DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,
CHHATRAPATI SAMBHAJINAGAR.

CIRCULAR NO.SU/B.Sc./CBC & GS/08/2024

It is hereby inform to all concerned that, the syllabi prepared by the Board of Studies/Ad-hoc Boards and recommended by the Dean, Faculty of Science & Technology, **Academic Council at its meeting held on 08 April 2024 has accepted the following Syllabi under the Faculty of Science & Technology as per Choice Based Credit Grading System** as appended herewith.

Sr.No.	Courses	Semester
1.	**B.Sc. Environmental Science (Optional)**	**Ist to VIth semester**
2.	**B.Sc. Fishery Science (Optional)**	**Vth & VIth semester**
3.	**B.Sc. Biochemistry (Optional)**	**Vth & VIth semester**

This is effective from the Academic Year 2024-25 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,
Aurangabad-431 004.
REF.No.SU/2024/1171-79
Date:- 18.06.2024.

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Deputy Registrar,
Academic Section

Copy forwarded with compliments to :-

1] **The Principal of all concerned 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 Sambhajinagar.

2] The Section Officer,[M.Sc.Unit] Examination Branch, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

3] The Programmer [Computer Unit-1] Examinations, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

4] The Programmer [Computer Unit-2] Examinations, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

5] The In-charge,[E-Suvidha Kendra], Rajarshi Shahu Maharaj Pariksha Bhavan, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

6] The Public Relation Officer, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

7] The Record Keeper, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

DR. BABASAHEB AMBEDKAR MARATWADA UNIVERSTIY
CHHATRAPATI SAMBHAJINAGAR -431004(MS) INDIA

NAAC Re-accredited "A"Grade

Undergraduate Bachelor Degree Program in Science (B.Sc.)
Fishery Science
Course Structure Based Curriculum)

Choice Based Credit System (CBCS)

SYLLABUS

B. Sc. Third Year

(Semester- V & VI)
Subject: Fishery Science

{Effective from Academic Year 2024-25}

In - Charge CHAIRMAN
BOARD OF STUDIES FISHERY SCIENCE

Dr. Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar

Choice Based Credit System (CBCS) Curriculum
For
Faculty of Science and Technology
Course Structure and Scheme of Examination
B.Sc. III Year Undergraduate Degree Program

Semester V								
	Course Code	Course Title	Total periods (Teaching periods/week)	Credits	Scheme of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSE-1 A) Discipline Specific Elective	FIS-511	DSE-1A (1) (Theory Paper – IX) Fish Technology & Processing	45(3/week)	2	50	10	40	20
	FIS-512	DSE-1A (2) Theory Paper – X – Soil and water management in aquaculture	45(3/week)	2	50	10	40	20
	FIS-521	Lab course 6 (based on XXX-511)	45(3/week)	1.5	50	10	40	20
	FIS-522	Lab course 7 (based on XXX-512)	45(3/week)	1.5	50	10	40	20
Optional II (DSE-2 A) Discipline Specific Elective	FIS-511	DSE-2A (1) (Theory Paper-IX) Aquaculture Technique and Fish nutrition	45(3/week)	2	50	10	40	20
	FIS-512	DSE-2A (2) (Theory Paper X) Indian Fisheries and Mericulture	45(3/week)	2	50	10	40	20
	FIS-521	Lab course 6 (based on XXX-511)	45(3/week)	1.5	50	10	40	20
	FIS-522	Lab course 7 (based on XXX-512)	45(3/week)	1.5	50	10	40	20
Optional III (DSE-3 A) Discipline Specific Elective	FIS-511	DSE-3A (1) (Theory Paper-IX) (Select any one paper from A1/B1/C1/D1)	45(3/week)	2	50	10	40	20
	FIS-512	DSE-3A (2) (Theory Paper-X) (Select any one paper from A2/B2/C2/D2)	45(3/week)	2	50	10	40	20
	FIS-521	Lab course 6 (based on XXX-511)	45(3/week)	1.5	50	10	40	20
	FIS-522	Lab course 7 (based on XXX-512)	45(3/week)	1.5	50	10	40	20

