required for success in life.

- Self awareness
- Empathy
- Inter personal relations
- Communication
- Critical thinking
- Creative thinking
- Decision making
- Problem solving
- Copying with emotion
- Copying with stress

The new curriculum addresses these areas.

Knowing the characteristics of the learner, role of the teacher and how to use the teachers handbook help the teacher to plan and effectively implement learning activities.

Objectives of the Vocational Higher Secondary Curriculum.

- To facilitate higher education while giving opportunity to enter in the field of employment.

- To develop environmental awareness, sense of national integration, tolerance and human values so as to ensure social and cultural improvement.
- To enable the learner to find on his own employment.
- To inculcate mental courage in the learner to face unfavourable situations.
- To make human resource development possible.
- To enable the learner to understand social problems and to react appropriately.
- To develop the learner to identify and develop his own competencies.
- To develop vocational aptitude, work culture and attitude in the learner so as to provide useful products and services to the society.
- To create an awareness about mental and physical health.
- To acquire awareness about different job areas and to provide backgrounds for acquiring higher level training in subjects of interest.
- To develop possibilities of higher education by creating awareness about common entrance examinations.
- To provide situation for the encouragement of creative thinking and organising training

programmes in each area, creative abilities and to develop artistic talents.

Nature of Approach

The learning device is to be organised in the selected vocational subjects in such a way that adequate practical experience should be given, making use of the modern technology. The development in each area on the basis of information technology is to be brought to the learner. The work experience in the respective fields(OJT, Field trip, Production/Service training, Survey, Workshop, Exhibition, Youth festival, Physical fitness etc.) are to be adjusted suitable to the learning and evaluation process. The participation and leadership of the students in planning and execution is to be ensured through this kind of activities. Social service is to be made a part of the course.

Approach towards Vocational Higher Secondary Education

The learning methodology has to be organised so as the learning provide adequate practical thinking on the opted vocational subject utilising the new technology. The development of information technology should be made available in each sector. Work experience, OJT, Field trip production, Service cum training centre, Survey, Workshops, Exhibitions, Youth festivals, Physical fitness etc should be systematised well appropriate to learning and evaluation. Learner

participation should be ensured in the planning and implementation of these activities. Social service should be a part of the course. If a learner has to change his school, he should be provided an opportunity to continue his studies in the new school. While considering criteria for admission to higher courses, grades of vocational subjects should also be given due weightage. In tune with the changes in the Vocational Higher Secondary Education changes should be ensured in the field of higher education.

The teachers have to take special care in arranging learning activities for the development of all the faculties of intelligence.

Learning activities and learning atmosphere.

A proper learning atmosphere is essential for the betterment of learning activities.

They are:

- Proper physical environment
- Healthy mental atmosphere
- Suitable social atmosphere
- Active participation of PTA, Local bodies and SRG
- Reference materials and visual media equipments.
- Academic monitoring
- School Resource Group (SRG)

Subject Associated Approach Paper

Fishing Craft and Gear Technology

Introduction

Vocational education, a dream of Mahatma Gandhi, was realized by the central government to address the problem of massive unemployment among the youth in our country. Among the different vocational courses introduced fisheries courses has great relevance. Being a country with a vast coastline of about 8000 km fishing and allied industries play an important role in providing employment to a vast majority of the population, as well as sustaining the economy with the foreign exchange earned from the export of various fisheries products. Among the maritime states of India, Kerala holds a remarkable position in fisheries sector. That is why the importance of fisheries in the economic development of Kerala was emphasized by our President Dr. APJ Abdul Kalam.

The courses like fishing craft and gear technology, fish processing technology, aquaculture offer scope in studying new technologies, and help to improve the fishing industry, which directly or indirectly helps to improve the standard of living of fisher folk and also generate employment opportunities.

Aims

- To create general awareness about the fisheries sector, its resources and their significances.
- To impart knowledge and training on various fish culture, capture and processing techniques.
- To create and develop confidence and skills for initiatives in self employment in fisheries sector.

Educational Approach

The studies conducted by UNESCO, SCERT on the various defects of teacher centred education evolved a new idea of student centred educational approach. According to their approach the learning activities should pave way for the construction of knowledge. While selecting the learning activities are should take into account the nature, mental ability and skills of students. This approach should explore in activities which are methods like problem solving and self studying. It is important that the new educational approach should create opportunities for individual learning, co-learning and group learning.

For this we can adopt different strategies and techniques.

1. Discovery learning

The teacher has to create an atmosphere that encourages the learner to discover ideas and facts of his own. For example the teacher can assign the students to identify and classify different marine fishes. This gives an opportunity for the learner to observe the different ***** fishes available in the local market and can collect information from different sources like internet and journals. Their observation can be consolidated and presented.

2. Co-operative learning

In this method the learners learn by helping

each other. The negotiation among peers take place here.

For example, if we want to make an awareness among the students about different fishing methods, the students can be divided into different groups and a group discussion on the topic can be conducted. The ideas evolved from the discussion can be consolidated and presented in the class by one person from each group.

3. Collaborative learning

The two important aspects of this method of learning are sharing of ideas and negotiation among the learners. Suppose we want to deal with different gear materials used both natural and synthetic and compare both in terms of strength, resistance to weather, their efficiency. Here also they can be divided into groups and the teacher can ask them to collect different types of supplementary feeds and their efficiency. Their observation can be consolidated and presented in the class. Their observations can be consolidated and presented.

4. Socio-Cultural related learning

This method of learning pertains to social and cultural aspect of the society. For example an informal interview can be conducted by the learner to study the impact of trawl-net over traditional gears. A suggested topic can be problems related to tsunami and resent fish

production fishery products in a region dominated by vegetarians.

Learning Objectives

1. To create basic knowledge of fishing craft and gear.
2. To develop a skill for construction of different types of boats.
3. To understand the importance of fisheries in the Indian economy.
4. To familiarise with constructional procedures of various traditional crafts.
5. To make an awareness of the topographic features of Indian coasts and to understand the relationship between topography and features of crafts used.
6. To make a clear idea about mechanised fishing crafts.
7. To develop skill to conduct the comparative study about different boat building materials and to understand merits and demerits.
8. To understand the operational methods of different trawl-nets seine-nets, gill-nets, longlines etc.
9. To understand and differentiate natural and synthetic gear materials.
10. To develop a skill to identify different gear accessories.
11. To make a clear idea of various physical properties of gear materials.
12. To develop the skill in fabrication of nets, assembling, rigging, mending of nets.

Curriculum Objectives

Curriculum Objectives

- 1.1 To understand the position of India in the world fisheries.
- 1.2 To understand the importance of fisheries in the Indian economy.
- 1.3 To identify the maritime states, major fishing harbours and ports of India.
- 1.4 To understand various fishing methods briefly.
- 1.5 To develop the skill in identifying the morphological characters of a typical fish and prawn.
- 1.6 To develop the skill in differentiating teleost and elasmobranchs.
- 1.7 To understand commercially important fishery resources of India.
- 1.8 To develop the skill in familiarizing different commercially important fishes, crustaceans and molluscs.
- 2.1 To familiarize the learners with the classification of marine environment.
- 2.2 To develop the skill in identifying various traditional crafts used in India.
- 2.3 To make an awareness of the topographic features of Indian coast and to understand the relationship between the topography and features of crafts used.
- 2.4 To familiarize the learners with constructional procedures of various traditional crafts briefly.
- 2.5 To understand the advantages and disadvantages of traditional crafts.
- 3.1 To develop a knowledge of mechanization of traditional fishing crafts.
- 3.2 To acquire an idea about the role played by FAO, INP and TCM in mechanization.
- 4.1 To make a clear idea about various mechanized fishing crafts – Trawler, Purse

- seiner, gill netter, long liner, combination vessel, factory vessel and fish carriers.
- 4.2 To develop a skill in differentiating various mechanized crafts.
- 4.3 To develop a skill in differentiating traditional crafts and mechanised crafts.
- 5.1 To get an idea about different materials used for the construction of boats – wood, steel, ferrocement, fiberglass reinforced plastic, aluminium and marine plywood.
- 5.2 To develop the skill to conduct a comparative study about different boat building materials and to understand its merits and demerits.
- 5.3 To acquire knowledge about estimation of construction cost of boats built with different materials.
- 6.1 To acquire an idea about the classification of fishing methods – Von Brandt classification.
- 6.2 To understand the operational methods of different trawl nets, seine nets, gill nets and lines.
- 7.1 To understand and differentiate natural and synthetic fibres used for making gear.
- 7.2 To develop skill to identify different gear accessories such as hooks, floats, sinkers, baits.
- 8.1 To make a clear idea on the differences between fibre, yarn, twine and rope.
- 8.2 To develop skill in differentiating different types of twists. (S,Z)
- 8.3 To understand about the specification of yarns (yarn numbering system.)
- 9.1 To make an awareness of various physical properties of gear materials.
- 9.2 To make an awareness of the reaction of gear materials to various chemicals – acid, alkali, oils.
- 10.1 To develop the skill in making different types of knots used for various purposes.
- 10.2 To develop the skill in fabrication of netting especially on braiding, creasing, batting, cutting (T, N, B Cuts), joining, mounting and rigging and understanding their uses.
- 11.1 To develop the skill in assembling a net panel with specific dimensions.
- 11.2 To develop the skill in identifying various tears and to repair damaged net by mending.

Syllabus

Unit 1 - General Introduction

- Morphology and biology of typical fish and shellfish. Major Indian fisheries: marine, estuarine and fresh water. Pelagic and demersal fisheries of India. Marine fish production in India. Export of marine products from India.

Unit 2 - Traditional Crafts

- Topographic features of the Indian coast. Traditional crafts of India: Cattamaran, dug out, outrigger and plank built canoes. Characteristics of traditional crafts in relation to topography. Methods of construction. Advantages and disadvantages.

Unit 3 - Mechanisation of Traditional Crafts

- The role played by national institutes and international organisations in mechanization. Part played by Kerala in mechanization.

Unit 4 - Types of Mechanised Boats

- Types of mechanized boats. Types of crafts

suitable for mechanization. Mechanised boats like gillnetter, shrimp trawler, purse-seiner, long liners. Combination vessels, Factory vessels and fish carriers.

