

**Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,
CHHATRAPATI SAMBAHAJINAGAR.**



NAAC- 'A' Grade

CIRCULAR NO.SU/ Sci./College/NEP-2020/73/2025

It is hereby inform to all concerned that, the syllabi prepared by the Board of Studies/ Ad-hoc Boards/Committee and recommended by the Dean, Faculty of Science & Technology, the Academic Council at its meeting held on 09 May 2025 has been accepted **the following B.Sc. Course Structure & Curriculum** under the Faculty of Science & Technology as per National Education Policy - 2020 run at the Affiliated Colleges of Dr. Babasaheb Ambedkar Marathwada University as appended herewith.

Sr.No.	Courses	Semester
1	B.SC. PHYSICS	III RD AND IV TH SEMESTER
2	B.SC. ELECTRONICS	III RD AND IV TH SEMESTER
3	B.SC. MATHEMATICS	III RD AND IV TH SEMESTER
4	B.SC. INDUSTRIAL CHEMISTRY	III RD AND IV TH SEMESTER
5	B.SC. AGROCHEMICAL AND FERTILIZE	III RD AND IV TH SEMESTER
6	B.SC. HORTICULTURE	III RD AND IV TH SEMESTER
7	B.SC. BIOCHEMISTRY	III RD AND IV TH SEMESTER
8	B.SC. BOTANY	III RD AND IV TH SEMESTER
9	B.SC. ZOOLOGY	III RD AND IV TH SEMESTER
10	B.SC. BIOTECHNOLOGY	III RD AND IV TH SEMESTER
11	B.SC. MICROBIOLOGY	III RD AND IV TH SEMESTER
12	B.SC. DIARY SCIENCE AND TECHNOLOGY	III RD AND IV TH SEMESTER
13	B.SC. STATISTICS	III RD AND IV TH SEMESTER
14	B.SC. COMPUTER SCIENCE	III RD AND IV TH SEMESTER
15	B.SC. GEOLOGY	III RD AND IV TH SEMESTER
16	B.SC. CHEMISTRY	III RD AND IV TH SEMESTER
17	B.SC. ANALYTICAL CHEMISTRY	III RD AND IV TH SEMESTER
18	B.SC. POLYMER CHEMISTRY	III RD AND IV TH SEMESTER
19	B.SC. ENVIRONMENTAL SCIENCE	III RD AND IV TH SEMESTER
20.	B.SC. FISHERIES SCIENCE	III RD AND IV TH SEMESTER

21.	B.SC. HOME SCIENCE	III RD AND IV TH SEMESTER
22.	B.SC. DATA SCIENCE	III RD AND IV TH SEMESTER
23.	B.SC. INFORMATION TECHNOLOGY	III RD AND IV TH SEMESTER
24.	B.SC. NETWORKING AND MULTIMEDIA	III RD AND IV TH SEMESTER
25.	B.SC. AUTOMOBILE TECHNOLOGY	III RD AND IV TH SEMESTER
26.	B.SC. FORENSIC SCIENCE	III RD AND IV TH SEMESTER
27.	B.SC. FORENSIC SCIENCE & CYBER SECURITY	III RD AND IV TH SEMESTER
28.	B.SC. NON-CONVENTIONAL & CONVENTIONAL ENERGY	III RD AND IV TH SEMESTER
29.	B.SC. CLINICAL LABORATORY SCIENCE	III RD AND IV TH SEMESTER
30.	BACHELOR OF COMPUTER APPLICATION	III RD AND IV TH SEMESTER

This is effective from the Academic Year 2025-26 and onwards.

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Chhatrapati Sambhajanagar
-431 004.

Ref.No. SU/Sci./2025/ 827-29
Date:- 26/05/2025

*
*
*
*
*
*
*
*
*

**Deputy Registrar,
Syllabus Section.**

Copy forwarded and necessary action to :-

- 1] **The Principal of all Affiliated Colleges,**
Dr. Babasaheb Ambedkar Marathwada University,
- 2] **The Director, University Network & Information Centre, UNIC, with a request to upload this Circular on University Website.**

Copy to :-

- 1] The Director, Board of Examinations & Evaluation, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajanagar.

Dr. Babasaheb Ambedkar Marathwada University

Chhatrapati Sambhajinagar- 431001



B.Sc. Degree Programme

(Three Year / Four Years (Hons) / Four Years (Hons with Research))

**Course Structure and
Syllabus for B.Sc. II_{nd} year**

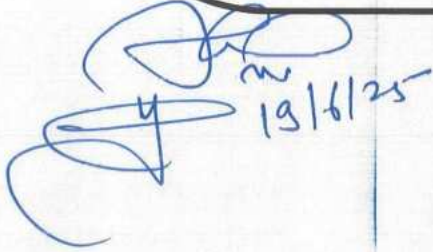
(Revised)

(AS PER NEP-2020)

Subject (Major): Fishery Science

Effective from 2025-26


Chairman
BOS in Fisheries


19/6/25



Details of the Board of Studies Members in the subject Fishery Science under the faculty of Science & Technology of Dr. Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar

1.	Dr. Dnyanesh N. Chinte. Shikshan maharshi Dnyandeo Mohekar College, Kalamb, Dist- Dharashiv	(Chairman)
2	Dr.A.B.Khodke Department of Fishery Pratishthan Mahavidyalaya, Paithan.	Member
3.	Dr.Sameer Bhimrao Patil , Department of Fisheries, Art's, Science and Commerce College, Naldurga, Dist.-Dharashiv.	Member
4.	Dr.Hemant Kamalakar Bhagwan , Shikshanmaharshi Dnyadeo Mohekar College, Kalamb, Tq-Kalamb, Dist Dharashiv	Member
5	Dr.Shashikala L. Bhalkare , Yashwantrao Chavan College, Tuljapur, Tq.Tuljapur, Dist. Dharashiv.	Member
6.	Dr. Dnyanoba Kasab , Department of Fisheries, Pratishthan College, Paithan, Dist- Chhatrapati Sambhajinagar	Member
7.	Dr.Shivaji Dnyanaba Jetithor , Yashwantrao Chavan College, Tuljapur, Tq. Tuljapur, Dist. Dharashiv.	Member
8.	Dr.Sunil Ahirrao . Shivaji College, Parbhani.	Member
9.	Shri.Dangre Rajendra , Assistant Commissioner Fisheries, Ahemadnagar,	Member
10	Prof. Jivan P. Sarwade , Arts, Science & Commerce College, Indapur, Tq-Indapur, Dist- Pune.	Member
11.	Dr.Somnath Ramchandra Yadav , Fisheries Science College, Udgir, Dist- Latur.	Member

PREFACE

As we stand on the threshold of a new era in education, the dawn of the National Education Policy 2020 illuminates our path toward a holistic, inclusive, and progressive educational landscape. The Bachelor of Science (B. Sc.) curriculum outlined herein reflects the ethos and aspirations of this transformative policy, aiming to equip learners with the knowledge, skills, and values necessary to thrive in the dynamic world of the 21st century.