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,
CHHATRAPATI SAMBHAJINAGAR
B. Sc Third Year (WEF JUNE – 2024)
Subject: - Fishery Science
Practical Paper XVII
(Based on elective paper B II)

Time 3 Hours **Marks 50**

1.	Identify and described as per instructions (Any Three) (Feed ingredients/ Aquatic weeds/ Planktons)	09
2.	Identify and described as per instructions (Any Three) (Equipment's/ Fertilizers)	09
3.	Estimation of CO_2, /DO/, Salinity from given water sample (Any One) OR Estimation of N/P/K from given sample (Any One)	08
4.	Estimation of Crude Protein/ Carbohydrate/ Liquid from feed ingredients. (Any one)	08
5.	Submission of Aquatic weeds, Planktons and Fertilizers.	06

Internal Marks

1. Record book and Viva voce	05
2. One test on practical	05

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, CHHATRAPATI SAMBHAJINAGAR

SYLLABUS (WEFJUNE – 2024)

B. Sc III Year (V&VI Semester) Fishery Science

Question Paper Pattern

Paper No XII, XIII, XIV, XV

Marks 40

All questions carry equal marks

Q.1 Write a short notes on any four on the following: (Based on all units) Marks 08

A)
B)
C)
D)
E)
F)

Q.2.Write notes on (any two) of the following (Based on I&II units) Marks 08

A)
B)
C)

Q.3) Long answer question (Based on I&II units) Marks 08

OR

Long answer question

Q.4) Write notes on (any two) (Based on III&IV units) Marks 08

A)
B)
C)

Q.5 Long answer question on (Based on III&IV units) Marks 08

OR

Long answer question on

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CHHATRAPATI SAMBHAJINAGAR
SYLLABUS (WEF JUNE – 2024)
B.Sc. III Year (V&VI Semester) Fishery Science
Practical Paper – XVII

Time: 3 hrs **Marks: 50**

1] Identify, Classify and Comments on commercially important fishes (Any two) 06

2] Identify, classify and Comments on commercially important Non fish organism (Any Two) 06

3] Identify and Comments on fishing crafts and gears (One each) 06

4] Identify& describe aquarium fishes & aquarium plant. (Two each) 12

5] Identification and Preparation of permanent slide of fish pathogen (Any one) 10

Internal Marks

1] Submission of Record book, viva voce. 05

2] One test on practical 05

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,
CHHATRAPATI SAMBHAJINAGAR
(WEF JUNE – 2018)
B. Sc III Year (V&VI Semester)
Fishery Science
Practical Paper – XVI (A)

Time: 3 hrs. **Marks: 50**

1] Identify, Classify and comments on cultivable fishes.	(Any three)	09
2] Identify, Classify and comments Non fish organism	(Any Two)	06
3] Identify & describe fish feed ingredients	(Any two)	06
4] Estimation of protein /Carbohydrate /Lipid from fish feed	(Any one)	08
5] Calculate per hector income of fish production from given		06
6] Submission of fishing crafts & gears model, prepared fish feed and feed ingredients.		05

Internal marks

1] Record book & Excursion Report	05
2] Test on practical	05

DR. BABASAHEB AMBEDKAR MARATWADA UNIVERSTIY,

CHHATRAPATI SAMBHAJINAGAR

B.Sc. Third Year (CBCS Pattern)

Syllabus (WEF June 2024)

Semester- V and VI

Subject: - Fishery Science

Practical Paper- XVII (Elective B II) Based on XIII(BII)+XIV(BII)

Marks-50

1. Study of fish feed ingredients.
2. Study of equipment's used in water and soil analysis.
3. Study of different types of organic and inorganic fertilizers.
4. Study of Aquatic weeds.
5. Study of Planktons
6. Estimation of dissolved oxygen, carbon dioxide, salinity, temperature and conductivity of water
7. Estimation of crude protein. Carbohydrate, and lipid from feed ingredients.
8. Estimation of Nitrogen, Phosphorus, Potassium of soil sample.
9. Fish feed formulation
10 Submission of feed ingredients and prepared fish feed
11 Submission of different types of fertilizers
12Submission of Aquatic weeds and Planktons
13 Submission of Tour report and Record book

