



CIRCULAR NO.SU/B.Sc./CBC&GS /65/2023

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, the Hon'ble Vice-Chancellor has accepted the **following syllabi of Bachelor of Science with Practical Pattern of Question Paper under the scheme of Choice Based Credit & Grading System** in his emergency powers under section 12(7) of the Maharashtra Public Universities Act, 2016 on behalf of the Academic Council as appended herewith.

Sr.No.	Courses	Semester
1.	B.Sc. Home Science (Degree)	IIIrd & IVth semester
2.	B.Sc. Information Technology (Degree)	IIIrd & IVth semester
3.	Bachelor of Computer Application (Degree)	IIIrd & IVth semester
4.	B.Sc.Botany (Optional)	IIIrd & IVth semester
5.	B.Sc.Dairy Science & Technology(Optional)	IIIrd & IVth semester
6.	B.Sc.Fisheries Science (Optional)	IIIrd & IVth semester
7.	B.Sc.Computer Science (Optional)	IIIrd & IVth semester
8.	B.Sc.Zoology (Optional)	IIIrd & IVth semester

This is effective from the Academic Year 2023-24 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/2023/30210-26

Date:- 26.05.2023.

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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.BAMU,A'bad.**
- 2] The Section Officer,[B.Sc.Unit] Examination Branch,Dr.BAMU,A'bad.
- 3] The Programmer [Computer Unit-1] Examinations, Dr.BAMU,A'bad.
- 4] The Programmer [Computer Unit-2] Examinations, Dr.BAMU,A'bad.
- 5] The In-charge,[E-Suvidha Kendra], Rajarshi Shahu Maharaj Pariksha Bhavan, Dr.BAMU,A'bad.
- 6] The Public Relation Officer, Dr.BAMU,A'bad.
- 7] The Record Keeper, Dr.BAMU,A'bad.

Dr. Babasaheb Ambedkar Marathwada University
Aurangabad - 431004 (MS) India



Undergraduate Bachelor Degree Program
in Science (B. Sc.)
Fishery Science [OPTIONAL]

Course Structure and Curriculum

(Outcome based Curriculum)

Choice Based Credit System

(Effective from Academic Year 2022-23)

Dean
Faculty of Science & Technology
Dr. Babasaheb Ambedkar Marathwada
University, Aurangabad

sign

CHAIRMAN
BOARD OF STUDIES
FISHERY SCIENCE

(DSC-3C) Core Courses	FIS-321	Lab course 3 (based on FIS-311)	45(3/week)	1.5	50	10	40	20
	FIS-322	Lab course 4 (based on FIS-312)	45(3/week)	1.5	50	10	40	20
Skill Enhancemen t course (SEC-1)	FIS-313	SEC-1 Any one skill to be chosen out of two SEC-1(A)Manufacturing of fish byproducts, SEC-1 (B) Freshwater fish production technology	45(3/week)	2	50	10	40	20
Ability Enhancemen t compulsory courses (AECC-3)	FIS-331	Communication skills in English- III	45(5/week)	3	50	10	40	20
	FIS-332	Marathi/Hindi/Urdu/Sanskrit A student can opt for any one of these languages (SL-III)	45(4/week)	3	50	10	40	20
			675	29	750	150	600	
Total Credits for Semester III : 29 (Theory : 20 ; Laboratory : 9)								

Semester IV								
	Course Code	Course Title	Total periods (Teaching periods/week)	Credi ts	Scheme of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSC-1D) Core Courses	FIS-411	Core Course (Theory Paper-VII) Fish Pathology	45(3/week)	2	50	10	40	20
	FIS-412	Core Course (Theory Paper-VIII) Indian fisheries and Mericulture	45(3/week)	2	50	10	40	20
	FIS-421	Lab course 4 (based on FIS-411)	45(3/week)	1.5	50	10	40	20
	FIS-422	Lab course 5 (based on FIS-412)	45(3/week)	1.5	50	10	40	20
Optional II (DSC-2D) Core Courses	FIS-411	Core Course (Theory Paper-VII)	45(3/week)	2	50	10	40	20
	FIS-412	Core Course (Theory Paper-VIII)	45(3/week)	2	50	10	40	20
	FIS-421	Lab course 4 (based on FIS-411)	45(3/week)	1.5	50	10	40	20
	FIS-422	Lab course 5 (based on FIS-412)	45(3/week)	1.5	50	10	40	20