Unit 5 - Boat building materials

- **Wood :** Common boat building timbers available in India, their common, trade and scientific names. Potential yield of boat building timbers in Kerala and neighboring states. Timber used for catamaran. Important technological characteristics of boat building timbers. Wood defects and general description of wood seasoning.
- **Steel :** Steel as a constructional material. Common grades of steel used in vessel construction. Corrosion of steel in sea water, in the splash zone and in atmosphere. Simple methods of steel vessel construction by welding and revetting.
- **Ferrocement :** Definition of ferrocement. Method of construction of ferrocement boat. Factors affecting strength of ferrocement. Repairing of ferrocement boats.

- Fibre glass reinforced Plastic (FRP) glass fibres: Chopped strand and woven mats. Catalyst and accelerator used – laying process. Single and double skin construction properties of FRP laminates.
- **Aluminium** : Marine aluminium alloys. Corrosion of aluminium in sea water. Fabrication techniques of aluminium boats.
- **Other materials** : General familiarization of the properties of cast iron, brass, bronze, stainless steel, copper and cupronickel.
- Comparative study of wood, FRP, Ferro cement, steel and aluminium as boat building materials, their merits and demerits. Cost of construction of small boats with different materials.

Unit 6 - Common Fishing Methods

- Traditional fishing methods: Line fishing (hand lines, drop lines, long lines, troll lines, pole and line), stationary nets (stake nets, dip nets, gill nets, chinese nets) encircling nets (seine nets, purse-seining), trawl nets (beam trawl, otter trawl, different types of trawling) deep sea trawlers and deep sea trawling.

Unit 7 - Gear Materials

- 7.1 Materials used and general concepts.
- Natural : Cotton, hemp, coir, jute, manila,

sisal, synthetic: - Nylon, polypropylene, poly ethylene (monofilament, multifilament, tape, spun). Natural, synthetic and wire ropes-different types of hooks. Floats, sinkers and baits.

Unit 8 - Specification and Construction of Gear Materials

- Twines and ropes. Numbering systems and specification. Preparation of twines and ropes twisting yarn, strand twines, ropes and braiding.

Unit 9 - Properties of Gear Materials

- Diameter, strength, moisture content, sinking speed, resistance to atmosphere. Reaction with materials of contact.

Unit 10 - Fabrication of Webbing

- Different types of knots, seaming, joining, braiding and creasing, cutting, tailoring, mounting and assembly.

Unit 11 - Understanding the Net

- Assembling of the net and reading the given design of a net. Mending nets.

Year Plan

Unit	Name of the Chapter	Time (in hours)	Months when Plan to teach	Activity/Strategy
1	General Introduction	5	June	<ul style="list-style-type: none"> • Data collection and analysis • Field visit • Group discussion • Demonstration of samples
1	General Introduction	20	July	<ul style="list-style-type: none"> • Field visit • Model demonstration • Debate
2	Traditional crafts	12	August	<ul style="list-style-type: none"> • Field visit • Group discussion • Demonstration of model crafts • Debate
3.	Mechanisation of Traditional crafts	8	September	<ul style="list-style-type: none"> • Field visit • Discussion • Debate
4.	Types of Mechanised Boats	12	September	<ul style="list-style-type: none"> • Field visit • Discussion • Assignment • Chart Preparation • Model Demonstration

Unit	Name of the Chapter	Time (in hours)	Months when Plan to teach	Activity/Strategy
5.	Boat Building Materials	20	October	<ul style="list-style-type: none"> • Field visit • Group discussion
6.	Common Fishing Methods	21	November	<ul style="list-style-type: none"> • Group discussion • Demonstration • VCD/Slide Display • On board Training - Project
6.	Common Fishing Methods	4	December	<ul style="list-style-type: none"> • Discussion • On board Training - Project
7.	Gear Materials	10	December	<ul style="list-style-type: none"> • Field visit • Demonstration • Group discussion
8.	Specification and construction of gear materials	10	January	<ul style="list-style-type: none"> • Group discussion • Demonstration
9.	Properties of year materials	6	January	<ul style="list-style-type: none"> • Group discussion • Experiment • Visit to gear material shop
10.	Fabrication of webbings	7	February	<ul style="list-style-type: none"> • Demonstration • Discussion
11.	Understanding the Net	5	February	<ul style="list-style-type: none"> • Demonstration • Discussion
	Total 11 Units	140 hours		

Model Unit Plan - Traditional Crafts

Total Period : 12 Hrs.

Objectives	Concepts/Ideas	Process Skill	Activities	Materials	Evaluation	Period
<ul style="list-style-type: none"> To familiarise about classification of marine environment 	<p>Idea about various divisions of pelagic and benthic zone.</p>	<ul style="list-style-type: none"> Observation Communication Identification Differentiation 	<ul style="list-style-type: none"> Practical demonstration of ecological divisions of sea and differentiate each zones. Discussion Chart Preparation and labelling of each divisions 	<ul style="list-style-type: none"> Diagrams Charts Slides 	<ul style="list-style-type: none"> Perfection of notes and diagrams Participation in observation and discussion Timely submission 	2
<ul style="list-style-type: none"> To develop skill to identify various traditional crafts used in India. 	<p>An idea about traditional crafts and its construction</p> <ul style="list-style-type: none"> Cattamaran Dugout Plank built Outrigger 	<ul style="list-style-type: none"> Identification Differentiation Observation Communication Classification 	<ul style="list-style-type: none"> Visit landing centres or boat building yard to observe various traditional crafts and their operation and construction. Model demonstration Assignment - Model construction of traditional crafts. 	<ul style="list-style-type: none"> Models of different traditional crafts. 	<ul style="list-style-type: none"> Construction skill and performance are evaluated. Observation Systematic recording Neatness and timely submission. 	3
<ul style="list-style-type: none"> To make an awareness of the topographic features of Indian coast and to understand the relationship between the topography and features of crafts used. 	<ul style="list-style-type: none"> Topographic features of maritime states of east and west coast (Nature of sea bottom, nature of sea, climatic condition, distance to fishing ground.) 	<ul style="list-style-type: none"> Classification Differentiation Observation Communication 	<ul style="list-style-type: none"> Discussion about topography of Indian coast. Picture demonstration Chart preparation of crafts used in different coasts. 	<ul style="list-style-type: none"> Diagrams Chart Models 	<ul style="list-style-type: none"> Preparation of notes and diagrams Active participation and observation are evaluated. Neatness and timely submission. 	1

Objectives	Concepts/Ideas	Process Skill	Activities	Materials	Evaluation	Period
<ul style="list-style-type: none"> To familiarise with constructional procedures of various crafts briefly. 	<p>A brief knowledge about the variation in the construction of traditional crafts. Eg. Different types of cattamaran, Dug out canoes, plank built canoes.</p>	<ul style="list-style-type: none"> Date Collection Observation Comparison Communication 	<ul style="list-style-type: none"> Visit to boat building site and collect data about the construction of traditional crafts. Model demonstration. Assignment - construction of different crafts of various designs. 	<ul style="list-style-type: none"> Diagrams Models Charts 	<ul style="list-style-type: none"> Preparation of notes and diagrams. Participation in observation and discussion. Neatness and timely submission 	3
<ul style="list-style-type: none"> To understand the advantages and disadvantages of traditional crafts. 	<ul style="list-style-type: none"> Idea about advantages and disadvantages of traditional crafts. 	<ul style="list-style-type: none"> Communication Data Collection Comparison Differentiation 	<ul style="list-style-type: none"> Group discussion Debate 	<ul style="list-style-type: none"> Notes based on discussion. 	<ul style="list-style-type: none"> Active participation in discussion. Ability to prepare report of discussion. Ability to substantiate his own ideas and views. 	1

Model Daily Play

Name of the Teacher :	Class : I VHSE
Name of the school :	Strength : 30
Subject : FCGT	Duration of Period : 1 hour

Topic : Traditional fishing methods

Curriculum Objectives : To understand the concepts and ideas of various traditional fishing methods.

Concepts and ideas : An introduction to traditional fishing gears.

Process Skills : Communication, observation and inference.

Previous knowledge: Locally used fishing gears.

Materials Required

- Notes based on discussion point.
- Models of various fishing gears.
- Video clipping of various fishing operation.
- Slides of various fishing gears.
- Charts showing fishing gear classification.

Activities / strategies

Responses/Feed back

Introduction

After establishing rapport with students ask some questions regarding their concept on traditional fishing gears and locally used fishing gears and their operations they have observed. Direct them to present their ideas in the class.

Class

Activity 1 - Group Discussion

From the difficulties to answer the questions they are asked to discuss with fellow students, for this purpose they are grouped into 5. Provide them .

Participation in discussion.
Method of presentation
Ability to substantiate his own ideas and views.

Activities / strategies	Responses/Feed back
<p>With discussion points like: different techniques of fishing, region of operation, behaviour of fishes, method of capture. Based on these points they are asked to discuss and categorise types of gears with respect to the fish behaviour, region of operation.</p> <p>Activities II - Video display/slides display Video/slides when presented they can easily discuss and answer the questions and prepare notes. Ask them to present the notes in groups. Then the points are consolidated in the class.</p> <p>Activity III When these discussion is completed ask a student to explain his experience in any one of the fishing gear operation to which he is accustomed to. The teacher have to initiate the student with necessary assistance.</p> <p>Discussion Points</p> <ul style="list-style-type: none"> • What is a gear. • Mention briefly about fishing gears. • Introduction to classification of fishing gears based on Von Brandt classification. 	<p>Participation in observation</p> <p>Presentation of prepared notes.</p> <p>Discussion on personal fishing experience.</p> <p>Assignment</p> <ul style="list-style-type: none"> • Chart preparation showing detailed classification of fishing gear based on Von-Brandt classification. • Model construction of various fishing gears.

Evaluation

Introduction

As the curriculum is based on a particular vocation, evaluation becomes an inevitable procedure. Evaluation is done along with learning process throughout the course of study. In order to make an evaluation, the teacher should be able to understand the students, their scholastic and co-scholastic knowledge. Capacity building in the selected vocation is the most important part in vocational education and it should be evaluated accordingly. The technical skills, interest and devotion in the particular field, communication skills, analysis, organising and presentation skills etc. have to be evaluated. The personal and social qualities also have to be evaluated. Thus evaluation is an integral part of learning process which assesses the implementation of the curriculum.