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, CHHATRAPATI SAMBHAJINAGAR
SYLLABUS (WEF JUNE – 2024)
B. Sc III Year Semester V&VI
Fishery Science
Practical Paper – XVII (B I)
(Based on XIII+XV)

50 Marks

1) Study of cultivable fishes: Labeo ,Catla, Cirrhina, Chanos chanos, Sea bass, Clarius, Anabus, Channa, Heteropneustes fossilis
2) Non fish organisms - P. indicus , P.monodon, Crab
3) Study of phytoplankton and zooplanktons (Any 5)
4) Study of locally available feed ingredients (Any 5)
5) Formulation of fish feed
6) Estimation of crude protein from feed ingredients and feed.
7) Estimation of lipid from feed ingredients and feed.
8) Estimation of carbohydrate from feed ingredients and feed.
9) Estimation of vitamin from feed ingredients and feed.
10 Collection and submission of locally available feed ingredients.
11) Submission of prepared fish feed.
12) Calculate per hector income of fish production from given data.
13) Visit to fisheries co-operative society/ Fish market

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SYLLABUS (WEF JUNE – 2024)
B. Sc III Year Semester V&VI Fishery Science.
Practical Paper – XVI (Based on XII+XIV)

Mark 50

1) Identification, classification and commercial importance of following fishes.

1) Sardine 2) Mackerel 3) Bombay duck 4) Sole fish

5) Pomfret 6) Ribbon fish 7) Hilsa 8) Mugil

2) Identification, classification and commercial importance of following Non fish organisms

1) Peanius indices 2) Peanius Monodon 3) Edible oyster 4) Pearl oyster

5) Sepia 6) Loligo 7) Chanks. 8) Mytilus

3) Study of fishing crafts and gears (Five each)

4) Identification penaeid and non-penaeid prawns with sex.

5) Identify and describe the aquarium accessories with their use and maintains. (any five).

6) Preparation of an aquarium tank of suitable size.

7) Setting of aquariums.

8) Maintenance of an aquarium.

9) Study of aquarium fishes (any five).

10] Study of aquarium plants (any five).

11] Study of fish pathogens

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Choice Based Credit System (CBCS) Course Structure
Faculty of Science
B. Sc Third Year VI Semester
Subject: - Fishery Science
Effective from June 2024
Skill Enhancement (SEC-4) FIS-613 SEC-4 –(G)

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(G)-Fabrication of Aquarium

1)Introduction

2)Types of aquariums

3)Different shape & sizes of aquarium

4)Accessories for aquarium fabrication

5)Fabrication of aquarium

6)Aquarium tank accessories

7)Setting of aquariums

*** Practical based on theory paper**

OR

(H)Breeding techniques of Aquarium

1. Introduction
2. Breeding of egg-scatterers (With adhesive eggs & non-adhesive eggs)
3. Breeding of egg-depositors
4. Breeding of egg-buriers
5. Breeding of nest-builders
6. Breeding of live-bearers

Suggested Readings:

ADCP(1980). (Aquaculture Development and Co-ordination Programme).

Fish Feed Technology. ADCP/REP/80/11. FAO.

Cyrino EP & Bureau D & Kapoor BG. (20080. Feeding and Digestive Functions in Fishes. Science Publ.

D' Abramo LR, Conklin DE & Akiyama DM. (1977). Crustacean Nutrition:Advances in Aquaculture. Vol. VI. World Aquaculture Society,Baton Roughe.

De Silva SS & Anderson TA. 1995. Fish Nutrition in Aquaculture. Chapman & Hall Aquaculture Series.

Halver J & Hardy RW.(2002). Fish Nutrition. Academic Press.

Halver JE & Tiews KT. (1979). Finfish Nutrition and Fishfeed Technology Vols. I, II Heenemann, Berlin.