At its core, the National Education Policy 2020 envisions an educational framework that is learner-centric, multidisciplinary, and geared towards fostering creativity, critical thinking, and innovation. It emphasizes the integration of knowledge across disciplines, breaking down traditional silos to encourage holistic understanding and application of concepts. The Bachelor of Science (B. Sc.) curriculum embodies these principles by offering a diverse array of courses spanning various scientific domains, while also incorporating interdisciplinary studies to nurture well-rounded graduates capable of addressing complex challenges with agility and insight.

Furthermore, the curriculum is designed to promote experiential learning, research, and hands-on exploration, recognizing the importance of practical engagement in deepening understanding and cultivating real-world skills. Through laboratory work, field experiences, internships, and project-based learning opportunities, students will have the chance to apply theoretical knowledge in practical settings, develop problem-solving abilities, and cultivate a spirit of inquiry and discovery.

Integral to the National Education Policy 2020 is the commitment to inclusivity, equity, and access to quality education for all. The Bachelor of Science (B. Sc.) curriculum reflects this commitment by embracing diversity in perspectives, backgrounds, and experiences, and by fostering an inclusive learning environment where every student feels valued, supported, and empowered to succeed.

Moreover, the curriculum emphasizes the cultivation of ethical values, social responsibility, and global citizenship, instilling in students a sense of accountability towards society and the environment. By integrating courses on ethics, sustainability, and social sciences, the Bachelor of Science (B. Sc.) program aims to produce graduates who are not only proficient in their respective fields but also compassionate, ethical leaders committed to making a positive impact on the world.

As we embark on this journey of educational transformation guided by the National Education Policy 2020, the Bachelor of Science (B. Sc.) curriculum stands as a testament to our collective vision of a more equitable, inclusive, and enlightened society. It is our hope that through rigorous academics, innovative pedagogy, and unwavering dedication to excellence, we can inspire the next generation of scientists, scholars, and change-makers to realize their full potential and contribute meaningfully to the advancement of knowledge and the betterment of humanity.

**Structure of B. Sc. (Three / Four Years Honours / Honours with Research Degree)
Programme with Multiple Entry and Exit Options**

Subject (Major): Fishery Science

B.SC.SecondYear:3rd Semester

Course Type	Course Code	Examination Code (to be given respective BOS)	Course Name	Teaching Scheme Hrs./week		Credit Assigned		Total Credits
				Theo ry	Practi cal	Theo ry	Practical	
Major (Core) Mandatory DSC	FIS/DSC/T/201	SAC00112013 T	Freshwater Fish breeding technique and hatcheries	2	-	2	-	2+2+2+2=08
	FIS/DSC/T/202	SAC00112023 T	Fundamentals of Aquaculture	2	-	2	-	
	FIS/DSC/P/221	SAC00112213 P	Practical based on the FIS/DSC/T/201	-	4	-	2	
	FIS/DSC/P/222	SAC00112223 P	Practical based on the Fish/DSc/T/202	-	4	-	2	
Minor Choose any one from pool of courses) It from different discipline of the same faculty	FIS/DSC/MT200	SCC0012013T	A) Culture of shellfishes Or B) Aquatic Ecology	2	-	2	-	2+2 = 4
	FIS/DSC/MP200	SCC00112013 P	Practical based on FIS/DSC/MT201	2	-	2	-	
Generic / Open Elective (GE/OE) Choose any one from pool of courses) It should be chosen Compulsorily from the faculty other than that of Major	FIS/GE/3 T	SDC00112013 T	Manufacturing of organic fertilizers	2	-	2	-	2
VSC (Vocational Skill Courses) (Choose any one from pool of courses)	VSC/T/200	SEC00112013T	1) Manufacturin g of fish byproducts	1	-	1	-	1+1= 2
	VSC/T/201	SEC00112023T	2) Freshwater Fish production Technology	-	2	-	1	
AEC, VEC, IKS Ability Enhancement Course	FIS/VSC/P/226	SE333C001122 63P	Practical based on VSC/T/200	2	-	2	-	2+2=04
	FIS/VSC/P/227	SEC00112273 P	Practical based on VSC/T/201	2	-	2	-	

OJT/ FP/CEP/CC/R P	CC-3/P		Cultural Activity NSS/NCC (Common for all faculty)	-	4	-	2	02
				15	1	15	07	22 Credits

Minor Courses for other Discipline

SUB/Mn/T/200: This is a 2-credit theory course to be designed for other discipline

SUB/Mn/T/201: This is a 2-credit theory course to be designed for other discipline

Generic/Open Elective Courses for other faculty Generic/Open Elective Courses for Other Faculty:

1. Manufacturing of organic fertilizers.

**Dr. Babasaheb Ambedkar Marathwada University
Chhatrapati Sambhajinagar- 431001**

FIS/DSC/T/201: Freshwater Fish Breeding Technique and Hatcheries

Total Contact Hours: 30 Hrs.

Total Credit :02

Maximum Marks: 50

Learning objectives of the course

1. Understand Fish Reproductive Biology – Learn about the breeding behavior, spawning cycles, and reproductive physiology of different freshwater fish species.
2. Apply Breeding Techniques – Gain hands-on experience in various breeding methods, including natural, hormone-induced, and artificial incubation techniques.
3. Manage Hatchery Operations – Develop skills in hatchery site selection, water quality management, larval rearing, and disease control to ensure high survival rates.

After completing this course, students will be able to:

1. Explain the Principles of Fish Reproduction – Understand the biological and environmental factors influencing freshwater fish breeding.
2. Demonstrate Various Breeding Techniques – Apply natural, hormone-induced, and artificial breeding methods to successfully propagate different freshwater fish species.
3. Manage Hatchery Operations efficiently – Implement best practices in water quality management, egg incubation, larval rearing, and disease prevention to maximize fish survival rates.

Module No.	Topics/Actual Contents of the Syllabus	Contact Hours
I	1) Breeding techniques A) Bundh breeding Types of bundhs – i) Wet bundhs ii) Dry bundhs iii) Modern bundhs B) Artificial fertilization by stripping C) Induced breeding by hypophysation i) Definition iii) Hormones responsible for induced breeding iv) Dissection and removal of gland v) Preservation and storage of pituitary gland vi) Preparation of gland suspension for injection and dosage. vii) Collection, rearing and selection of brooders vii) Synthetic hormones used in induced breeding	10
II	1) Fish seed trade and transport a) Classification of fish seed and identification techniques b) Different units of fish seed counting c) Fish seed trade in India d) Fish seed transportation system i) Open transportation system ii) Close transportation system e) Causes of mortality in transportation f) Use of chemicals in live-fish transportation g) Anaesthetic drugs use in transport h) Antiseptic and antibiotics used in transportation i) Technique of fish seed release.	10

III	(Hatcheries and management (Principle, structure and management)	
	a) Hatching happa b) Glass jar hatchery c) Bin hatchery d) CIFE D 80 model e) CIFE D 81 model f) Chinese hatchery	10

Dr. Babasaheb Ambedkar Marathwada University

Chhatrapati Sambhajanagar- 431001

Syllabus- FIS/DSC/T/202:

Fundamentals of Aquaculture

Total Contact Hours: 30 Hrs.