Optional III (DSC-3D) Core Courses	FIS-411	Core Course (Theory Paper-VII)	45(3/week)	2	50	10	40	20
	FIS-412	Core Course (Theory Paper-VIII)	45(3/week)	2	50	10	40	20
	FIS-421	Lab course 4 (based on FIS-411)	45(3/week)	1.5	50	10	40	20
	FIS-422	Lab course 5 (based on FIS-412)	45(3/week)	1.5	50	10	40	20
Skill Enhancemen t course (SEC-2)	FIS-413	SEC-2 Any one skill to be chosen out of two SEC-2(C) Fish Preservationan and Processing, SEC-2 (D)Manufacturing of fishing nets	45(3/week)	2	50	10	40	20

Ability Enhancemen t compulsory courses (AECC-4)	FIS-431	Communication skills in EnglishIV	45(5/week)	3	50	10	40	20
	FIS-432	Marathi/Hindi/Urdu/Sanskrit A student can opt for any one of these languages (SL-IV)	45(4/week)	3	50	10	40	20
Additional credits		Environmental Studies	45(3/week)	2*	50	10	40	20
			675	29	750	150	600	

Total Credits for Semester IV : 29 (Theory : 20 ; Laboratory : 9)

Skill Enhancemen t 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
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Important Notes:

- i) **Nomenclature:** DSC- Discipline Specific Core course, SEC – Skill Enhancement Course, AECC- Ability Enhancement compulsory course, DSE- Discipline Specific Elective, UA- University Assessment (Semester End), CIA-Continuous Internal Assessment.
- ii) **There shall be one skill enhancement course (SEC) IIIrd to VIth Semester (any one SEC course to be chosen (any one from three optional subjects) from the basket of SEC courses for the respective semester.**
- iii) **Code description:** XXX code has to be decided by BoS of the respective subject while designing their respective curriculum (e.g. for Physics it will be PHY; for Electronics it will be ELE)
 - The codes for first semester courses will start from XXX-111, Second-semester courses will start from XXX-211 and so on
 - XXX-111 : The first digit indicate the Semester Number, the second two digits indicate paper numbers for the first-semester courses and the same analogy is for the remaining semesters
 - The codes for theory courses will start from XXX-111 (for the first semester and the same analogy is for the remaining semesters)
 - The codes for practical courses will start from XXX-121 (for the first semester and the same analogy is for the remaining semesters)
 - The codes for Ability Enhancement compulsory courses will start from XXX-131 (for the first semester and the same analogy is for the remaining semesters)
- iv) **Assessment:** 80% for University Assessment (Semester End Examination) and 20 % for Continuous Internal Assessment (CIA)
- v) **Continuous Internal Assessment (CIA): Theory** (10 Marks): Internal Test 05 Marks (Two Internal Tests of 05 marks each and average of the two test will be considered) and 05 Marks for Assignment/tutorials.
- vi) **Continuous Internal Assessment (CIA): Practical** (10 Marks): 07 Marks for Internal Practical Examination and 03 Marks for record book/submission of collection and field survey report and excursion report
- vii) **Practical examination : Annual examination**

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

Choice Based Credit System (CBCS) Course

B.Sc. Second year (III - Semester)

Semester Pattern effective from June 2023

FISHERY SCIENCE

Paper - V

FUNDAMENTALS OF AQUACULTURE

Credits: 02

(MARKS: 50)

Periods: 45

UNIT: I

13

Periods

1) Introduction

2) Importance, objective of aquaculture 3) Scope of aquaculture.

4) Comparison between agriculture, aquaculture and capture fishery.