Hertrampf JW & Pascual FP. (2000). Handbook on Ingredients for Aquaculture Feeds.

Kluwer. Houlihan D, Boujard T & Jobling M. (2001). Food Intake in Fish. Blackwell.

Lavens P & Sorgeloos P. (1996). Manual on the Production and Use of Live Food for Aquaculture.

FAO Fisheries Tech. Paper 361,

Lovell RT. (1998). Nutrition and Feeding of Fishes. Chapman & Hall.

Ojha JS. (2005). Aquaculture Nutrition and Biochemistry. Daya Publ.

UNIT III

1)Feed Resources: Nutritional value of feed ingredients and live feed.

2)Importance of natural food to nutrient requirements of fish

3)Feed additives -attractants, growth stimulants and probiotics and binders

UNIT IV

1)Feed Manufacture: Feed formulation and processing.

2) On-farm feed manufacture.

3)Commercial feed manufacture.

4)Feed storage.

5)Supplementary feed.

6)Feeding methods and scheduling.

7)Feed performance and economics.

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Choice Based Credit System (CBCS) Course Structure
Faculty of Science
B. Sc Third Year VI Semester
Subject: - Fishery Science
Effective from June 2024
FIS-612 DSE-2A (2) (Theory Paper-XII)
Nutrition and Feed Technology (Elective B II)

Total period 45 **Marks 50**

UNIT I

1)Fish nutrition: Principles of fish nutrition and terminologies.

2)Nutritional requirements of cultivable finfish: larvae, juveniles and adults.

3)Nutritional biochemistry: Classification, nutrient quality and evaluation of proteins, lipids and carbohydrates.

4)Role of nutrients: amino acids, fatty acids, proteins, lipids, carbohydrates, vitamins and minerals.

UNIT II

1)Nutritional physiology:

Digestion,

Accretions

Nutrient flow,

Factors affecting digestibility.

1)Nutrient deficiency and symptoms

Unit – III

Growth studies

a) Introduction to growth

b) Linear growth characteristic

c) Estimation of length (Linear growth)

d) Length- weight relationship

e) Ponderal index

f) Age and growth studies in fishes

Different methods of age and growth determination: - Tagging method, Marking method, Scale method, otolith method, radio carbon uptake method, RNA– DNA ratio method.

Unit – IV

Nutritional value and Economical importance of Fish.

a) Bio-chemical composition of raw fish.

b) Medicinal value of fishes.

c) Calorific value in fishes.

d) Economic importance of fishes.

e) By products.

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Choice Based Credit System (CBCS) Course Structure
Faculty of Science
B. Sc Third Year VI Semester
Subject: - Fishery Science
Effective from June 2024
FIS-611 DSE-2B (1) (Theory Paper-XI)
Fish Biology

Total period 45 **Marks 50**

Unit – I

Developmental biology

a) Types of eggs.

b) Cleavage and formation of blastula.

c) Fate map of blastula.

d) Gastrulation.

e) Hatching and post embryonic development.

f) Oviparity, viviparity & ovo – viviparity.

Unit – II

Reproductive biology

a) Sexual dimorphism in Fishes.

b) Seasonal changes in Testes (Morphological and Histological).

c) Seasonal change in ovary (Morphological and Histological).

d) Study of oogenesis and spermatogenesis in fishes.

e) Assessment of fecundity in fishes

i) Volumetric method ii) Gravimetric method iii) Von Bayrs methods f) Study of Gonado Somatic Index (GSI)

Unit – III

Fish Co-operatives:

i) Definitions and principals of co-operative societies.

ii) History of co-operatives movements in India.

iii) Organs of co-operatives

i) President ii) vice-presidents iii) Directors iv) Members

v) Treasurer vi) Auditors vii) Types of meetings

iv) Structure of fisheries co-operative society.

i) Primary co-operative ii) Regional federation

iii) State level federation iv) National federation

v) Function of fishermen co-operative society

vi) Problems of fishermen co-operative society and their remedial measures.