Total Credit: 02

Maximum Marks: 50

Learning outcomes of the course

- 1) Explain the Basic Principles of Aquaculture – Understand the scope, importance, and history of aquaculture in food production and the economy.
- 2) Identify and Differentiate Aquaculture Systems – Describe various aquaculture methods, including extensive, semi-intensive, and intensive systems.
- 3) Apply Water Quality Management Techniques – Analyze and maintain essential water parameters for optimal fish health and growth.

After completing this course, students will be able to:

- 1) Understand the Basic Concepts of Aquaculture – Explain the principles, history, and significance of aquaculture in global and local contexts.
- 2) Differentiate Various Aquaculture Systems – Identify and compare different types of aquaculture systems, such as freshwater, brackish water, and marine farming.
- 3) Manage Water Quality and Fish Health – Apply knowledge of water quality parameters, disease prevention, and nutrition to maintain a healthy aquatic environment.

Fundamentals of Aquaculture

Module No.	Topics/Actual Contents of the Syllabus	Contact Hours
I	1)Introduction 2)Importance, objective of aquaculture 3) Scope of aquaculture. 4) Comparison between agriculture, aquaculture and capture fishery.	10
II	1)Composite fish farming a) Principle of composite fish farming. b) Objectives of composite fish culture. c)Composite fish culture in India d)Stocking density e) Food & feeding	10
III	Integrated fish Farming a) Duck cum fish farming b) Pig cum fish farming c) Cattle cum fish farming. d)Paddy cum fish farming	10

Dr. Babasaheb Ambedkar Marathwada University

Chhatrapati Sambhajnagar- 431001

FIS/DSC/P/221 Practical based on –

The FIS/DSC/T/-201

After completing the practical sessions, students will be able to:

1) Demonstrate Water Quality Analysis – Measure and maintain essential water parameters such as temperature, pH, dissolved oxygen, and ammonia levels for optimal fish health. 2) Handle and Manage Aquaculture Systems – Operate and maintain different aquaculture setups, including ponds, tanks, and recirculating aquaculture systems (RAS)

Practical's

Module No.	Topics/Actual Contents of the Syllabus	Contact Hours
I	1) Preparation of pituitary gland extract and injection techniques, dosage of synthetic hormones to fishes for induced breeding. 2) Micro Technique Block Preparation section cutting and staining of tissue: a) Ovary b) Testis Intestine d) Stomach) Liver 3) Isolation of micro-organism (Bacteria & fungi) from fish (Streak plate method).	10
II	4) Staining monochrome staining and Gram's staining. 5) Identification of fresh fishes and spoiled fishes. 6) Study of fishing lines. (Any two). 7) Study of Fishing gears (Any five).	10
III	8) Study of fishing craft (Any five). 9) Identification, Classification and Characters of fresh water aquatic weeds. (any five) 10) Study of Organic and Inorganic fertilizers. (each two) 11) Fabrication of fishing boat model; Submission of Slides, Blocks. (Any one). 12) Preservation of locally available fishes by Ratnagiri method.	10

After completing the practical sessions, students will be able to:

1. Identify and handle common aquaculture species including freshwater and marine fishes, crustaceans, and mollusks.
2. Demonstrate basic aquaculture practices such as pond preparation, water quality testing, feeding, and health management of aquatic organisms.
3. Operate and maintain essential aquaculture equipment like aerators, water pumps, and filtration units, ensuring optimal culture conditions.

Module No.	Topics/Actual Contents of the Syllabus	Contact Hours
I	Water Quality Management & Analysis: Sampling Techniques: Collecting water samples from various aquaculture systems (ponds, tanks, raceways) using appropriate methods (e.g., grab samples, integrated samples). Physical Parameters: Measurement of temperature using thermometers. Measurement of transparency/turbidity using a Secchi disc. Measurement of total suspended solids (TSS) and total dissolved solids (TDS) using gravimetric methods or TDS meters.	10
II	II Chemical Parameters: Measurement of dissolved oxygen (DO) using: Winkler titration method. DO meter. Measurement of pH using: pH meter. pH indicator papers/solutions.	10
III	-Biological Parameters: Basic plankton identification (phytoplankton and zooplankton) using microscopes and identification keys. Observation of live plankton cultures. Estimation of primary productivity (e.g., light and dark bottle method - if time permits).	10

A) Culture of Shellfishes: Minor Course (Theory)

Module	Unit	Title of topic	Hrs
1		Unit-I: Culture of giant freshwater prawn	08
	1.1	Introduction to giant Freshwater Prawn - <i>Macrobrachium rosenbergii</i>	
	1.2	Biology of Freshwater Prawn: Morphology, Life cycle, food and feeding, reproduction	
	1.3	Seed production	
	1.4	Pond Culture of Freshwater Prawn - Pre-stocking management - Stocking management - Post stocking management	
2		Unit-II: Culture of Tiger Shrimp	07
	2.1	Introduction to Tiger Shrimp (<i>Penaeus monodon</i>)	
	2.2	Biology of Tiger Shrimp: Morphology, Life cycle, food and feeding, reproduction	
	2.3	Seed supply and resources	
	2.4	Pond Culture of Tiger Shrimp - Pre-stocking management - Stocking management - Post stocking management	
3		Unit-III: Culture of Mud crab	
	3.1	Introduction to mud crabs (<i>Scylla serrata</i> , <i>Scylla tranquebarica</i>)	
	3.2	Biology of mud crab: Morphology, Life cycle, food and feeding, reproduction	
	3.3	Seed resources and seed supply	
	3.4	Culture practices of mud crab - Pre-stocking management - Stocking management - Post stocking management	
	3.5	Fattening of crabs	
		Pearl culture	
	3.6	Introduction	
	3.7	Important pearl oyster species: <i>Pinctada maxima</i> , <i>P. fucata</i> and <i>P. margaritifera</i>	
	3.8	Biology of Pearl oyster: Morphology, Food and feeding, life cycle, reproduction	
	3.9	-pre stocking management -stocking management Post stocking management	
			15

Periods: 30

No. of Credits: 02

Marks: 50

Minor Course (Practical)**FIS/DSC/MP200: Practical based on (Culture of Shellfishes)**