UNIT: II

12

Periods

5) Types of aquacultures.

a. Culture bases on types of water: - Brackish water aquaculture, mariculture.

b. Culture based on economic or commercial consideration:

c. Extensive culture, intensive culture & semi-intensive culture

UNIT: III

10

Periods

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

UNIT:IV

10 periods

Integrated fish farming

- a. Duck cum fish farming
- b. b. Pig cum fish farming
- C. Cattle cum fish farming.
- d. Paddy cum fish farming

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

Choice Based Credit System (CBCS) Course Structure

B. Sc. Second year (III - SEMESTER)

Semester Pattern effective from June 2023

FISHERY SCIENCE

Paper - VI

FISH BREEDING AND SEED PRODUCTION

Credits: 02 (MARKS: 50)

PERIODS: 45

UNIT I

13 Periods

1) Breeding techniques

A) Bundh breeding

Types of bundh –

i)Wet bundhs

ii)Dry bundhs

iii)Modern bundhs

B) Artificial fertilization by stripping

C) Induced breeding by hypophysation

i) Definition

ii) Hormones responsible for induced breeding

iii) Dissection and removal of gland

iv) Preservation and storage of pituitary gland

v) Preparation of gland suspension for injection and dosage.

vi) Collection, rearing and selection of brooders vii) Synthetic hormones used in induced breeding.

UNIT-II

12Periods

- 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. Anesthetic drugs use in transport
 - h. Antiseptic and antibiotics used in transportation
 - i. Technique of fish seed release.

UNIT III

10 Periods

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

UNIT IV

10 Periods

- a) Riverine spawn resources investigation technique
- b). Selection of spawn collection site
- c) Gears used for collection of spawn and their diversities
- d) Methods of collection of spawn

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY AURANGABAD

B.Sc. Second Year (CBCS Pattern) From June 2023

Semester- IV

Subject: - Fishery Science

FISH PATHOLOGY

Paper:-VII

Marks 50

Periods:45

Unit:-I

10

Periods

- 1) Introduction
- 2) Inflammation and immune response and Pathological Changes in tissues.
- 3) Signs of sickness and effect on fish and mode of contractions of infection.

Unit:-II

12

Periods

- 1) Nutritional disease and elements from environmental factors.
- 2) Disease caused by parasites, pathogen and its control measures.

Unit:- III

13

Periods

Fish Pathology (Disease causing organism, symptoms, preventives measures).

- 1) Fungal diseases:- Gill rot, Branchiomycosis.
- 2) Bacterial diseases:- Dropsy and fin rot
- 3) Protozoan diseases: - White spot and costiasis.

Unit:- IV

10

Periods

- 4) Helminth diseases:- Gyrodactylus and Dactylogyrosis.
- 5) Crustacean diseases:- Lerniasis and Argulosis.

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

SYLLABUS (with effect from JUNE – 2023)

B. Sc Second Year IVth Semester

Subject: - Fishery Science

Theory Paper - VIII

INDIAN FISHERIES AND MERICULTURE

Credits:2

Marks 50

Periods 45

Unit - I

13Periods

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

12

Periods

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

Unit – III

10

Periods

Mericulture:-

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

Unit - IV

10

Periods

Important lakes and Estuarine fisheries of India

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

DR. BABASAHEB MARATHWADA UNIVERSITY, AURANGABAD AMBEDKAR

B. Sc. Second Year (CBCS Pattern) From June 2023

Semester- III & IV

Subject: - Fishery Science

Practical Paper based on Theory Paper

Paper- X

[1] Water analysis –

- a) Dissolved O₂
- b) Dissolved CO₂
- c) Chlorides
- d) Carbonates

[2] Collection, identification and submission of prepared slides of Fresh water phytoplankton & Zooplankton.

3] Collection, identification and submission of prepared slides of Marine Phytoplankton & Zooplankton.

4] Identification, classification & diagnostic characters of

- a) Marine Water Fishes with adaptive characters (any 08)
- b) Fresh Water Fishes (any 08)
- c) Estuarine Fishes (any 05)

5] Identification & 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)

9] Identification, classification of marine water aquatic insects (any three)

10] Assessment of spawning periodicity by ova diameters measurement in any locally

available fish.

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) Ichthyophtheris multiphlis.

15] Excursion tour, visit to coastal / fish farm/ fish market and submission of excursion report.

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

B. Sc. Second Year (CBCS Pattern) From June 2023

Semester- III & IV

Subject: - Fishery Science

Practical Paper based on Theory Paper Paper- XI

- 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) Pituitary
 - b) Ovary
 - c) Testes
 - d) Intestine
 - e) Stomach
 - f) Liver
- 3) Isolation of micro-organism (Bacteria & fungi) from fish (Streak plate method).
- 4) Staining – monochrome staining and Grams staining.
- 5) Identification of fresh fishes and spoiled fishes.
- 6) Study of fishing lines. (Any two).
- 7) Study of Fishing gears (Any five).
- 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 (Any one).
- 12) Preservation of locally available fishes by Ratnagiri method.