Need and importance of Evaluation

Evaluation is to assess the scientific knowledge of students and to recognise to what extent they have achieved the specified capabilities. A written examination at the end of an year which is purely based on a textbook is not of much use. "Evaluation is a systematic process of collecting, analysing and interpreting evidence of students' progress and achievement both in cognitive and non-cognitive areas of learning for the purpose of taking a variety of discussions".

The teacher can properly assess the level of the learner and can identify his/her strength and weakness. This will help each student to evaluate themselves and to improve their level of learning by taking necessary assistance from the teacher (self evaluation) classmates can evaluate themselves through interaction (peer group

evaluation) Evaluation even help the teacher to analyse and improve their performance. Evaluation helps to integrate the teacher, learner and even the parents. Thus student who are socially useful and can perform productive work are created. This will improve the quality of our young generation.

Features of Evaluation

- Evaluation should be humane in nature. It must help the students grow as social beings.
- Evaluation should be the responsibility of the teacher who teaches the students and is responsible for developing the requisites healthy attributes in them.
- Evaluation should be consistent with its purpose and must provide a reliable and valid measure of the student's performance.
- Evaluation should reflect the outcome of each learning intervention and should provide all the students with equal opportunity to display their individual potential.
- Evaluation should take into account both the background and the prior experience of the students.
- Procedures for grading and their reporting should be appropriate and easily understood by one and all.

- Evaluation should restore the faith and trust of the masses by ensuring transparency in the procedure.

Theories of constructivism and multiple intelligence are the basis of modern learning. So evaluation strategies have also to be changed. Evaluation must be;

- Continuous and comprehensive
- Scholastic and co-scholastic
- Depending on grading system.
- Depending on a vocational or trade proficiency.

Continuous and Comprehensive Evaluation

Most of our traditional evaluation methods are related only to the area of scientific knowledge or the memory of students. To eliminate the limitations of this method we are forced to evaluate the multi-dimensional competencies of the learner with respect to the practicability and nature of the subject.

Continuous and Comprehensive Evaluation is an essential ingredient of any learning process. It helps the learner to understand and evaluate his own progress and to develop adequate strategy for further improvement. Continuous Evaluation also helps us to measure the attained goals of formulated curriculum objectives.

Merits of Continuous and Comprehensive Evaluation system are:

1. Making student's learning regular
2. Provides for a variety of activities
3. Effective feedback is possible
4. Assess the all round development of the learner on a continuous basis through a variety of activities.
5. Remedial and diagnostic teaching is possible.
6. The process as well as the product is assessed.

Different tools are used to evaluate the multi dimensional competencies of the learners. The Continuous and Comprehensive Evaluation (CCE) includes not only written test (class tests) but also oral tests, observation, interview, debates, discussions, seminars etc.

The learner proceeds through a variety of learning experiences. Therefore the level of progress should be evaluated in a comprehensive

and continuous manner. More over, the learner is to be made aware of the findings and it helps him to measure his progress. Necessary help should be provided to them in time. As such we can generate the environment and opportunity for Continuous Evaluation.

In order to evaluate the multi- dimensional competencies of the learner, different tools and techniques have to be used. The multi-dimensional competencies of the learner include:

- Class -room interaction
- Task orientation
- Creative expression
- Field/institutional interactions
- Knowledge assessment/ expression

Continuous Evaluation Items

1. Assignment
2. Seminar
3. Class test
4. Project etc.

* For continuous evaluation class test (CT) is made compulsory taking any two of the above said indicators. CT can be a written test, oral test (viva), Practical test.

CE Item	Evaluation Indicators	Weightage	Score
1. Assignment	1. Awareness of the content 2. Comprehensiveness of the content 3. Systematic and sequential arrangement 4. Observation/suggestions/Views Judgements/ Evaluation 5. Timely Submission	4/3/2/1 4/3/2/1 4/3/2/1 4/3/2/1 4/3/2/1	20
2. Seminar	1. Ability to plan and organise 2. Skills in the collection of data	4/3/2/1 4/3/2/1	
	3. Awareness of the content (presentation of the paper, participation in discussion, ability to substantiate the ideas and views)	4/3/2/1	
	4. Ability to prepare the report (sequence in the presentaionof the concepts, authenticity and clarity of ideas/views/concepts 5. Quality of Seminar Document	4/3/2/1 4/3/2/1	20
3. Project	1. Ability to plan (Selection of the method for solution of the problem, identifying suitable tools, planning the various activities to be carried out in each stage) 2. Ability to collect data (sufficiency and Relevance of data. Classification and arrangement of data for analysis, reliability and authenticity of the Collected data.) 3. Ability to analyse the elements and procedure (Structuring of elements and developing logic. Efficiency in using the package/tool. Recognising design errors and correcting them) 4. Ability to prepare the project report (Reflection of the process skills. Communicability and authenticity of the report in relation with the Project diary 5. Viva Voce(Knowledge of the content and Process)	4/3/2/1 4/3/2/1 4/3/2/1 4/3/2/1 4/3/2/1	20

CE item calculation

Subject		item: Assignment					Total Score (20)
Sl. No	Name	Evaluation Indicators					
		I (4)	II (4)	III (4)	IV (4)	V (4)	
1	Anand	2	3	4	4	4	17
2	Shibu	4	3	4	4	4	19

Consolidated statement of CE

Class: 1st year

Stream: Fisheries

Subject: Fishing Craft and Gear Technology

Sl. No	Name	CE Items			Total (60)	Total CE Out of 20
		1 Class Test (20)	2 Assignment (20)	3 Seminar/ Project (20)		
1	Anand	18	17	19	54	18
2	Shibu	20	19	18	57	19

No minimum score for CE

Terminal Evaluation (TE)

Terminal Evaluation is in written form. The test should not be aimed to test the memory alone. The terminal evaluation questions give more emphasis on application level, analysis and synthesis. The questions are framed so that the students are able to apply their different mental process. The maximum score is 80 and the minimum score of TE is 24 (30%).

The terminal evaluation questionnaire should be capable of measuring

- Content validity
- Criterion validity
- Constant validity
- Reliability
- Class test, term evaluation and annual examination should be in tune with the new approach.
- Should not be prepared to test the rote memory.
- Questions asked should provoke the thinking abilities of students.
- Questions to test the competency of application analysis, synthesis and evaluation are to be given. In other words the questions should be framed in such a way that the students are able to apply their various mental processes.

- Questions should be based on the learning process and the new approach to each subject.
- Results should be scientifically analysed.
- Evaluation results should be analysed and follow up may be carried out at relevant levels (remedial measures).
- Eighty percent marks are set apart for the common examination as the part of the Term Evaluation

The Question Paper must have

- Application level questions
- Synthesis level questions
- Comparison of facts
- Challenging questions
- Scope for obtaining innovative ideas
- Giving creative thinking by the students
- Questions based on the objectives of learning activities
- Practical oriented questions
- Environment related questions
- Divergent thinking level questions

Role of the Teacher in the Evaluation Process

- Preparation for the effective execution of evaluation

- Preparation of daily planning notes (teaching manual) and helping learners in their activities.
- While learners are engaged in doing seminars/collections/assignments/collections, conduct interim evaluation and provide necessary help.
- Consider assignment, seminar, collections etc. as learning activities and approach them as evaluation materials.
- Prepare a format to record continuous evaluation.
- Identify and evaluate the progress at different stage.
- Find out learner's difficulty by conducting feedback.
- Make use of the support mechanism fully, provided by the department of education.
- Make the parents aware of the new approach to curriculum and evaluation system through class P.T.A.
- Make use of the training programme for professional excellence and transparency in work.
- Make use of the Humanities Teachers Council for academic progress.
- Identify and make use of the possibility of action research to resolve classroom learning problems.

Grading

It is not scientific to assess the achievement of a student solely based on the marks in the terminal examinations. Marking system proved unscientific in evaluating the growth and development of students both in cognitive and non-cognitive areas. To overcome these shortcomings, a popular mode of evaluation based on students' performance- grading system- has been evolved. At the Higher Secondary stage, it is desirable to use a point absolute grading to co-ordinate and record the evaluation. After giving the score, they are changed into percentages and appropriate letter grades are awarded corresponding to each percentage. The score percentage and corresponding letter grade in Fishing Craft and Gear Technology is given below.

Score in percentage	Grade
90-100	A+
80-89	A
70 -79	B+
60-69	B
50-59	C+
40-49	C
30-39	D+
20-29	D
Below 20	E

Consolidated statement of CE & TE

Class: 1st year

Stream: Fisheries

Subject: Fishing Craft and Gear Technology

Sl. No	Name	CE (20)	TE (80)	Total CE+ TE (100)	Grade
1	Anand	18	60	78	B+
2	Shibu	19	72	91	A+

The maximum score of CE+TE is 100 and the minimum score is 30. (30%)

Practical Evaluation (PE)

PE is the important part of vocational practicals. The practical skills must be evaluated after completing all practical experiments in each term and at the end of the academic year. PE must cover all required indicators to evaluate the technical skill and practical knowledge of the different topics covered.