Unit – IV

Fisheries Eextension:

i) Governments policies

ii) Plans and programmes

iii) Funding, Training and mass media

iv) Socioeconomics condition of fishermen

v) Role of FFDA

vi) Role of remote sensing

i) Direct methods

ii) indirect methods

vii) Exclusive economic zone (EEZ)

viii) Fisheries institutions of India

i) Central marine fisheries Research institute – CMFRI

ii) Central institute of fisheries Technology – CIFT

iii) Central institute of fisheries Education – CIFE

iv) Central institute of freshwater Aquaculture – CIFA

v) Fisheries survey of India - FSI

vi) National institute for oceanography - NIO

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CHHATRAPATI SAMBHAJINAGAR
Choice Based Credit System (CBCS) Course Structure
Faculty of Science
B. Sc Third Year VI Semester
Subject: - Fishery Science
Effective from June 2024
FIS-612 DSE-1B (1) (Theory Paper-XII)
Fish Economics, Marketing, Cooperative and Extension

Total period 45 **Marks 50**

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Unit – I

Fish economics:

i) Definitions and principals of fisheries economics.

ii) Terms in economics.

iii) Demand.

iv) Supply.

v) Cost.

Unit – II

Fish Marketing:

i) Introduction and definition.

ii) Characteristics of fish marketing.

iii) Types of marketing:

a) Traditional fish market.

b) Modern fish market.

iv) Types of distribution channel:

a) Direct distribution channel.

b) Indirect distribution channel.

v) Marketing functions:

a) Functions of exchange.

b) Functions of physical supply.

c) Facilitating functions. vi) Price structure and problems in fish marketing.

Unit – III

1. Study of ornamental fishes

(Taxonomy general characters, food and feeding and breeding habits)

A. Egg Layers i) Gold fish ii) Zebra iii) Koi carp vi) Angle v) Gourami

B. Live Bearers i) Guppy ii) Mollies iii) Sword tail iv) Platies

2.Breeding and rearing of ornamental fishes:

i) Identification of brooders

ii) Breeding behavior

iii) Induced breeding

iv) Management of water quality in breeding and rearing of fishes.

v) Transportation of ornamental fishes.

Unit IV

Disease management of ornamental fishes

(Symptoms, life cycle, and control measures)

i Protozoan disease

ii Bacterial disease

iii Crustacean disease

iv. Fungal disease

v. Helminth

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Choice Based Credit System (CBCS) Course Structure
Faculty of Science
B. Sc Third Year VI Semester
Subject: - Fishery Science
Effective from June 2024
FIS-612 DSE-1B (1) (Theory Paper-XI)
Aquarium Keeping and Rearing of Ornamental Fishes

Total period 45 **Marks 50**

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Unit – I

Fish Aquarium

1) Introduction
2) Types of aquariums.
3) Importance of aquarium.
4) Accessories of aquarium.
5) Aquarium fabrication.
6) Setting of aquariums.

Unit – II

1) Care and maintenance of aquarium.
2) Aquarium water quality and management.
3) Aquarium plants.
4) Food for Aquarium fishes.

			585	23	650	130	520	

Total Credits for Semester V: 23 (Theory: 14; Laboratory: 9)
Total Credits for three years: Sem. I (22.5) + Sem. II (22.5) + Sem. III (29) + Sem. IV (29) + Sem V (23) + Sem. VI (23) = 149 Credits

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Choice Based Credit System (CBCS) Curriculum
For
Faculty of Science and Technology
Course Structure and Scheme of Examination
B.Sc. Third Year Undergraduate Degree Program
Semester VI