- 13) Preparation of fish Preservation (Washing, gutting, cleaning, and other stages & processing).
- 14) Preservation of locally available fishes by mechanical drying method.
- 15) Excursion tour: - Visit to fish processing industries and submission of report.

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

B. Sc. Second Year (CBCS Pattern) From June 2023

Semester- III & IV

Subject: - Fishery Science

SEC: Scheme of B. Sc Second Year (III & IV Sem.) Programme

Fishery Science under Science Faculty CBCS Pattern from June 2023

Skill Enhancement Course (any Two) (Credit: 02 each)

SEC I TO SEC IV: Fishery Science

----- SEC- I

A) Manufacturing of fish by products.

OR

B) Fresh water fish production technology

C) SEC –II

A) Fish Preservation and Processing Technology

OR

B) Manufacturing of fishing nets.

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

B. Sc. Second Year (CBCS Pattern) From June 2023

Subject: - Fishery Science

SEC: Scheme of B. Sc Second Year (III Sem.) Programme

Fishery Science under Science Faculty CBCS Pattern From June 2023

Skill Enhancement course (any One) (Credit: 02 each)

Syllabus: SEC –I A

A- Manufacturing of fish by-products.

- 1) Sorting and grading the fish catch ,
- 2) Fish spoilage- causes of spoilage
- 3) Nutritional value and energy requirements;
 - i) Proteins ii) Fats iii) Carbohydrates iv) vitamins and minerals, v) Biochemical composition of raw fish, vi) Calorific value in fishes.
- 4) Fish by products-
 - a) Fish Oil: Composition of fish oils, Color, un-saponifiable matter and variations in oil contents
 - b) Fish liver oil- oil extraction method
 - c) Fish meal
 - d) Fish manure
 - e) Fish flour
 - f) Fish silage
 - g) Concentrates of fish soluble
 - h) Fish protein powder
 - i) Fish fins
 - j) Fish Roe
 - k) Fish macaroni

l) Fish Sausage and Ham

m) Fish Glue

n) Isinglass

o) Fish skin

p) Artificial pearl

q) Ornamental value

r) Fish food poisoning

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

Practical based on theory syllabus

Syllabus: SEC I –B

Fresh water fish production technology

- 1) Introduction of aquaculture
- 2) Topography
- 3) Analysis and maintenance of water quality
- 4) Analysis and maintenance of soil quality
- 5) Lay out plan of fish farm
- 6) Construction of different types of ponds
- 7) Management of fertilizers
- 8) Induced breeding technique
- 9) Fish seed identification technique
- 10) Fish seed packing and transport
- 11) Disease management

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

B. Sc. Second Year (CBCS Pattern) From June 2023

Semester- IV

Subject: - Fishery Science

Practical based on theory syllabus

SEC: Scheme of B. Sc Second Year (IV Sem.) Programme

Fishery Science under Science Faculty CBCS Pattern From June 2023

Skill Enhancement course (any One) (Credit: 02 each)

Syllabus: SEC II A

A) Fish Preservation and Processing Technology

- 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
- 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
- 4) Methods of Fish Preservations
 - a) Refrigeration, b) Deep Freezing, c) Freeze Drying,
 - d) Salting: Dry salting, Wet salting, Brine salting, Cold salting
 - h) Demerits' of Fish Preservation

Practicals based on Theory syllabus

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

Syllabus SEC II B

Manufacturing of Fishing Nets:

i) Fishing gear materials and accessories ii) Fishing gear materials-

a) Classification of fishing gear materials, b) Natural fibers, synthetic fibers, Basic fiber forms iii)

Properties of fibers

a) Physical properties, b) Chemical properties, c) Biological properties, iv) Identification of synthetic netting yarns

a) Construction of netting yarns, b) Twist- types of twists

v) Ropes- Types and Classification of ropes vi) Floats- classification of floats vii) Sinkers- types of sinkers viii) Buoys- Types of buoys ix) Anchors- Parts and Types

x) Fishing gear accessories xi) Care and Maintenance of fishing gear xii) Fabrication of fishing gear- Braiding, Taitoring of webbing, Knots, Bends, Hitches etc.