Syllabus**Practical 420 hrs**

- 1 Collection and identification of commercially important teleosts, elasmobranchs, crustaceans and molluscs. - 50 hrs.
- 2 Study and recording of morphological characters of selected teleosts, elasmobranchs, crustacean and molluscs. - 25 hrs
3. Preparation of charts showing fish landing centres, fishing harbours and ports in India and Kerala. Compilation of data of fish landings (item-wise and quantity wise) of India and Kerala for the past 10 years. - 30 hrs
4. Identification and familiarisation with traditional and mechanised boats in use in India and Kerala. Study of their design, operation and operational problems. - 50 hrs

5. Boat building materials: Visit to boat building yards. Identity of wood, quality, quantity required for construction, wastage, use of various types of wood in the construction of boat. Ingredients used in FRP boat building. Quality, quantity required for construction and wastage of FRP. Identification of different thickness of steel used in boat building. Quality of steel, quantity required for construction and wastage. Identity of ferro-cement, quality, quantity required and wastage. - 70 hrs
6. Construction of boats. Familiarisation of construction procedures, tools, methods, equipments used, inspection at progressive stages of construction and constructional problems of boats made of wood, FRP, steel and ferro-cement. - 60 hrs
7. Making twine/rope. Study of different fibres used for making twine/rope. Identification of yarn made by various fibres, strands made from yarns, twines made from strands, ropes made from stands. Practise of making twine/rope. - 25 hrs
8. Making of webbing by hand braiding. Study of webbing using different types of knots. Identification of the webbing made by trawl knot/double trawl knot. Practise making of webbing. Shaping of webbing: tapering of webbing by different methods, shaping by braiding, by creasing, by tailoring, by flymesh. Practising shaping of webbing. - 60 hrs
9. Assembling, mounting and rigging of nets. Assembling of webbing by lacing and stapling. Mounting of webbing to bolch line. Mounting of webbing by different percentage or hanging. Fastening mounted webbing to the head and foot rope and fixing floats and sinkers. - 50 hrs

Indicators for Practical evaluation and their score

No	Indicators	Percentage	Score
1	Procedure and demonstration	40%	60
2	Calculation	10%	15
3	Identification	20%	30
4	Spotters	10%	15
5	Record	10%	15
6	Viva	10%	15
		Total	150

Consolidated statement of Practical Evaluation**Class: 1st year****Stream: Fisheries****Subject: Fishing Craft and Gear Technology**

No	Name	Procedure and demonstration	Calculation	Identification	Spotters	Record	Viva	Total	Grade
		60	15	30	15	15	15	150	
1	Anand	40	10	20	10	12	13	105	B+
2	Shibu	55	13	25	13	13	13	142	A+

How will you find out grade for PE

Convert the total score into percentage and find out the grade

eg: Total score: 105, percentage $\frac{105}{150} \times 100 = 70$, Grade B+

The minimum score to be obtained is fixed at 40% that is 60 out of 150. Grade B

Vocational Competency Evaluation

Being a vocational course, a system to judiciously evaluate the required value addition and consequent capacity building in the selected vocational subject is highly essential. As the other evaluation components like CE, PE and TE cannot assess the vocational competencies and professional skills acquired by the students, an internship evaluation (IE) component has been introduced to meet this requirement.

IE Item	Evaluation Indicators	Weightage	Score
1. Regularity and Punctuality			10
2. Value addition	<p>Field Visit</p> <ol style="list-style-type: none"> 1. Attitude and readiness towards the task. 2. Capacity for observation. 3. Data collection. 4. Application of ideas. 5. Documentation/ recording. <p style="text-align: center;">OR</p> <p>Survey</p> <ol style="list-style-type: none"> 1. Planning. 2. Data collection. 3. Consolidation of data and analysis. 4. Drawing inference. 5. Reporting. 	<p>4/3/2/1</p> <p>4/3/2/1</p> <p>4/3/2/1</p> <p>4/3/2/1</p> <p>4/3/2/1</p> <p>OR</p> <p>4/3/2/1</p> <p>4/3/2/1</p> <p>4/3/2/1</p> <p>4/3/2/1</p> <p>4/3/2/1</p>	20
3. Capacity building	<p>OJT/ Simulated Experiment/ Practical skill</p> <ol style="list-style-type: none"> 1. Involvement/ Participation. 2. Skills in doing work/ Communication skill. 3. Time bound action. 4. Capacity for observation, analysis and innovation. 5. Documentation, Recording and display. <p style="text-align: center;">OR</p>	<p>4/3/2/1</p> <p>4/3/2/1</p> <p>4/3/2/1</p> <p>4/3/2/1</p> <p>4/3/2/1</p> <p>OR</p> <p>4/3/2/1</p>	20

IE Item	Evaluation Indicators	Weightage	Score
3. Capacity building	Performance in camp/ Exhibition/ clinic		
	1. Ability for planning and organising.	4/3/2/1	
	2. Mastery of subject.	4/3/2/1	
	3. Ability for communication.	4/3/2/1	
	4. Innovation.	4/3/2/1	
	5. Involvement/Social commitment.	4/3/2/1	
	OR		
	Performance in production/ service cum training centre (PSCTC)		
	1. Mastery of vocational skills.	4/3/2/1	
	2. Managerial capacity.	4/3/2/1	
	3. Promoting self confidence.	4/3/2/1	
	4. Innovative approach.	4/3/2/1	
	5. Promoting self -reliance.	4/3/2/1	

**Vocational Competency
Items for Internship
Evaluation**

Items	Score
Regularity & Punctuality	10
Field visit/survey(any one)	20
OJT/simulated experiment/ Practical Skill/ Performance- Camp/exhibition/Clinic Performance- PSCTC (any one)	20
Total	50

A minimum of 80% attendance is required for promotion to the second year. Those who have shortage of attendance should repeat first year. Those who have 80% and above attendance but failed to achieve 30% of Internship Evaluation (IE) will be promoted to the second year. He has to improve the component in which he performed poor. He has to attain the minimum by improving the particular component to get eligible for appearing second year public examination.

Consolidated statement of IE

Class: 1st year

Stream: Fisheries

Subject: Fishing Craft and Gear Technology

SI No	Name	Regularity & Punctuality	Field visit or survey	OJT or Practical skill	Total Score	Grade
		10	20	20	50	
1	Anand	5	12	10	27	C+
2	Shibu	6	15	16	37	B+

Section II

Unit 1

General Introduction

Introduction

Fisheries Science is an applied science which mainly deals with culture, capture and processing of aquatic animals and plants. As this is a new subject to the students we are trying to provide a basic knowledge and general awareness to Indian fisheries through this unit. Discussion, general secondary data collection and analysis through graphs should be the main part of the learning activities which should be followed in this chapter.

Plan the learning activities and provide such learning experiences to students so as to develop creativity, process skill and research attitude through secondary data collection, documentation and preparing charts of Indian capture fishery related materials.

Syllabus

Morphology and biology of typical fish and

shellfish. Major Indian fisheries: marine, estuarine and fresh water. Pelagic and demersal fisheries of India. Marine fish production in India. Export of marine products from India.

Curriculum Objectives

- To understand the position of India in the world fisheries.
- To understand the importance of fisheries in the Indian economy.
- To identify the maritime states, major fishing harbours and ports of India.
- To understand various fishing methods briefly.
- To develop the skill in identifying the morphological characters of a typical fish and prawn.
- To develop the skill in differentiating teleost and elasmobranchs.

- To understand commercially important fishery resources of India.
- To develop the skill in familiarizing different commercially important fishes, crustaceans and molluscs.

Suggested Activities

a) Status of India in world fisheries.

- Data collection of landing, exports – from internet, journals and economic reviews. Based on the collected data, graphs and pie diagrams can be prepared and discussed.

The activity aims at developing the skill in observing and comparing the collected data and thus help them to reach a conclusion over the present status of Indian fishery.

Points for discussion

- Percentage contribution of fish in Indian economy.
- Total seafood export in terms of quantity and value.

b.) Major fishing zones of India

- Map preparation of maritime states, major harbours and ports of India.

Points for discussion

- Mention fishing zones, maritime states, major fishing harbours and ports of India.

- Mention the length of coastline of India and Kerala; EEZ.
- Mention the major fisheries institutions (CMFRI, CIFT, IFP, CIFNET, EIA, MPEDA, FSI)

c. Familiarisation of fishing methods.

- Field visit to a nearby landing centre and prepare report on observed fishing methods.
- Group discussion on fishing methods of India Kerala and local area.

Points for discussion

- Mention the major fishing methods like trawling, seining, gillnetting, line fishing.

d) Morphology of fish and Prawn

- Discussion with demonstration using specimen, chart, slides.

Points for discussion

- Mention the characters of typical fish and prawn.
- Morphological characters.

e) Teleost and Elasmobranchs

- Discussion with demonstration using specimens, slides of commercially important teleosts and elasmobranchs.

Points for discussion

- Mention the classification and morphological characters of teleost and elasmobranch and help the students to differentiate.

f) Commercially important fishes, crustaceans and molluscs

- Field visit to landing centers or markets to identify and collect commercially important species.
- Based on references and collections from field visit let them prepare notes and diagrams.

Points for discussion

- Mention the scientific and common names, classification, geographical distribution,

commercially important species, food and feeding, breeding and fishing season, fishing methods, economic importance (oil sardine, mackerel, Bombay duck, tuna, peracids.)

- Mention the identification points and classification of commercially important fishes-oil sardine, mackerel, Tuna, Anchovy, Ribbon fish, Bombay duck, seer fish, Pomfrets, Horse mackerel, Torpedo trevally, Silver belly, Flat fish, Crustaceans – white prawn, tiger prawn, karikadi, poovalan, thelly, *Scylla serrata*, *Portunus pelagicus*, *Portunus sanguinolentus*, molluscs, cuttle fish, squid, octopus, edible oyster, pearl oyster, clam, lobster, fresh water fishes – catla, rohu, mrigal, Chinese carps, scampi brackish water – tilapia, mullet, pearl spot, chanos – based on practical section.