	Course Code	Course Title	Total periods (Teaching periods/week)	Credits	Scheme of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSE-1 B) Discipline Specific Elective	FIS-611	DSE-1B (1) (Theory Paper-XI) Aquarium Keeping and Rearing of Ornamental Fishes(A)	45(3/week)	2	50	10	40	20
	FIS-612	DSE-1B (2) (Theory Paper-XII) Fish Economics and Marketing Cooperative and Extension	45(3/week)	2	50	10	40	20
	FIS-621	Lab course 8 (based on XXX-611)	45(3/week)	1.5	50	10	40	20
	FIS-622	Lab course 9 (based on XXX-612)	45(3/week)	1.5	50	10	40	20
Optional II (DSE-2 B) Discipline Specific Elective	FIS-611	DSE-2B (1) (Theory Paper-XI) Fish Biology	45(3/week)	2	50	10	40	20
	FIS-612	DSE-2A (2) (Theory Paper-XII) Nutrition and feed technology	45(3/week)	2	50	10	40	20
	FIS-621	Lab course 8 (based on XXX-611)	45(3/week)	1.5	50	10	40	20
	FIS-622	Lab course 9 (based on XXX-612)	45(3/week)	1.5	50	10	40	20
Optional I (DSE-3 B) Discipline Specific Elective	FIS-511	DSE-3B (1) (Theory Paper-XI) (Select any one paper from A1/B1/C1/D1)	45(3/week)	2	50	10	40	20
	FIS-612	DSE-3B (2) (Theory Paper-XII) (Select any one paper from A2/B2/C2/D2)	45(3/week)	2	50	10	40	20
	FIS-621	Lab course 8 (based on XXX-611)	45(3/week)	1.5	50	10	40	20
	FIS-622	Lab course 9 (based on XXX-612)	45(3/week)	1.5	50	10	40	20
Skill Enhancement course (SEC-4)	FIS-613	SEC-4 Any one skill to be chosen out of two SEC-4(G)Fabrication of Aquarium, SEC-4 (H)Breeding techniques of Aquarium	45(3/week)	2	50	10	40	20

Dr. BABASAHEB AMBEDKAR MARATWADA UNIVERSTIY, CHHATRAPATI SAMBHAJINAGAR

Choice Based Credit System (CBCS) Course Structure
Faculty of Science

B. Sc Third Year (Semester- VI)
Subject: Fishery Science
Effective from June 2024

Unit – III 12

Endocrine Gland: (Structure & Functions)

i) Pituitary gland

ii) Thyroid gland

iii) Adrenal gland

iv)Gonads

v) Thymus gland

Unit – IV

Fish Microbiology

i) General account of harmful and useful micro-organisms in fresh water and marine water.

ii) Fish spoilage

Causes of fish spoilage – Bacterial, enzymatic and chemical spoilage.

iii) Changes during fish spoilage – Rigor mortis.

iv) Chemical test for freshness.

v) Organoleptic test for freshness.

vii) Sources of contamination of fish

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,
CHHATRAPATI SAMBHAJINAGAR
Choice Based Credit System (CBCS) Course Structure
Faculty of Science
Peper Code 521
B. Sc Third Year V Semester
Subject: - Fishery Science
Effective from June 2024
DSE-2A (2) (Theory Paper-X)
Fish Anatomy, Physiology & Fish microbiology

Periods – 45 Marks – 50

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Unit – I

Comparative study of –

i) Teeth: - Types and function.

ii) Gill Rakers: -structure, types and function.

iii) Food: - Types of food, Feeding habits in fishes.

iv) Alimentary canal: - alimentary canal of herbivorous and carnivorous fish

Unit – II

i) Structure and working of heart in elasmobranchs and teleost.

ii) Excretory System: - Kidney – structure types & functions.

iii) Structure & function of air bladder in fishes.

iv) Osmoregulation in fishes: - Osmoregulation in fresh water and marine fishes.

Unit – III

Growth studies

a) Introduction to growth

b) Linear growth characteristic

c) Estimation of length (Linear growth)

d) Length- weight relationship

e) Ponderal index

f) Age and growth studies in fishes

Different methods of age and growth determination: - Tagging method, Marking method, Scale method, otolith method, radio carbon uptake method, RNA– DNA ratio method.

Unit – IV

Nutritional value and Economical importance of Fish.

a) Bio-chemical composition of raw fish.

b) Medicinal value of fishes.

c) Calorific value in fishes.

d) Economic importance of fishes.

e) By products.