Module	Unit	Title of Practical	Hrs
1	1	Morphological study: - Giant Freshwater prawn - Tiger Shrimp - Mud Crab - Pearl oyster	30
	2	Study of morphometric parameters of shellfishes.	
	3	Sexual dimorphism: - Giant Freshwater prawn - Tiger Shrimp - Mud Crab - Pearl oyster	
	4	Dissection of shellfish (Giant Freshwater prawn, Tiger Shrimp, Mud Crab, Pearl oyster) - Digestive system, reproductive system, Respiratory system, circulatory system	
	5	Study of lifecycle and Life stage: - Giant Freshwater prawn - Tiger Shrimp - Mud Crab - Pearl oyster	
	6	Study of pearl formation.	
	7	Study of fattening in mud crabs	
	8	Eyestalk ablation of shrimp	
	9	Study of implant for pearl culture	
	10	Preparation and submission of models (Morphology, life cycle, etc)	

Periods: 30**No. of Credits: 02****Marks: 50****B) Aquatic Ecology: Minor Course (Theory)**

Module	Unit	Title of topic	Hrs
1		Unit-I: River ecosystem	10
	1.1	Introduction to river ecosystem	
	1.2	Physico-chemical characteristics	
	1.3	Biotic factors-Producers, consumers and decomposer.	
	1.4	Zonation of river	
	1.5	Flora and fauna of rivers	
2		Unit-II: Lake Ecosystem	10
	2.1	Introduction to lake ecosystem	
	2.2	Physico-chemical characteristics	
	2.3	Biotic factors	
	2.4	Zonation of lake	
	2.5	Types and classification of lake	
	2.6	Flora and fauna of lake	
	2.7	Community of lentic system	
		-Producers -Consumers -Decomposers	
3		Unit-III: Marine ecosystem	10
	3.1	Introduction to marine ecosystem	
	3.2	Physico-chemical properties	
	3.3	Zonation of sea	
	3.4	Flora and fauna of sea	
	3.5	Food web and food chain	

Periods: 30

No. of Credits: 02

Marks: 50

Minor Courses (Practical)

Practical based on B) (Aquatic Ecology)

Module	Unit	Title of topic	Hrs
1	1	Estimation of DO from Water	30
	2	Estimation of CO ₂ of Water	
	3	Estimation of salinity of Water	
	4	Estimation of turbidity of Water	
	5	Estimation of pH of water	
	6	Identification of aquatic insects	
	7	Identification of aquatic weeds	
	8	Estimation of available nitrogen from soil	
	9	Estimation of available phosphorus from soil	
	10	Estimation of available potassium from soil	
	11	Estimation of pH of soil.	
	12	Preparation of permanent slides and identification of planktons	

**Dr. Babasaheb Ambedkar Marathwada University
Chhatrapati Sambhajinagar- 431001**

**Syllabus:
VSC-200 (Vocational Skill Courses)
Manufacturing of fish byproducts**

Total Credit: 01

(15 Theory Periods)

Learning Outcomes for the course Manufacturing of Fish Byproducts:

- 1) Understand the Importance of Fish Byproducts – Explain the significance of utilizing fish waste to create value-added products and reduce environmental impact.
- 2) Demonstrate Processing Techniques – Apply various methods for manufacturing fish byproducts such as fish meal, fish oil, fish silage, and gelatin.
- 3) Ensure Quality and Safety Standards – Analyze and implement hygiene, preservation, and quality control measures in fish byproduct processing.

After completing this course, students will be able to:

- 1) Understand the Utilization of Fish Byproducts – Explain the economic and environmental benefits of processing fish waste into value-added products.
- 2) Apply Processing Techniques – Demonstrate knowledge of manufacturing fish meal, fish oil, fish silage, fish gelatin, and other byproducts.
- 3) Implement Quality Control and Safety Measures – Follow industry standards for hygiene, preservation, and processing to ensure high-quality and safe fish byproducts

VSC-200 (Vocational Skill Courses)**Manufacturing of fish byproducts**

Module No.	Topics/Actual Contents of the Syllabus	Contact Hours
I	Introduction to Fish By-products 1) Definition and significance of fish by-products. 2) Scope and economic importance of fish by-product manufacturing. 3) Overview of fish processing waste and its potential uses.	05
II	Fish Meal and Fish Oil Production 1) Raw materials and selection of fish waste for fish meal and oil. 2) Processing methods: wet reduction, dry rendering, and hydrolysis. 3) Uses of fish meal in animal feed and aquaculture. 4) Applications and extraction of fish oil.	05
III	Fish Liver Oil and Fish Sauce 1) Extraction and processing of fish liver oil (e.g., cod liver oil). 2) Nutritional and medicinal benefits. 3) Traditional methods and commercial production of fish sauce.	05

Dr. Babasaheb Ambedkar Marathwada University

Chhatrapati Sambhajnagar- 431001

VSC-200 (Vocational Skill Courses)

Manufacturing of fish byproducts

Practical based on VSC/T/200

Learning outcomes for the course:

1. Hands-on Experience in Fish By-product Processing

Students will be able to demonstrate the step-by-step processing methods for producing various fish by-products like fish meal, fish oil, and gelatin.

2. Operation of Equipment and Machinery

Learners will gain practical skills in operating tools and machinery used in the manufacturing of fish by-products.

3. Quality Testing and Analysis

Students will be able to conduct basic quality tests on fish by-products to assess parameters like moisture content, oil yield, and protein levels.

4. Waste Management and Safety Practices

Learners will implement hygiene, safety, and waste management protocols during the by-product processing to ensure sustainable and safe practices.

After completing this course, students will be able to:

1. Identify and Classify Fish By-products

After completing this course, the student will be able to identify various fish by-products and understand their uses and commercial value.

2. Demonstrate Processing Techniques

After completing this course, the student will be able to perform practical steps involved in the extraction and preparation of fish by-products such as fish oil, fish meal, and collagen.

3. Operate and Maintain Processing Equipment

After completing this course, the student will be able to safely operate, clean, and maintain equipment used in the manufacturing of fish by-products.

4. Apply Quality Control and Safety Measures

After completing this course, the student will be able to conduct basic quality assessments and follow hygiene and safety practices during fish by-product processing.

Topics/Actual Contents of the Syllabus

Practical paper on Manufacturing Fish byproducts:

1. Preparation of Fish Meal from Fish waste
2. Extraction of Fish Oil
3. Production of Fish silage
4. Isolation of Gelatin from Fish skin and bones
5. Preparation of Fish Protein hydrolysate
6. Manufacturing of Fish Glue
7. Extraction of chitin and chitosen from selfish waste
8. Preparation of pearl Essence (Guinine crystals)
9. Production of Fish leather
10. Development of Fish based pet treats.

**Dr. Babasaheb Ambedkar Marathwada University
Chhatrapati Sambhajinagar- 431001**

**VSC-201(Vocational Skill Courses)
Freshwater Fish Production Technology-201**

Total Credit: 01

(15) Theory Periods

Learning Objective

- 1) Understand Freshwater Fish Farming Systems – Explain different aquaculture systems such as pond culture, cage culture, and recirculating aquaculture systems (RAS).
- 2) Apply Fish Rearing Techniques – Demonstrate knowledge of stocking, feeding, water quality management, and disease control for optimal fish growth.