Unit I

Unit Plan - General Introduction

Objectives	Concepts or Ideas	Process Skill	Activities	Learning Aid	Evaluation
1. To understand the importance of Fisheries in Indian economy and the position of India in world fishery.	<ul style="list-style-type: none"> Indian Fisheries 	<ul style="list-style-type: none"> Interpretation of data Inferring 	<ul style="list-style-type: none"> Data collection 	<ul style="list-style-type: none"> Graph 	<ul style="list-style-type: none"> Active Participation Punctuality Reliability Authenticity
<ul style="list-style-type: none"> To get an idea about the maritime states, coast line, major fishing harbours and ports of India 	<ul style="list-style-type: none"> Maritime states Coast line 	<ul style="list-style-type: none"> Observation 	<ul style="list-style-type: none"> Data collection 	<ul style="list-style-type: none"> Chart 	<ul style="list-style-type: none"> Active Participation Punctuality Reliability Authenticity
<ul style="list-style-type: none"> To understand various fishing methods. 	<ul style="list-style-type: none"> Knowledge about commonly used fishing methods 	<ul style="list-style-type: none"> Communication Observation Identification 	<ul style="list-style-type: none"> Field visit to a nearby landing centre and report preparation on observed fishing methods. Group discussion on fishing methods of India and Kerala 	<ul style="list-style-type: none"> Models Pictures 	<ul style="list-style-type: none"> Responsiveness Observation Interest

Objectives	Concepts or Ideas	Process Skill	Activities	Learning Aid	Evaluation
<ul style="list-style-type: none"> To develop the skill in identifying the morphological characters of a typical fish and prawn. 	<ul style="list-style-type: none"> Basic characters of a typical fish and prawn and morphological characters 	<ul style="list-style-type: none"> Observation Communication Identification Differentiation 	<ul style="list-style-type: none"> General discussion with demonstration using specimen, chart and shade. 	<ul style="list-style-type: none"> Specimen Chart Slide 	<ul style="list-style-type: none"> Identification skill Awareness Skill in communication Ability to prepare the report
<ul style="list-style-type: none"> To develop the skill in differentiating teleost and elasmobranchs. 	<ul style="list-style-type: none"> Taxonomical classification Morphological characters 	<ul style="list-style-type: none"> Observation Communication 	<ul style="list-style-type: none"> Discussion with demonstration using specimens and slides of commercially important teleost and elasmobranchs. 	<ul style="list-style-type: none"> Specimen Slide 	<ul style="list-style-type: none"> Identification skill Classification skill Skill in Communication Ability to prepare the report
<ul style="list-style-type: none"> To understand commercially important fishery resources of India 	<p>Idea about</p> <ul style="list-style-type: none"> Scientific name Common name Classification Geographical distribution Food and feeding Growth Fishing season Breeding season Fishing methods Ecological importance of Oil sandine) Mackerel Bombay duck Tuna Penaeids 	<ul style="list-style-type: none"> Observation Idea conception 	<ul style="list-style-type: none"> Field trip to Landings / fishmarket to collect and identify commercially important fishes Preparation of notes and diagrams based on references and data collected 	<ul style="list-style-type: none"> Reference book Specimen Pictures 	<ul style="list-style-type: none"> Classification skill Perfection of note is evaluated Ability to collect sufficient and relevant data

Objectives	Concepts or Ideas	Process Skill	Activities	Learning Aid	Evaluation
<ul style="list-style-type: none"> To develop the skill to familiarise varieties of commercially important fishes, crustaceans and molluscs. 	Idea about <ul style="list-style-type: none"> Fresh water Brackish water Marine fishes Shell fishes and molluscs 	<ul style="list-style-type: none"> Observation Classification skill 	<ul style="list-style-type: none"> Collection and identification of commercially important specimen. Field visit Based on book reference and speimen collected, notes and diagrams can be prepared. 	<ul style="list-style-type: none"> Specimen Slide 	<ul style="list-style-type: none"> Identification skill Observation Perfection in note preparation Record evaluation Reliability and authenticity of the collected data

Unit II

Traditional Crafts

Introduction

India has a long coastline of 8118km along which various types of indigenous crafts and mechanized crafts are used. The important types of traditional crafts used in our coast are cattamaram, dug out canoes, plank built canoes. These are designed to suit the local climatic condition and topography of the sea bottom and coast. Through this unit we try to familiarize briefly about the ecological divisions of sea, topographical features of Indian coast and the relationship between the topography and features of traditional crafts used along the coast. For this various learning activities like pictorial demonstration chart preparation and field visits are included.

Syllabus

Topographic features of the Indian coast. Traditional crafts of India: Cattamaran, dug out, outrigger and plank built canoes. Characteristics

of traditional crafts in relation to topography. Methods of construction. Advantages and disadvantages.

Curriculum Objectives

- To familiarize with the classification of marine environment.
- To develop the skill in identifying various traditional crafts used in India.
- To make an awareness of the topographic features of Indian coast and to understand the relationship between the topography and features of crafts used.
- To familiarize the learners with constructional procedures of various traditional crafts briefly.
- To understand the advantages and disadvantages of traditional crafts.

Suggested Activities

a) Ecological divisions of sea

- Pictorial demonstration of ecological divisions of sea.
- Discussion about various zones of sea and differentiate each zones.
- Preparing charts on ecological divisions of sea.

Points for discussion

- Discuss about pelagic and benthic zone of Ocean.
- Mention the subdivisions of pelagic and benthic zone – Neretic, Oceanic, continental shelf, continental slope, abyssal.

b) Traditional crafts

- Visit to landing centers, boat building yards of traditional crafts to observe various crafts and their operation and construction.
- Model demonstration of different traditional crafts.
- Model construction of different traditional crafts.

Points for discussion

- Mention what is a craft.
- Discuss about catamaram, Plank built canoe, dug out, outrigger canoes.

- Discuss briefly the constructional procedures of catamaran, Plank built, outrigger, dug out canoes.

c) Topography of Indian coast and crafts used

- Discussion about topography of Indian coast.
- Model and picture demonstration.
- Map preparation of India and show various crafts used in various maritime states.

Points for discussion

- Mention about topography.
- Differentiate topographic features of maritime states of west and east coast – Nature of sea bottom, nature of sea, climatic condition, distance to fishing ground.
- Characteristics of various crafts in relation to topography.

d) Merits and demerits of traditional crafts

- Group discussion on merits and demerits of traditional crafts.
- Debate.

Points for Discussion

- Discuss the advantages and disadvantages of traditional crafts.

**Additional Information to
Teacher**

**Names of other traditional crafts used
in various coast.**

Gujarat : Machwa, Hodi, Lodhia,
Malia

Maharashtra : Satpati, Versova, Ratnagiri
type.

Goa : Dugout and Plank built
canoe.

Karnataka : Rampani, Pattamar

Tamil Nadu : Tuticorin boat, Cattamaran

Andhra Pradesh: Masula, Cattamaran,
Kakinada Nava

Orissa : Ganjan, Dingi, Nava

West Bengal : Bat chari, Chot-type.

Suggested Assignment

Construction of models of various typical
traditional crafts. Construction of different
traditional crafts of varied designs.

Unit Plan - Traditional Crafts

Unit II	Unit Plan - Traditional Crafts				
Objectives	Concepts or Ideas	Process Skill	Activities	Learning Aid	Evaluation
<ul style="list-style-type: none"> To familiarise learners with classification of marine environment. 	<p>Ideas about various divisions of pelagic and benthic zone.</p>	<ul style="list-style-type: none"> Communication Observation skill Inferring skill 	<ul style="list-style-type: none"> Pictorial demonstration of ecological divisions of sea and differentiate each zones. Chart preparation 	<ul style="list-style-type: none"> Diagrams Chart 	<ul style="list-style-type: none"> Preparation of notes and diagram. Participation in observation and discussion.
<ul style="list-style-type: none"> To develop skill in identifying various traditional crafts used in India. 	<ul style="list-style-type: none"> An idea about traditional crafts and their construction Cattamaram Dug out Plank built Outrigger 	<ul style="list-style-type: none"> Observation Application Performance skill 	<ul style="list-style-type: none"> Visit to landing centres or boat building yard to observe various traditional crafts and their operation and construction. Model demonstration 	<ul style="list-style-type: none"> Model 	<p>Skill in</p> <ul style="list-style-type: none"> Construction and performance are evaluated Observation Systematic recording Neatness and timely submission
<ul style="list-style-type: none"> To make an awareness of the topographic features of Indian coast and to understand the relationship between the topography and features of craft used. 	<ul style="list-style-type: none"> Topographic features of maritime states of east and west east (Nature of sea bottom, nature of sea, climatic condition, distance to fishing ground.) 	<ul style="list-style-type: none"> Communication skill Observation skill 	<ul style="list-style-type: none"> Discussion about topography of Indian coast. Picture demonstration. Chart preparation of crafts used in different coasts. 	<ul style="list-style-type: none"> Diagram Chart Model 	<ul style="list-style-type: none"> Preparation of notes and diagrams Active preparation and observation are evaluated. Neatness and timely submission

Objectives	Concepts or Ideas	Process Skill	Activities	Learning Aid	Evaluation
<ul style="list-style-type: none"> To familiarise with constructional procedures of various crafts briefly. 	<p>A brief knowledge about the variation in the construction of traditional crafts. Eg.: Different types of cattamaram, plank built, dugout.</p>	<ul style="list-style-type: none"> Data collection Observation Evaluation 	<ul style="list-style-type: none"> Assignment (Construction of different traditional crafts. Visit to boat building site and collection of data about the construction of traditional crafts. Model demonstration. 	<ul style="list-style-type: none"> Diagrams Chart Models 	<ul style="list-style-type: none"> Preparation of notes and diagrams. Participation in observation and discussion. Neatness and timely submission
<ul style="list-style-type: none"> To understand the advantages and disadvantages of traditional crafts. 	<ul style="list-style-type: none"> Idea about advantages and disadvantages of traditional crafts. 	<ul style="list-style-type: none"> Communication skill 	<ul style="list-style-type: none"> Group discussion Debate 		<ul style="list-style-type: none"> Construction skill Active participation in discussion Awareness of the content Ability to prepare the report Ability to substantiate his own ideas and views.

Unit III

Mechanisation of Traditional Crafts

Introduction

Due to the inefficiency of traditional Crafts used, mechanization was started during the 1st five year plan with the help of various international organizations. This chapter deals with the difference between motorisation and mechanization through various learning activities. This also helps the student to understand how mechanization helps to increase the efficiency of catch.

Syllabus

The role played by national institutes and international organisations in mechanization. Part played by Kerala in mechanization.

Curriculum Objectives

- To develop a knowledge of mechanization of traditional fishing crafts.
- To acquire an idea about the role played by FAO, INP and TCM in mechanization.

Suggested Activities

- Field visit to fish landing centres to observe and differentiate motorized and mechanized crafts.
- Discussion and debate on observation in field visit.

Points for discussion

- Make a clear concept about motorisation and mechanization of traditional crafts.
- Discuss various stages of mechanisation and the role played by FAO, INP and TCM.

Additional Information

- Number of motorized boats in India.
- Number of mechanized boats in India.
- Number of motorized boats in Kerala.
- Number of mechanised boats in Kerala.