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CHHATRAPATI SAMBHAJINAGAR
Choice Based Credit System (CBCS) Course Structure
Faculty of Science
Peper Code 521
B. Sc Third Year V Semester
Subject: - Fishery Science
Effective from June 2024
Theory Paper – DSE-3A (1) (Theory Paper-IX) Fish Biology

Periods – 45 Marks – 50

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Unit – I

Developmental biology

a) Types of eggs.

b) Cleavage and formation of blastula.

c) Fate map of blastula.

d) Gastrulation.

e) Hatching and post embryonic development.

f) Oviparity, viviparity & ovo – viviparity.

Unit – II

Reproductive biology

a) Sexual dimorphism in Fishes.

b) Seasonal changes in Testes (Morphological and Histological).

c) Seasonal change in ovary (Morphological and Histological).

d) Study of oogenesis and spermatogenesis in fishes.

e) Assessment of fecundity in fishes

i) Volumetric method ii) Gravimetric method iii) Von Bayrs methods

f) Study of Gonado Somatic Index (GSI).

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CHHATRAPATI SAMBHAJINAGAR
Choice Based Credit System (CBCS) Course Structure
Faculty of Science
Peper Code 512
B. Sc Third Year V Semester
Subject: - Fishery Science
Effective from June 2024
Theory Paper – XIII – Indian Fisheries and Mariculture (DSE-2 A)

Marks: 50

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Unit - 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

Unit – II

1) Hilsa fishery.
2) Pomfret fishery.
3) Mollusk fishery, (Cephalopod, Chanks).
4) Prawn fishery.

Unit – III

Mericulture: -

1) Prawn Culture.
2) Mussel Culture (Edible oyster)
3) Pearl oyster culture.
4) Seaweed culture.

Unit - IV

Important lakes and Estuarine fisheries of India

1) Hooghly-Matla estuary
2) Chilka lake
3) Pulicat lake
4) Kolleru lake.

Unit- III

Fish Nutrition:

1) Ingredients for fish feed. i) Mill - by – Products. ii) Oil extractives.

iii) Animal by- products. iv) Miscellaneous.

2) Fish feed formulation.

i) Balancing crude protein level.

ii) Steps in feed formulation.

iii) Best-bye techniques.

iv) Storage and distribution.

Unit- IV

Aquaculture and Probiotics

1) Introduction and Definition.

2) History of probiotics.

3) Selection criteria for probiotics 4) Composition and dosages.

5) Potential of probiotics

i) Pathogen inhibition

ii) Growth promoters

iii) Water quality maintenance

6) Overall significance of probiotics in aquaculture

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,
CHHATRAPATI SAMBHAJINAGAR
Choice Based Credit System (CBCS) Course Structure
Faculty of Science
Peper Code 512
B. Sc Third Year V Semester
Subject: - Fishery Science
Effective from June 2024
Theory Paper – XIII - Aquaculture Technique and Fish nutrition ((DSE-2 A)

Marks: 50

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Unit – I

Fish culture:

1. Culture of Indian major carps.
2. Culture of airbreathing fishes.
3. Culture of milk fish – Chanos chanos.
4. Culture of sea bass.
5. Culture of crabs.

Unit - II

Marine water prawn culture:

1. Study of general characteristics.
2. Food and feeding.
3. Selection of site.
4. Collection of broods.
5. Mating and spawning.
6. Development.
7. Water quality for culture.
8. Prawn rearing.
9. Larval food supply.
10. Methods of fishing.

Suggested Readings:

Adhikari S & Chatterjee DK. (2008)-. Management of Tropical Freshwater Ponds. Daya Publ.

APHA, AWWA, WPCF. (1998)- Standard Methods for the Examination of Water and Wastewater, 20th Ed. American Public Health Association, American Water Works Association, and Water Pollution Control Federation, Washington, D. C.

Boyd, C. E. and Tucker, C. S. (1992). - Water Quality and Pond Soil Analyses for Aquaculture, Alabama Agricultural Experimental Station, Auburn University.