After completing this course, students will be able to:

- 1) Explain Freshwater Aquaculture Systems – Understand various fish farming techniques, including pond culture, cage culture, and recirculating aquaculture systems (RAS).
- 2) Apply Effective Fish Rearing Practices – Manage stocking density, feeding, water quality, and disease control to enhance fish growth and survival rates.

Practical based on theory syllabus -VSC-202

Module No.	Topics/Actual Contents of the Syllabus	Contact Hours
I	1)Introduction of aquaculture 2)Topography 3) Analysis and maintenance of water quality	05
II	4)Analysis and maintenance of soil quality 5) Lay out plan of fish farm 6)Construction of different types of ponds	05
III	7) Management of fertilizers 8)Induced breeding technique 9) Fish seed identification technique	05

B.Sc. Second Year: 4th Semester

Course Type	Course Code	Examination Code (To be given by respective BoS)	Course Name	Teaching Scheme Hrs./week		Credit Assigned		Total Credits
				Theory	Practical	Theory	Practical	
Major (Core) Mandatory DSC	FIS/DS C/T/250	SAC00112504T	Indian Fisheries Mariculture	2	-	2	-	2+2+2+ =08
	FIS/DS C/T/251	SAC00112514T	Fish Pathology	2	-	2	-	
	FIS/DS C/P/276	SAC00112764P	Practical Based on FIS/DSC/T/251	-	4	-	2	
	FIS/DS C/P/277	SAC00112774P	Practical Based on FIS/DSC/T/250	-	4	-	2	
Minor (Choose any one from pool of courses) It from different discipline of the same faculty	FIS/Min-3/T/250	SCC00112504T	A) Preparation of Value-Added Products Or B) Fish Spoilage, Preservation and Quality issues	2	-	2	-	2+2 = 4
	FIS/Min-4/T	SCC0011254P	Practical Based on FIS/Min-4/T	2	-	2	-	
Generic / Open Elective (GE/OE) (Choose any one from pool of courses) It should be chosen compulsorily from the faculty other than that of Major	FIS/GE/4T	SDC00112504T	Fabrication and Maintenance of Aquarium	2	-	2	-	2

SEC (Skill Enhancement Courses) (Choose any one from pool of courses)	SEC/T/250	SEC0011250 4T	1. Manufacturing of Fishing nets	1	-	1	-	1+1=2
	SEC/T/251	SEC0011225 14T	2. Fish preservation and processing technology	-	2	-	1	
AEC, VEC, IKS Ability Enhancement Course	FIS/SEC/P/276	SEC0011276 4P	Practical Based on SEC/T/250	2	-	2	-	2
OJT/FP/CEP/CC/RP	FISH/SEC/P/277	SEC0011277 4P	Practical Based on SEC/T/251	-	4	-	2	2+2=4
	CC-4/P		(Fine/Applied/Visual/Performing Arts) (Common for all faculty)	-	4	-	2	
				16	12	16	06	22 Credits

Minor Courses for other Discipline

SUB/Mn/T/250: This is a 2-credit theory course to be designed for other discipline

SUB/Mn/T/251: This is a 2-credit theory course to be designed for other discipline

Generic/Open Elective Courses for other faculty Generic/Open Elective Courses for Other Faculty:

1. Fabrication and Maintenance of Aquarium

Detailed Illustration of Courses included in 3rd and 4th semester:

1) **Major (Core)** subject is mandatory.

FIS/DSC-5/T: This is a 2 credit theory course corresponding to Major (core) subject

FISH /DSC-6/T: This is a 2 credit theory course corresponding to Major (core) subject

FIS /DSC-7/P: This is a 2-credit practical course based on **FIS /DSC-5/T**

FIS /DSC-8/P: This is a 2-credit practical course based on **FIS /DSC-6/T**

FIS /DSC-9/T: This is a 2 credit theory course corresponding to Major (core) subject

FIS /DSC-10/T: This is a 2 credit theory course corresponding to Major (core) subject

FIS /DSC-11/P: This is a 2-credit practical course based on **FIS /DSC-9/T**

FIS /DSC-12/P: This is a 2-credit practical course based on **FIS/DSC-10/T**

2) **Minor Courses for Other Discipline:**

SUB /Min-1/T: This is a 2-credit theory course to be designed for other discipline

SUB/Min-2/T: This is a 2-credit theory course to be designed for other discipline

SUB/Min-3/T: This is a 2-credit theory course to be designed for other discipline

SUB /Min-4/T: This is a 2-credit theory course to be designed for other discipline

3) Generic / Open Elective (GE/OE): (Needs to be chosen (any two) from pool of courses available at respective college). **These courses should be chosen compulsorily from faculty other than that of Major.**

GE/OE-3/T: This is a 2-credit theory course should be chosen compulsorily from faculty other than that of Major.

GE/OE-4/T: This is a 2-credit theory course should be chosen compulsorily from faculty other than that of Major.

4) VSC (Vocational Skill Courses): Choose any one from pool of courses. These courses should be based on Hands on Training corresponding to Major (core) subject.

FIS /VSC-S3. A/T: This is a 1 credit theory course-based Hands-on Training corresponding to Major (core) subject.

FISH /VSC-3.B/T: This is a 1 credit theory course-based Hands-on Training corresponding to Major (core) subject.

FIS /VSC-4.A/P:: This is a 1 credit practical course based on **FIS/DSC-10/T**

FIS /VSC-4.B/P:: This is a 1 credit practical course based on **FIS /VSC-3.B/T**

5) SEC (Skill Enhancement Courses): Choose any one from pool of courses. These courses need to be designed to enhance the technical skills of the students in specific area.

FIS /SEC-3. A/T: This is a 1 credit theory course to enhance the technical skills of the students in specific area.

FIS/SEC-3. B/T: This is a 1 credit theory course to enhance the technical skills of the students in specific area.

FIS /SEC-4.A/P:: This is a 1 credit practical course based on **FIS /SEC-3.A/T**

FIS /SEC-4.A/P:: This is a 1 credit practical course based on **FIS /SEC-3.B/T**

6) AEC (Ability Enhancement courses): The focus of these courses should be based on linguistic and communication skills.

AEC-3/T: English

This is a 2 credit theory course based on linguistic proficiency.

AEC-4/T: Modern Indian Language (MIL-2) (Hindi/Marathi/Pali & Buddhism/Sanskrit/Urdu)

This is a 2 credit theory course based on linguistic proficiency. Students will have to choose one of the above mentioned languages.

7) VEC (Value Education Courses): Environmental Studies

VEC-2/T: Environmental Studies

This is a 2 credit theory course based on Environmental Studies.