Unit III

Mechanisation of Traditional Crafts

Objectives	Concepts or Ideas	Process Skill	Activities	Learning Aid	Evaluation
<ul style="list-style-type: none"> To develop a knowledge of mechanisation of traditional crafts. 	<ul style="list-style-type: none"> A clear concept about motorisation and mechanisation of traditional crafts. Various stages of mechanisation 	<ul style="list-style-type: none"> Observation Identification 	<ul style="list-style-type: none"> Field visit to fish landing centres for observing and differentiating motorised and mechanised crafts. Discussion and debate on observed information. 	<ul style="list-style-type: none"> Notes prepared during field visit. Reference books 	<ul style="list-style-type: none"> Perfection in note preparation based on observed data. Active participation in discussion Ability to substantiate his own ideas and views.
<ul style="list-style-type: none"> To acquire an idea about the role played by the FAO, the INP and the TCM in mechanisation. 	<ul style="list-style-type: none"> Idea about the role played by the FAO, the INP and the TCM. 	<ul style="list-style-type: none"> Communication Grasping skill 	<ul style="list-style-type: none"> Discussion 	<ul style="list-style-type: none"> Reference books 	<ul style="list-style-type: none"> Evaluation based on active participation Presentation method Skill in communication Clarity of ideas

Unit IV

Types of Mechanised Boats

Introduction

By the implementation of mechanization in fishing boats a boost up have occurred in the case of mechanized boats. In addition to higher efficiency of mechanized boats the improving economy added to the popularization of mechanized boats. This chapter deals with various types of mechanized boats like trawlers, purse seiners, gin netters, long liners, combination vessels, factory vessels and fish carriers.

Syllabus

Types of mechanized boats. Types of crafts suitable for mechanization. Mechanised boats like gillnetter, shrimp trawler, purse-seiner, long liners. Combination vessels, Factory vessels and fish carriers.

Curriculum Objectives

- To make a clear idea about various mechanized fishing crafts – Trawler, Purse

seiner, gill netter, long liner, combination vessel, factory vessel and fish carriers.

- To develop a skill in differentiating various mechanized crafts.
- To develop a skill in differentiating traditional crafts and mechnised crafts.

Suggested Activities

- Visit to fishing harbours to observe different mechanized boats and their operation.
- Discussion on reports prepared after visits.
- Preparation of chart on deck arrangement of different mechanized crafts – purse seiner, trawler, gill netter, long liner.
- Construction of model of mechanized boats.

Points for Discussion

- Mention concept and features of various mechanized boats – Trawler, Purse seiner,

gill netter, longliner, combination vessel, factory vessel and fish carriers.

- Mention deck arrangements of different mechanized boats.

Additional Information

- Mention different types of trawlers outrigger

trawler, stern trawler, side trawler, beam trawler, single boat and double boat trawler, shrimp trawler, fish trawler.

Suggested Assignment

Construction of models of different mechanized boats.

Unit IV

Types of Mechanised Boats

Objectives	Concepts or Ideas	Process Skill	Activities	Learning Aid	Evaluation
<ul style="list-style-type: none"> To make a clear idea about various mechanised fishing crafts - Trawler Purse seiner Gillnetter Longliner Combination vessel Factory vessel and fish carrier 	<ul style="list-style-type: none"> Concepts and features of various mechanised boats. 	<ul style="list-style-type: none"> Communication Observation Construction skill 	<ul style="list-style-type: none"> Visit to a fishing harbour to observe different mechanised boats and their observation. Discussion on report prepared after visit. Assignment: Construction of models of mechanised boats. 	<ul style="list-style-type: none"> Models Pictures Notes prepared during field visits. Reference books 	<ul style="list-style-type: none"> Active participation in discussion Evaluation of the report prepared Skill in communication Neatness and timely submission
<ul style="list-style-type: none"> To develop the skill in differentiating various mechanised crafts and traditional crafts. 	<ul style="list-style-type: none"> Idea about deck arrangement of different mechanised crafts and comparison of traditional and mechanised crafts. 	<ul style="list-style-type: none"> Observation Inferring skill 	<ul style="list-style-type: none"> Chart preparation on deck arrangement of different mechanised crafts 	<ul style="list-style-type: none"> Models Pictures Notes prepared during field visits. Reference books 	<ul style="list-style-type: none"> Chart preparation Participation

Unit V

Boat Building Materials

Introduction

It is an important pre-requisite to have an uninterrupted supply of raw materials for the fishing boat building industry. A careful selection of materials is needed to avoid disasters. For this a thorough knowledge of different types of boat building materials is essential. No single material is ideally suited for all types, sizes and areas of operation. Each material has its own merits and demerits. In this chapter the teacher can elicit their knowledge through field visits and group discussions.

Syllabus

Wood : Common boat building timbers available in India, their common, trade and scientific names. Potential yield of boat building timbers in Kerala and neighboring states. Timber used for catamaran. Important technological characteristics of boat building timbers. Wood

defects and general description of wood seasoning.

Steel : Steel as a constructional material. Common grades of steel used in vessel construction. Corrosion of steel in sea water, in the splash zone and in atmosphere. Simple methods of steel vessel construction by welding and revetting.

Ferrocement : Definition of ferrocement. Method of construction of ferrocement boat. Factors affecting strength of ferrocement. Repairing of ferrocement boats.

Fibre glass reinforced Plastic (FRP) glass fibres: Chopped strand and woven mats. Catalyst and accelerator and – laying process. Single and double skin construction properties of FRP laminates.

Aluminium : Marine aluminium alloys. Corrosion of aluminium in sea water. Fabrication techniques of aluminium boats.

Other materials : General familiarization of the properties of cast iron, brass, bronze, stainless steel, copper and cupronickel.

Comparative study of wood, FRP, Ferrocement, steel and aluminium as boat building materials, their merits and demerits. Cost of construction of small boats with different materials.

Curriculum Objectives

- To get an idea about different materials used for the construction of boats – wood, steel, ferrocement, fiberglass reinforced plastic, aluminium and marine plywood.
- To develop the skill to conduct a comparative study about different boat building materials and to understand its merits and demerits.
- To acquire knowledge about estimation of construction cost of boats built with different materials.

Suggested Activities

- Field visit to boat building yards or landing centers, collection and identification of different boat building materials.
- Conduct survey in landing centers and boat building yards to collect data from fishermen and boat builders on merits and demerits of different boat building materials. Prepare a report of this survey and conduct a group discussion on it.

- Conduct a survey on the construction cost of boats using different types of materials.

Points for discussion

- Mention the commonly used wood for boat building, their trade name and scientific name.
- Mention important characteristics of boat building timbers.
- Discuss on timbers commonly used for catamaran.
- Mention the common grades of steel used for boat construction.
- Discuss what is ferrocement, its components.
- Discuss what is FRP, chopped strand, wovenmat, catalyst and accelerator.
- Mention properties of FRP laminates.
- Discuss marine aluminium alloys.
- Discussion on comparative study of each materials with their merits and demerits.
- Analysis on construction cost with different materials.

Additional information

- Mention the types and significance of marine plywoods in boat building industry.

Unit V

Boat building materials

Objectives	Concepts or Ideas	Process Skill	Activities	Learning Aid	Evaluation
<ul style="list-style-type: none"> To get an idea about different materials used for the construction of boats. 	<ul style="list-style-type: none"> Commonly used wood for boat building, their trade name and scientific name. Characteristics of boat building timbers. Timbers commonly used for cattamaran. Different grades of steel, FRP, ferro cement aluminium alloy and marine plywood types and importance. 	<ul style="list-style-type: none"> Observation Identification Differentiation 	<ul style="list-style-type: none"> Field trip to boat building yard or landing centers and collection and identification of different boat building materials. Discussion 	<ul style="list-style-type: none"> Specimen Reference books 	<ul style="list-style-type: none"> Active participation Observation Ability to collect sufficient and relevant specimens Recording of observation
<ul style="list-style-type: none"> To develop the skill to conduct a comparative study about different boat building materials and to understand their merits and demerits. 	<ul style="list-style-type: none"> Comparative study of each material with their merits and demerits. 	<ul style="list-style-type: none"> Data collection Presentation skill 	<ul style="list-style-type: none"> Report preparation on the comparative study of different boat building materials from the data collected from the field visit. Report preparation on merits and demerits of boat building material after conducting a survey to fish landing centres and boat building yards collecting data from fishermen, boat builders and conduct a group discussion. 	<ul style="list-style-type: none"> Reference books Notes/reports prepared during field visits. 	<ul style="list-style-type: none"> Active participation Observation Ability to prepare the report (Sequence in the presentation of the concepts, authenticity and clarity of ideas/views/concepts)

Objectives	Concepts or Ideas	Process Skill	Activities	Learning Aid	Evaluation
<ul style="list-style-type: none"> To acquire knowledge about the estimation of cost of construction of boats using different materials. 	<ul style="list-style-type: none"> Analysis of construction cost. 	<ul style="list-style-type: none"> Data collection Analysis skill Inferring 	Project - Survey on construction cost of boat built with different types of materials.	<ul style="list-style-type: none"> Reference notes Survey reports 	<ul style="list-style-type: none"> Ability for datacollection, analysis and preparation of report. Presentation of the report

Unit VI

Common Fishing Methods

Introduction

Fishing gear and fishing methods are two identical terms but are not similar. Fishing gear is the tool used for catching the fish while the fishing method denotes fishing activities with or without gear. There are endless varieties of fishing gears used all over the world. Hence for studying this a compact, reliable and systematic classification is needed.

In this chapter we intend to classify various fishing methods based on operation and features. As a consequence of classification study, through learning activities, the students can acquire knowledge about the selection of gear according to various parameters.

Syllabus

Traditional fishing methods: Line fishing (hand lines, drop lines, long lines, troll lines, pole and line), stationery nets (stake nets, dip nets,

gill nets, chinese nets) encircling nets (seine nets, purse-seining), trawl nets (beam trawl, otter trawl, different types of trawling) deep sea trawlers and deep sea trawling.

Curriculum Objectives

- To acquire an idea about the classification of fishing methods – Von Brandt classification.
- To understand the operational methods of different trawl nets, seine nets, gill nets and lines.

Suggested Activities

a) Fishing methods classification

- Discussion with demonstration of various gears.
- Model construction of various fishing gears.

Points for Discussion

- Mention briefly about fishing without gear, wounding gears, stupefying device, lines, fish traps, aerial traps, bag nets, dragged gear, seine nets, surrounding nets, driving nets, lift/dipnets, falling gear, gill net, tangle nets, harvesting machines.

b) Fishing Operations

- On-board training – On different fishing boats.
- Display of video clippings of different fishing operations.
- Working model demonstrations and discussion.