Boyd CE. (1979)-. Water Quality in Warm Water Fish Ponds. Auburn University.

Handbook of Fisheries and Aquaculture. ICAR.

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Choice Based Credit System (CBCS) Course Structure
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B. Sc Third Year V Semester
Subject: - Fishery Science
Effective from June 2024
Theory Paper – XIII - DSE-2A (I) (Theory Paper-X)
Soil and Water Management in Aquaculture

Marks: 50

UNIT I

Soil and water interaction:

1)Physical properties of water

2)Chemical properties of water

3)Physical properties of soil

4)Chemical properties of soil

5)Aquatic microorganisms and their role in carbon, nitrogen, phosphorus and Sulphur cycles and impact on aquatic habitats and species.

UNIT II

Soil and water quality monitoring:

1)soil and water quality standards.

2)soil and water quality monitoring and management.

3) Productivity and eutrophication of water resources

UNIT III

Fertilizers and manures:

1) Different kinds of fertilizers, biofertilizers, manures and their applications.
2) Use of treated sewage for pond fertilization,
3) Ecological changes taking place after fertilizing.
4) Utilization of bioactive compounds by microorganisms.

UNIT IV

Soil and water quality management:

1) Waste water treatment, water filtration devices, aeration, chlorination, Ozonization and UV radiation.
2) Aquatic weed management.
3) Water quality management in hatcheries,
4) Productivity and eutrophication of water resources

Unit – III

Fish Preservation

Introduction

i) Principles of preservation: -Washing, Gutting, Cleaning, lowering the temperature, rising the temperature, dehydration, use of salt, use of preservatives.

ii) Methods of Preservation: -

a) Chilling with ice & salt.

b) Freezing & refrigeration.

c) Storing in cold storage.

d) Deep freezing & freeze drying.

e) Canning

f) Sun drying

g) Mechanical drying

h) Dry salting

i) Brining

j) Smoking

k) Pickling

Unit – IV

i) Special Problems in fish preservation.

a) Denaturation due to freezing of fish.

b) Food poisoning and allergies from fish food.

c) Food poisoning from consumption of poisonous fish.

d) Food poisoning of bacterial origin.

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CHHATRAPATI SAMBHAJINAGAR
SYLLABUS (W E F JUNE – 2024)
B. Sc Third Year Vth Semester
Peper Code-511
Subject: - Fishery Science
Theory Paper - Fish Technology & Processing

Periods: - 45 **Marks: - 50**

Unit – I

Methods of Fishing and Fishing gear

i) History of fishing

ii) Methods of fishing

a) Traditional methods- Catching by hands, fishing by hunting (wounding) fishing by plant poisons

b) Conventional methods

iii) Nets- mode of netting

a) Active netting

Dip net, cast net, purse net, Drag net, Gill net, Rampani net, Bag net, Trawls, Hooks and Lines, Fishing Baited springs, Fish screens.

b) Passive netting

Gill net, Drift net, Trammel net, Fixed bag net, Fixed trap net,

iv) Material used in manufacture of nets: - a) Natural b) Synthetic

v) Preservation of the gear.

Unit – II

Unconventional fishing and Fishing crafts

a) Unconventional fishing

i) Electric fishing-mode of site of electric fishing

ii) Light fishing

iii) Fish finder- Hydro-acoustic devices, Fishing operations by eco-sounders

b) Fishing crafts

i) Inland fishing crafts

ii) Sea fishing crafts

iii) Mechanized crafts

iv) Material used in Boat/Craft constructions

Skill Enhancement SEC-3 Any one skill to be chosen out of two	FIS-513	(E) Fish feed production,	45(3/week)	2	50	10	40	20
t course (SEC-3)	SEC-2	Culture of fish food organisms						
			585	23	650	130	520	

Total Credits for Semester V: 23 (Theory: 14; Laboratory: 9)
Total Credits for three years: Sem. I (22.5) + Sem. II (22.5) + Sem. III (29) + Sem. IV (29) + Sem V (23) + Sem. VI (23) =
149 Credits