8) FP: Field Project

FIS FP-1/P: This is a 2-credit course, should be corresponding to Major (core) Subject

9) CC (Curricular Courses): The courses such as Health and wellness, Yoga education, Sports and Fitness, Cultural activities, NSS/NCC, Performing Arts.

CC-3/P: Cultural Activity NSS/NCC

This is a 2 credit practical course based on Co-curricular activities. It will be common for all the faculty

CC-4/P: Fine/Applied/Visual/Performing Arts

This is a 2-credit practical course based on Co-curricular activities. It will be common for all the faculty

Dr. Babasaheb Ambedkar Marathwada University

Chhatrapati Sambhajinagar- 431001

FIS/DSC/T/250

Indian Fisheries and Mariculture

Credits:2 Marks 50

Hrs.30

Learning objectives of this course

- 1) Understand the Status of Indian Fisheries – Learn about the history, scope, and economic importance of inland, marine, and coastal fisheries in India.
2. Explore Mariculture Techniques – Study various mariculture practices, including cage culture, pen culture, and open-sea farming of marine species.
- 3) Analyze Fisheries Management and Policies – Understand government regulations, conservation strategies, and sustainable fisheries management practices in India.

After completing this course, students will be able to:

- 1) Explain the Status and Importance of Indian Fisheries – Describe the scope, diversity, and economic significance of inland, marine, and coastal fisheries in India.
- 2) Apply Mariculture Techniques – Demonstrate knowledge of cage culture, pen culture, and open-sea farming for sustainable marine fish production.
- 3) Understand Fisheries Management and Policies – Analyze government regulations, conservation measures, and sustainable fisheries practices in India.

. Indian Fisheries and Mariculture

Module No.	Topics/Actual Contents of the Syllabus	Contact Hours
I	Study of marine fisheries (classification, external feature, distribution, food, feeding & reproduction) 1) Sardine fishery. 2) Bombay duck fishery. 3) Mackerel fishery. 4) Sole fishery	10
	1) Hilsa fishery. 2) Pomfret fishery. 3) Mollusc fishery, (Cephalopod, Chunks). 4) Prawn fishery	
II	Unit – III -Mariculture 1) Prawn Culture. 2) Mussel Culture (Edible oyster) 3) Pearl oyster culture. 4) Seaweed culture.	10
III	Unit – IV -Important lakes and Estuarine fisheries of India 1) Hooghly- Malta estuary 2) Chilka lake 3) Pulicat lake 4) Kolleru lake.	10

Dr. Babasaheb Ambedkar Marathwada University

Chhatrapati Sambhajnagar- 431001

FIS/DSC /T/ 251-

FISH PATHOLOGY

Credits:2 Marks 50

Hrs.30

Learning objectives of this course

- 1) Understand Fish Diseases and Their Causes – Learn about bacterial, viral, fungal, and parasitic infections affecting fish health and productivity.
2. Identify Symptoms and Diagnosis Methods – Develop skills to recognize clinical signs of diseases and apply diagnostic techniques such as histopathology and microbiological testing.
- 3) Explore Disease Prevention and Control Measures – Study biosecurity, vaccination, and water quality management strategies to prevent and control fish diseases.

After completing this course, students will be able to:

- 1) Identify and Diagnose Fish Diseases – Recognize symptoms and apply diagnostic techniques to detect bacterial, viral, fungal, and parasitic infections in fish.
- 2) Understand Disease Causation and Transmission – Explain the factors influencing fish diseases, including environmental stress, poor nutrition, and pathogen transmission.
- 3) Implement Disease Prevention and Biosecurity Measures – Apply strategies such as vaccination, water quality management, and biosecurity protocols to prevent disease outbreak

FISH PATHOLOGY

Module No.	Topics/Actual Contents of the Syllabus	Contact Hours
I	1) Introduction 2) Inflammation and immune response and pathological changes in tissues. 3) Symptoms of sickness and effect on fish and mode of contractions of infection.	10
II	1) Nutritional & associate disease and elements from environmental factors. 2) Disease caused by parasites, pathogen and its control measures life cycle.	05
III	Fish Pathology (Disease causing organism, symptoms, preventives measures. 1) Fungal diseases: Gill rot, Brachymeiosis. 2) Bacterial diseases: Dropsy and fin rot 3) Protozoan diseases: - White spot and Costiasis.	15
	1) Helminth diseases: - Gyrodactylus and Dactylogyrosis. 2) Crustacean diseases: - Lernaeosis and Argulosis	

**Dr. Babasaheb Ambedkar Marathwada University
Chhatrapati Sambhajanagar- 431001
Practical based on**

FIS/DSC/T/250 And 251

Credits: 02 Marks 50

Hrs.30

Learning objectives of this course

1. Fish Farming and Hatchery Management – Learn about fish seed production, pond preparation, stocking, feeding, and water quality management.
2. Fishing Gear and Mari culture Techniques – Understand fishing methods, net types, cage culture, and open-sea farming of marine species.
3. Disease Management and Post-Harvest Handling – Identify common fish diseases, apply treatment methods, and learn fish preservation and processing techniques.

After completing this course, students will be able to:

1. Identify and Classify Aquatic Species – Recognize important fish and shellfish species used in aquaculture and mariculture.
2. Manage Aquaculture Systems – Apply techniques for pond preparation, stocking, feeding, and water quality management.
3. Operate Fish Hatcheries – Understand breeding techniques, seed production, and larval rearing of commercially important species.
4. Use Fishing Gear and Techniques – Learn about different fishing methods, net types, and sustainable capture techniques.

FIS/DSC/P/276 And 277**Practical based on****FIS/DSC/T/250 And 251**

Module No.	Topics/Actual Contents of the Syllabus	Contact Hours
I	[1] Water analysis- a) Dissolved O ₂ b) Dissolved CO ₂ c) Chlorides d) Carbonates [2] Collection, identification and submission of prepared slides of Freshwater phytoplankton & Zooplankton.	10
II	4] Taxonomic Study of- a) Marine Water Fishes with adaptive characters (any 08) b) Fresh Water Fishes (any 08) c) Estuarine Fishes (any 05) 5] Identification of sexual dimorphisms in fishes. (Any five) 6] Study of maturity stages in teleost locally available fish (Morphological & Histological). 7] Assessment of fecundity of locally available fish. (any two) 8] Identification, classification of fresh water aquatic insects (any three)	10
III	11] Length-weight relationship study of locally available fish. (any two) 12] Quantitative estimation of Protein/fat/carbohydrate from fish tissue (dry or wet). 13] Determination of fish age by scale method. 14] Identification of Fish Parasite a) Argulus b) Dactylogyrus c) Gyrodactylus d) Ichthyophthirius multifiliis. 15] Excursion tour, visit to coastal/fish farm/fish market and submission of excursion report	10