Points for discussion

- Mention different types of trawling – pelagic, mid water, bottom, beam trawling, otter trawling, outrigger trawling, side

trawling, stern trawling, one boat trawling, twin trawling.

- Seine nets – Shore seining, boat seining.
- Gill nets – stationary, drift nets, and trammel nets.
- Lines – Pole and line, troll line, hand line, long line.

Additional information

- Mention on other classifications – A.C. Hardy, Umali, FM Davis, ISSCFG (International Standard Statistical Classification of Fishing Gears.)
- Commonly used fishing gears in Kerala with special reference to locally used gears; Environment friendly fishing gears.

Assignments – Suggested

- Model construction of various fishing gears.

Unit VI

Common Fishing Methods

Objectives	Concepts or Ideas	Process Skill	Activities	Learning Aid	Evaluation
<ul style="list-style-type: none"> To acquire an idea about the classification of fishing methods. 	<ul style="list-style-type: none"> Classification of fishing gears (based on Von Brandt Classification.) 	<ul style="list-style-type: none"> Observation Communication Model construction Classification 	<ul style="list-style-type: none"> Discussion with demonstration of various fishing gears. Assignment model construction of various fishing gears. 	<ul style="list-style-type: none"> Fishing gears 	<ul style="list-style-type: none"> Based on model constructed and differentiating capacity evaluation can be done. Participation in discussion Ability to substantiate his own ideas and views. Neatness and timely submission.
<ul style="list-style-type: none"> To understand the operational methods of trawl nets, seine nets, gill nets and lines. 	<ul style="list-style-type: none"> Idea about different types of trawling Pelagic Mid water Bottom Beam Outrigger Side Stern One boat and Twin trawling Seine nets Shore seine Boat seine Purse seine Gillnet Stationary Drift Lines Pole and line Trawl line Hand line Long line Trammel net 	<ul style="list-style-type: none"> Observation Application Inferring 	<ul style="list-style-type: none"> On board training on different fishing crafts. Video display on different fishing operation Model demonstration 	<ul style="list-style-type: none"> VCD Models 	<ul style="list-style-type: none"> Participation in training Understanding ability Discipline and neatness in work Basic interest Self reliance Quality and quantity of work Observation Attitude and commitment Timely submission

Unit VII

Gear Materials

Introduction

By now the students will have acquired knowledge on the different types of fishing methods and gears common in the world. The efficiency of a fishing gear depends to a very great extent on the materials used for its construction. Here we discuss on the different types of gear materials and their properties.

In addition to gear materials we also discuss various fishing accessories used in several fishing activities.

Syllabus

Materials used and general concepts.
Natural : Cotton, hemp, coir, jute, manila, sisal,
synthetic: - Nylon, polypropylene, poly ethylene
(monofilament, multifilament, tape, spun).
Natural, synthetic and wire ropes-different types
of hooks. Floats, sinkers and baits.

Curriculum Objectives

- To understand and differentiate natural and synthetic fibres used for making gear.
- To develop skill to identify different gear accessories such as hooks, floats, sinkers, baits.

Suggested Activities

- Collection and identification of different gear materials – natural and synthetic – from gear material shop.
- Visit to a gear material shop for understanding trade names of gear materials and specifications and types of fishing accessories.
- Demonstration and identification of different gear accessories.

Points for discussion

- Mention Natural fibres – Plant and Animal origin, Types of plant fibres (leaf, fruit, seed, bast fibres).
- Mention synthetic fibres – poly condensation compound (PA, PES) Polymeric compound (PVA, PVC), Poly additive compounds (PE, PP), Mixed polymers (Poly vinylidene chloride.)

- Discuss different forms of fibres (Monofilament, multifilament, split fibres and tapes.)
- Discuss the materials and types used for hooks, floats, sinkers, baits.

Additional information

- Mention about shackle, thimble, swivel, bouys, anchors, net sonde, TED-Turtle excluding devices.

Unit VII

Gear Materials

Objectives	Concepts or Ideas	Process Skill	Activities	Learning Aid	Evaluation
<ul style="list-style-type: none"> To understand and differentiate natural and synthetic fibers used for making gear. 	<ul style="list-style-type: none"> Idea about natural fibres. (Plants animal origin) Synthetic fibres Poly condensation Poly meric Polyadditive Mixed polymers Different forms of fibers Monofilament Multi filament Split fibres 	<ul style="list-style-type: none"> Observation Identification 	Visit to a gear material shop for <ul style="list-style-type: none"> Collection and identification of gear materials and understanding the trade names of various gear materials. 	<ul style="list-style-type: none"> Gear materials Reference books 	<ul style="list-style-type: none"> Ability to prepare notes on observation and identification skill
<ul style="list-style-type: none"> To develop a skill to identify different gear accessories such as hooks, floats, sinkers, bait. 	<ul style="list-style-type: none"> Types of hooks, float, Sinkers, baits, material and its purpose. 	<ul style="list-style-type: none"> Observation Identification 	Demonstration and identification of gear accessories. <ul style="list-style-type: none"> Visit to a gear material shop for collection and identification of gear accessories. 	<ul style="list-style-type: none"> Hook Float Sinker Baits 	<ul style="list-style-type: none"> Identification skill Observation skill

Unit VIII

Specification and Construction of Gear Materials

Introduction

A detailed account of different gear materials have been provided on the previous chapter. In this unit, essential information is provided on the specification and construction of gear materials. A detailed discussion about different yarn numbering system prevailing all over the world is also given in this unit. Discussions, demonstration and construction should be the main part of the learning activities which should be followed in this chapter. Plan the learning activities and provide such learning experiences to students so as to develop creativity, process skill and differentiation skill.

Syllabus

Twines and ropes. Numbering systems and specification. Preparation of twines and ropes twisting yarn, strand twines, ropes and braiding.

Curriculum Objectives

- To make a clear idea on the differences between fibre, yarn, twine and rope.
- To develop skill in differentiating different types of twists. (S,Z)
- To understand about the specification of yarns (yarn numbering system.)

Suggested Activities

- Discussion with demonstration of various types of ropes.
- Demonstrate different types – size, material – and conduct a discussion on the type of braiding, number of strands, type of material used.
- Demonstrate ropes of different twists and ask students to identify and differentiate.
- Construction of rope with different materials and by different twists.

- Familiarisation of conversion of yarn numbering system through conversion formulas and discussion.
- Discuss twists and brief about degree of twists, direction and types of twists – (S, Z)

Points for discussion

- Mention what is a fibre, yarn, twine and rope.
- Discuss combination and wire rope.
- Mention the different types of yarns (single, folded and braided yarns.)

- Describe direct and indirect yarn numbering systems.

Additional information

- Mention the use of core.

Unit VIII

Specification and construction of gear materials

Objectives	Concepts or Ideas	Process Skill	Activities	Learning Aid	Evaluation
<ul style="list-style-type: none"> To differentiate different types of twines and ropes. 	<ul style="list-style-type: none"> Idea on different types of fibres, yarn, twine and ropes. 	<ul style="list-style-type: none"> Observation Communication Inference 	<ul style="list-style-type: none"> General discussion with demonstration of various types of ropes (fibres, yarns, twines.) 	<ul style="list-style-type: none"> Fibre, yarn, twine, rope. 	<ul style="list-style-type: none"> Perfection in observation and ability of differentiation are evaluated.
<ul style="list-style-type: none"> To differentiate different types of twists. 	<ul style="list-style-type: none"> Identification of different types of twist. 	<ul style="list-style-type: none"> Observation Communication Application 	<ul style="list-style-type: none"> Demonstration of ropes of different twists and let them identify and differentiate construction of rope with different twist. 	<ul style="list-style-type: none"> Ropes of different twist. Fibres of different material 	<ul style="list-style-type: none"> Observation skill Differentiation Application skill
<ul style="list-style-type: none"> To develop a clear idea about yarn numbering system. 	<ul style="list-style-type: none"> Conversion of yarn numbering system through formulas. 	<ul style="list-style-type: none"> Mathematical approach Learning Communication 	<ul style="list-style-type: none"> Conversion with discussion and demonstration 	<ul style="list-style-type: none"> Formulas Reference books 	<ul style="list-style-type: none"> Problem solving ability is evaluated.

Unit IX

Properties of Gear Materials

Introduction

It is essential to know the properties of different types of gear materials prior to their selection for construction of fishing gears. So a thorough knowledge of the properties is necessary for a student studying fishing gears. Till now the pupils have attained an awareness in the types of gear materials and their specifications. In this chapter, we intend to familiarize the various physical properties of gear materials the resisting property of gear materials to various weather conditions and to different chemicals during gear operations. Further this chapter also aims at the student to develop the skill in selecting gear materials for different fishing gears.

Syllabus

Diameter, strength, moisture content, sinking speed, resistance to atmosphere. Reaction with materials of contact.

Curriculum Objectives

- To make an awareness of various physical properties of gear materials.
- To make an awareness of the reaction of gear materials to various chemicals – acid, alkali, oils.

Suggested Activities

- Discussion with demonstration – conduct an experiment to analyse different properties like density – density can be measured by finding the sinking speed of different materials Breaking strength – by using special machines known as breaking strength testers or dynamo meters (if provided.)

Water absorption – to check ability of different materials to absorb water when immersed. Weather resistance – In different

conditions like rain, light, wind. Diameter – using screw guage.

- Discussion with demonstration – on resistance to chemicals like acid, alkali, oils – conduct experiments with different gear materials and to have a comparative study of the results.

Points for discussion

- Discuss physical properties like resistance to weathering, density, diameter, breaking strength, sinking speed, water absorption.

- Mention the damages caused by chemicals like acid, alkali, oil.

Additional information

- Discuss visibility, knot stability, elasticity, shrinkage.
- Mention various gear materials suitable for making different gears.