Dr. Babasaheb Ambedkar Marathwada University
Chhatrapati Sambhajanagar- 431001,
SYLLABUS

Periods: 30

No. of Credits: 02

Marks: 50

Minor Course (Theory)

FIS/DSCMT1251: Preparation of Value-Added Products

Module	Unit	Title of topic	hrs
1		Unit-I:	07
	1.1	Fish cutlets	
	1.2	Fish fingers	
	1.3	Fish balls	
	1.4	Fish pickles	
2		Unit-II: Other value-added products	08
	2.1	Fish wafers	
	2.2	Fish soup powder	
	2.3	Fish noodles	
	2.4	Fish burgers	
	2.5	Fish protein concentrate	
	2.6	Fish sausages	
3		Unit-III: Packing material and criteria of selection	15
	3.1	Packing materials	
	3.3	Criteria of selection	
		Packing system	
	3.4	Vacuum packing (VP)	
	3.5	Modified atmospheric air packing (MAP)	
	3.6	Controlled atmospheric packing (CAP)	

**Dr. Babasaheb Ambedkar Marathwada University
Chhatrapati Sambhajanagar- 431001**

SYLLABUS

Periods: 30

No. of Credits: 02

Marks: 50

Minor Course (Practical)

Practical based on-A) Preparation of Value-Added Products

Module	Unit	Title of topic	hrs
1	1	Preparation of fish cutlets	30
	2	Preparation of fish fingers	
	3	Preparation of fish balls	
	4	Preparation of fish pickles	
	5	Study of packing material	
	6	Study of value-added products:	
		i) fish wafers ii) fish soup powder iii) fish noodles	
		iv) fish burgers v) fish protein concentrate vi) fish sausages	
	7	Demonstration of vacuum packing.	
	8	Demonstration of MAP	
	9	Demonstration of CAP	
	10	Demonstration of Packing machine	
	11	Demonstration of Sealing machine	
	12	Demonstration of Labeling	
	13	Visit to value added fish product byproduct company and submission of report	

Dr. Babasaheb Ambedkar Marathwada University
Chhatrapati Sambhajanagar- 431001

SYLLABUS

Periods: 30

No. of Credits: 02

Marks: 50

Minor Course (Theory)

B) Fish Spoilage, Preservation and Quality Issues

Module	Unit	Title of topic	Hrs
1		Unit-I: Fish Spoilage	07
	1.1	Introduction	
	1.2	Causes of spoilage - Chemical, Microbial, Enzymatic	
	1.3	Sources of contamination	
	1.4	Test of freshness - Chemical and organoleptic	
2		Unit-II: Fish processing	08
	2.1	Stunning of fish	
	2.2	Grading	
	2.3	Removal of slime	
	2.4	Scaling	
	2.5	Washing	
	2.6	Deheading	
		2.7 Gutting 2.8 Fin cutting 2.9 Filleting 2.10 Skinning 2.11 Meat bone separation 2.12 Benefits of processing	
3		Unit-III: Fish preservation	15
	3.1	Principal of fish preservation	
	3.2	Fish processing	
	3.3	Methods of fish preservation	
	i.	Drying - Sun drying, Mechanical drying and Freeze drying	
	ii.	Salting - Dry salting, wet salting, Kench salting, Mona curing.	
	iii.	Freezing - Plate freezing, Blast freezing, Deep freezing	
	iv.	Canning	
	v.	Smoking	
	vi.	Pickling	

Dr. Babasaheb Ambedkar Marathwada University
Chhatrapati Sambhajinagar- 431001

SYLLABUS

SYLLABUS

Periods: 30

No. of Credits: 02

Marks: 50

Minor Course (Practical)

Practical based on- (Fish Spoilage, Preservation and Quality Issues)

Module	Unit	Title of topic	Hrs
1	1	Identification of fresh and spoiled fishes	30
	2	Assessment of fish spoilage by organoleptic method	
	3	Fish processing of locally available fish	
	4	Fish preservation by ice method	
	5	Fish preservation by drying	
	6	Fish preservation by salting	
	7	Fish preservation by freezing	
	8	Isolation of microorganisms by streak plate method	
	9	Gram staining and identification of microorganisms.	
	10	Microbial analysis of fish products (Enumeration: Total plate count)	
	11	Determination of TVB-N	
	12	Determination of fish quality by using Hedonic scale method	
	13	Visit to fish processing industry and submission of report.	

Dr. Babasaheb Ambedkar Marathwada University
Chhatrapati Sambhajanagar- 431001

SYLLABUS

Periods: 30

No. of Credits: 02

Marks: 50

Generic Elective (Theory)

GE/OE-4/T: Fabrication and Maintenance of Aquarium

Module	Unit	Title of topic	hrs
1		Unit-I: Fabrication of aquarium	10
	1.1	Types of aquarium	
	1.2	Material used for fabrication	
	1.3	Fabrication of aquarium tank	
	1.4	Equipment's used: Filter, aerator, heater	
2		Unit-III: Maintenance of aquarium	10
	2.1	Types of food and feeding	
	2.2	Monitoring water quality	
	2.3	Oxygen level	
	2.4	Light	
	2.5	Temperature	
3		Unit-IV: Disease management	10
	3.1	Common fish disease	
	3.2	Symptoms and prevention of disease	
	3.3	Disease treatment	
	3.4	Quarantine and isolation	

**Dr. Babasaheb Ambedkar Marathwada University
Chhatrapati Sambhajanagar- 431001**

SYLLABUS

Periods: 30

No. of Credits: 02

Marks: 50

Skill Based Course (Practical)

SFISVSC1251: Fabrication and Maintenance of Aquarium

Module	Unit	Title of topic	hrs
1	1	Equipment of aquarium	30
	2	Aquarium fishes	
	3	Aquarium toys	
	4	Aquarium plants	
	5	Air pumps and filters	
	6	Types of food	
	7	Fabrication of aquarium	
	8	Setting of aquarium	
	9	Decoration of aquarium	
	10	Maintenance of water quality	
	11	Common fish disease	
	12	Treatment of fish disease	

Dr. Babasaheb Ambedkar Marathwada University

Chhatrapati Sambhajinagar- 431001

Skill Enhancement Course Syllabus: SEC II A (any One)

Fish preservation Technology and Processing

(Credit: 01) (15 Theory Periods)

Learning objectives of this course

1. Principles of Fish Preservation – Learn methods like drying, smoking, salting, freezing, and canning to prevent spoilage.
2. Fish Processing Techniques – Understand handling, cleaning, and hygienic practices in fish processing.
3. Technology in Processing – Explore modern preservation technologies and equipment used in the industry.