Unit IX

Properties of Gear Materials

Objectives	Concepts or Ideas	Process Skill	Activities	Learning Aid	Evaluation
<ul style="list-style-type: none"> To understand the physical properties of gear materials. 	<ul style="list-style-type: none"> Density Breaking strength Water absorption Weather resistance Diameter 	<ul style="list-style-type: none"> Communication Observation Experimental skill 	<ul style="list-style-type: none"> Discussion Demonstration To conduct an experiment to analyse different properties like density, breaking strength, water absorption and weather resistance. 	<ul style="list-style-type: none"> Gear material, water, breaking strength testers or dianomometer, screw guage 	<ul style="list-style-type: none"> Perfection in observation notes. Handling of apparatus Active participation Self reliance
<ul style="list-style-type: none"> To develop knowledge about the ability of gear material to withstand corrosion. 	Reaction with <ul style="list-style-type: none"> Acid Alkali Oils 	<ul style="list-style-type: none"> Experimental skill Observation Inference 	<ul style="list-style-type: none"> Discussion with demonstration Conduct experiments with gear materials by immersing it in chemicals like acid, alkali and oil and make a comparative study of the result. 	<ul style="list-style-type: none"> Gear materials (natural, synthetic) Acid Alkali Oil 	<ul style="list-style-type: none"> Active participation Observation Ability in organising Documentation Result review

Unit X

Fabrication of Webbings

Introduction

After studying the types, specifications and properties of gear materials, next step is to familiarize the fabrication techniques of nets. For this purpose this chapter deals with different types of knots, joints, braiding, shaping methods – through cutting tailoring methods.

Syllabus

Different types of knots, seaming, joining, braiding and creasing, cutting, tailoring, mounting and assembly.

Curriculum Objectives

- To develop the skill in making different types of knots used for various purposes.
- To develop the skill in fabrication of netting especially on braiding, creasing, bating, cutting (T, N, B Cuts), joining, mounting and rigging and understanding their uses.

Suggested Activities

- Demonstration and practice to make different knots (reef knot, clove hitches, rolling hitches, bowline, sheet bend, double sheet bend, fisherman's knot, overhand knot, sheep shank, butterfly knot.)
- Demonstration and practice of braiding of nets with different knots (single sheet bend and double sheet bend.)
- Demonstration and practice of shaping of nets by creasing, bating, cutting/tailoring and fly meshing.
- Demonstration and practise of joining, mounting and rigging of net.

Points for discussion

- Briefly describe different types of knots and their uses – reef knot, single sheet bend, double sheet bend, bow line, fisherman's

knot, sheep shank, figure of eight, butterfly knot.

- Discuss netting – knotless and knotted netting, direction of netting and measurement of mesh size.
- Mention shaping of net by creasing, bating and cutting/tailoring.
- Mention joining – seaming, sewing, mounting – reaving, stapling and rigging.

Additional information

- Mesh size measurements can be practiced by measuring the total length of 4 sides, or measuring from the centre of knot to the centre of next diagonally opposite knot.
- Mention direction of netting, direction of braiding, row, mesh, selvages.

Unit X

Fabrication of Webbing

Objectives	Concepts or Ideas	Process Skill	Activities	Learning Aid	Evaluation
<ul style="list-style-type: none"> To understand different knots. 	Different knots <ul style="list-style-type: none"> Reef knot Overhand knot Bow line Sheet bend Double sheet bend Fishermans knot Sheepshank Clove hitch Rolling hitch Butterfly knot 	<ul style="list-style-type: none"> Observation Application skill 	<ul style="list-style-type: none"> Demonstration of different knots 	<ul style="list-style-type: none"> Ropes of suitable size. Pictures 	<ul style="list-style-type: none"> Active participation and performance are evaluated.
<ul style="list-style-type: none"> To develop the skill in fabrication of netting. 	Braiding of nets with differnt knots. Shaping of net by creasing <ul style="list-style-type: none"> Cutting Bating Fly meshing Joining and rigging of nets.	<ul style="list-style-type: none"> Observation Application Handling of tools 	<ul style="list-style-type: none"> Demonstration and practising of different knots Braiding of nets Shaping Joining Rigging of nets. 	<ul style="list-style-type: none"> Twine of suitable size. Gauge Needle Stand Scissors Floats sinkers 	<ul style="list-style-type: none"> Active participation Performance Handling efficiency Mathematical ability

Unit XI

Understanding the Net

Introduction

Students have already acquired the skill in making nets with different types of knots, joining, cutting, braiding, creasing and bating techniques. This chapter deals with understanding assembling of net panels, and repair of net panels by mending. This can be attained through repeated practices.

Syllabus

Assembling of the net and reading the given design of a net. Mending nets.

Curriculum Objectives

- To develop the skill in assembling a net panel with specific dimensions.
- To develop the skill in identifying various tears and to repair damaged net by mending.

Suggested Activities

- Students are asked to make different net panels having specific dimension and assembling them accordingly.
- Enable the students to identify different tears – simple, complex in damaged nets through demonstration and discussion.
- Make students to repair the nets by mending methods.

Points for discussion

- Mention briefly hanging co-efficient (horizontal and vertical.)
- Mention briefly mounting of net.
- Discuss different types of tears – simple, horizontal, vertical, oblique, complex.
- Mention mending methods and their significance.

Unit XI

Understanding the Net

Objectives	Concepts or Ideas	Process Skill	Activities	Learning Aid	Evaluation
<ul style="list-style-type: none"> To develop the skill in assembling a net panel. 	<ul style="list-style-type: none"> Idea about assembling nets. 	<ul style="list-style-type: none"> Observation Performance Handling efficiency 	<ul style="list-style-type: none"> Let them make different net panels having specific dimension and assemble them accordingly 	<ul style="list-style-type: none"> Twine Needle Guage Stand Scissors Float Sinkers 	<ul style="list-style-type: none"> Participation Handling efficiency Applicaicon skill
<ul style="list-style-type: none"> To identify various tears and their repair. 	Mention different types of tears <ul style="list-style-type: none"> simple vertical oblique complex and various mending methods and their significance. 	<ul style="list-style-type: none"> Observation Application 	<ul style="list-style-type: none"> Demonstration and discussion Let them identify different tears. Repair the nets by mending method. 	<ul style="list-style-type: none"> Net panel Scissors Needle Guage Stand Twine. 	<ul style="list-style-type: none"> Participation Neatness and performacne can be evaluated

Section III

Sample Questions

- Note the relationship between the first two words and suggest a suitable word for the fourth position.
 - Crustacean : Prawn :: Teleost :
 - Liftnet : Chinese net :: Surrounding net :
 - Natural fibre : Cotton : : Synthetic fibre :
- Mark the maritime states in the outline map of India choosing from the following list.
Kerala, Punjab, Karnataka, Assam, Haryana, Gujarat, Uttar Pradesh, Andhra Pradesh.
- Find out the odd man out from the following.
 - Purse seine, Trawl-net, beach seine, boat seine.
 - Sardine, Shark, Mackerel, Tuna.
- Match the following

Wood	Traditional Craft
PP, PE	Shaping of net
Creasing	Boat building material
Fibre	Floats in water
Cattamaran	Yarn

5. Arrange the steps for construction of a netting yarn from fibres.
(Folded yarn, fibres, cabled yarn, single yarn)
6. What suggestion will you give to a person in case of selecting a suitable and economical boat building material and justify your suggestions.
7. During a visit to a harbour with your friend express how you help him to differentiate bony fishes and elasmobranches with their external characters.
8. How will you explain to a friend to identify different mechanized boats.
9. During a visit to a sea shore a group of people were found pulling a large long net from two sides towards shore.
 - a) What type of fishing method is it?
 - b) Name the gear used?
 - c) Which type of fishes are caught by this type of fishing method?
10. You were asked to conduct a burning test of a net material, when burned it shrinks, then curled, melts and burned with light flame, also drops of melting drip down. Also the smoke smells similar to burning paraffin.
 - a) What type of material is it?
 - b) Do these material absorb water?
11. First column contains common name of fishes, second column their scientific name and third column with their family.

Common Name	Scientific Name	Family
1. Scampy	Megalaspis cordyla	Mytilidae
2. Karikkadi	Rastralliger kanagurta	Penaeids
3. Mackerel	Sardinella longiceps	Palecmonids
4. Mussel	Macrobrachium rosenbergi	Scombridae
5. Oil sardine	Parapenaeopsis stylifera	Carangidae

Suggested Topics

1. On Assignment

- a) Map preparation of India showing maritime states, major harbours and ports of India.
- b) Chart Preparation of India showing various traditional crafts used in Indian coast.
- c) Impact of the use of tracol nets on the catch of traditional fishermen.
- d) Conversion of yarn numbering system (from direct to indirect system.)
- e) Prepare an assignment on different types of boat building materials.
- f) Physical and chemical properties of different gear materials.
- g) Prepare an assignment on different fishing methods practised.
- h) Different types of tears and mending.
- i) Prepare an assignment on different gear accessories.

2. On seminar

- a) Seminar on tracol ban – is it a bon or bane.
- b) Effect of tsunami on fish catch.

- c) Suitability of various gear materials for making different fishing gears.
- d) Impact of the use of tracol-net on the catch of the traditional fishermen.
- e) Part played by Kerala in mechanization.
- f) Different stages of mechanization of traditional crafts.
- g) Impact of sea wall.

3. Project

- a) Landing of economically important species of fish, prawns and cephalopods within 5 km of nearby coastal area during a short period.
- b) Measure to be taken to improve the catch of traditional fishing craft.
- c) Conduct a survey on the construction cost of boats using different types of materials.
- d) Relationship between mesh size and size of the fishes being caught.
- e) Comparison of catch and earnings of traditional crafts and mechanised boats.

Reference

1. Fishing craft and gear technology - Latha Shenoy and Y. Sreekrishna.
2. Modern Fishing Gear Technology - Shahul Hameed M.A, M.R. Bhoopendranath.
3. Marine Fisheries. Bal. DV and Virabhadra Rao.
4. A text book of Fish, Fisheries and Technology - Biswas K.P.
5. Fish and Fisheries of India - V.G. Jhingran.
6. Fish and Fisheries - Yadav B.N.
7. A Census of Artisanal Marine Fishing Fleet of Kerala 1998 - A publication of SIFFS, Kerala.
8. Marine Fisheries of India - Dr. S. Shanbhogue.
9. Fishes of India Vol. I & II - Arun Jhingaran.

Internet Sites

1. listserv@searn.sunet.se
2. http://dir.yahoo.com/science/agriculture/aquaculture/fisheries/institutes/college_and_university/_departments.
3. <http://www.webscope.com/fishhelp/info.html>.