After completing this course, students will be able to:

1. Apply Preservation Techniques – Effectively use methods like drying, freezing, salting, and smoking to extend fish shelf life.
2. Process Fish safely and hygienically – Handle, clean, and process fish following industry hygiene and safety standards.
3. Utilize Modern Technology – Operate preservation and processing equipment for efficient fish production

Skill Enhancement Course Syllabus: SEC II A (any One)

Fish preservation and processing technology

Module No.	Topics/Actual Contents of the Syllabus	Contact Hours
I	A) Fish Preservation Technology and Processing (15 Theory Periods) 1) Study of fish spoilage- Bacterial, Enzymatic and Chemical. 2) Study of Rigor-mortis a) Causes of Rigor-mortis, b) Factors responsible for prolongation of Rigor-mortis, c) Identification of fresh and spoiled fish	05
II	3) Principles of Preservations a) Cleaning and gutting, b) Lowering temperature, High temperature and dehydration, c) Use of salts and Preservatives, d) Use of Natural Preservatives	05
III	4) Methods of Fish Preservations a) Refrigeration, b) Deep Freezing, c) Freeze Drying. d) Salting: Dry salting, e) Wet salting, Brine salting, Cold salting, Smoking, f) Drying Natural drying, Artificial Drying, g) Canning h) Demerits of Fish Preservation	05

Dr. Babasaheb Ambedkar Marathwada University

Chhatrapati Sambhajnagar- 431001

Syllabus: SEC II B

Skill Enhancement course (any One) Syllabus: SEC II B

Manufacturing of Fishing Nets

(Credit: 01) 15 HOURS

Learning objectives of this course

1. Identify and Classify Aquatic Species – Recognize important fish and shellfish species used in aquaculture and mariculture.
2. Manage Aquaculture Systems – Apply techniques for pond preparation, stocking, feeding, and water quality management.
3. Operate Fish Hatcheries – Understand breeding techniques, seed production, and larval rearing of commercially important species.

After completing this course, students will be able to:

1. Understand Different Types of Synthetic Yarns – Learn about commonly used synthetic fibers such as Nylon, Polyester, Polyethylene, and Polypropylene in net making.
2. Identify Physical and Chemical Properties – Recognize characteristics like strength, elasticity, abrasion resistance, water absorption, and UV resistance of different synthetic netting materials.
3. Perform Practical Identification Techniques – Use burn tests, microscopic analysis, and density tests to differentiate between various synthetic netting yarns.

Skill Enhancement course (any One) Syllabus: SEC II B

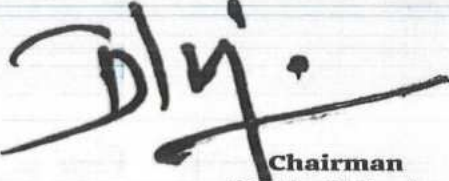
Manufacturing of Fishing Nets

Module No.	Topics/Actual Contents of the Syllabus	Contact Hours
I	1. Fishing gear materials and accessories 2. Fishing gear materials- a) Classification of fishing gear materials: Natural fibers, synthetic fibres, and Basic fibre forms 3. Properties of fibers: a) Physical properties, b) Chemical properties, c) Biological properties	05
II	4. Identification of synthetic netting yarns 5. Construction of netting yarns, b) Twist- types of twists 6. Ropes- Types and Classification of ropes	05
III	7. Floats- classification of floats 8. Sinkers- types of sinkers 9. Buoys- Types of buoys	05

Text books/References

1. Ahirrao S.D. Fish and Fisheries of Marathwada region, Int. Society of Science and Technology, Mumbai
2. Ayyappan, D. S., "Handbook of Fisheries and Aquaculture", Indian Council of Agricultural Research (ICAR).
3. Bonar, Scott A., Hubert, Wayne A., Willis, David W. (Eds.), "Standard Methods for Sampling North American Freshwater Fishes", American Fisheries Society.
4. Chakrabarti, N. M., "Textbook on Freshwater Aquaculture", Daya Publishing House.
5. Chinte D. N., Kasab. D.R, Wagh.D.C., Jethithor S. "A Textbook of Indian Fisheries and Mariculture", Kuldev Publication.
6. Chinte D.N. "Text book of Fish Pathology and Parasitology "Geeta Prakashan, Hyderabad.
7. Craig, John F. (Ed.), "Freshwater Fisheries Ecology", Wiley-Blackwell.
8. Dhanaji Patil and Sandip Markad (Ed.) (2025). Sustainable Aquaculture: Recent Advances and Techniques. Apple Academic Press Inc., Palm Bay, Florida 3290, U.S.A. 412p
9. D. W. Patil (Ed.) (2024). Introduction to Indoor Fish Farming. Delve Publishing, Burlington, Canada: 237p. (978-1-77469-838-9)
10. Emmens, C. W., "Keeping and Breeding Aquarium Fishes", Training Manual on Advances in Keeping & Breeding Ornamental Fishes.
11. Hiware C.J. and Sonawane S.R. Handbook of fish aquarium.
12. Korde S. S. (2022). Aquaculture. 978-81-977537-8-7. Opus Publication.
13. Korde S.S. A Textbook of Pisciculture, Knowledge Factory Publication, Laturs.
14. Kiran Shillewar, D.V. Totawar. A Text Book of Fish Seed Production, 2018, Lambert Academic Publishing, Beau Bassins, Mauritius, Germany
- Huet, M., "Textbook of Fish Culture: Breeding and Cultivation of Fish", Fishing News Books.
15. Lekang, Odd-Ivar, "Aquaculture Engineering", Blackwell Science.
16. Mohekar. A.D., Kamble S.M. Bhagawan H.K., Chinte.D. N; Manual of Fishery Science. Geeta Prakashan, Hyderabad
17. Pillai, N. G. K., "Marine Fisheries and Mariculture in India", Narendra Publishing House.
18. Pillays, T. V. R., "Aquaculture: Principles and Practices", Blackwell Publishing.
19. S.P. Chavan, M.S. Kadam, and S.D. Niture. Aquaculture and aquarium keeping.
20. Srivastava, C. B. L., "A Textbook of Fishery Science and Indian Fisheries", Kitab Mahal.

21. Stickney, R. R., "Principles of Warm Water Aquaculture", John Wiley & Sons.
22. Thomas, P. C., Rath, Suresh, Mohapatra, Kanta Das, "Breeding & Seed Production of Fin Fishes & Shell Fishes", Daya Publishing House (Astral International Pvt. Ltd.), New Delhi, 2014.
23. Upadhyay, Alok Kumar, "Textbook of Marine Fisheries: Fisheries of World Oceans and India in Perspective", Biotech Books.
24. Wedemeyer, Gary A., "Aquaculture Technology: Flowing Water and Static Water Fish Culture", CRC Press.
25. Wedemeyer, Gary A., "Aquaculture Technology: Flowing Water and Static Water Fish Culture", CRC Press.
26. "Fisheries and Aquaculture: A Textbook for Undergraduate and Postgraduate Students", Amazon.
27. Kumar, Rajendra, "A Textbook of Fish and Fisheries", Daya Publishing House.


Chairman
BOS in Fisheries