DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY

CIRCULAR NO.SU./B.Sc.CBC & GS/11/2022

It is hereby inform to all concerned that, on the recommendation of Faculty of Science & Technology Meeting dated 24.08.2022, **the Academic Council at its meeting held on 29 August 2022 has accepted the following Syllabi of B.Sc. Degree under the Choice Based Credit & Grading System along with Rules and Regualtion** as appended herewith:-

1.	B.Sc.Computer Science (Optional)	Ist and IInd semester
2.	B.Sc.Computer Application (Optional)	Ist and IInd semester
3.	B.Sc.Computer Application (Degree)	Ist and IInd semester
4.	B.Sc.Computer Science (Degree)	Ist and IInd semester
5.	B.Sc.Horticulture (Optional)	Ist to VIth semester
6.	B.Sc.Botany (Optional)	Ist to VIth semester
7.	B.Sc. Agrochemical & fertilizer (Optional)	Ist to VIth semester
8.	B.Sc.Home Science (Optional)	Ist and IInd semester
9.	B.Sc.Automobile Technology (Degree)	Ist and IInd semester
10.	B.Sc.Workshop Technology (Degree)	Ist and IInd semester
11.	B.Sc.Refrigeration and Air Conditioning (Degree)	Ist and IInd semester
12.	B.Sc.Environmental Science (Optional)	Ist and IInd semester
13.	B.Sc.Biotechnology (Degree)	Ist and IInd semester
14.	B.Sc.Biotechnology (Optional)	Ist and IInd semester
15.	B.Sc.Dairy Sci.& Tech (Optional)	Ist and IInd semester
16.	B.Sc.Zoology (Optional)	Ist to VIth semester
17.	B.Sc.Polymer Chemistry (Optional)	Ist and IInd semester
18.	B.Sc.Fisheries Science (Optional)	Ist and IInd semester
19.	B.Sc.Instrumentation Practice (Optional)	Ist semester
20.	B.Sc.Biochemistry (Optional)	Ist and IInd semester
21.	B.Sc.Non Conventional & Conventional Energy (Degree)	Ist and IInd semester

This is effective from the Academic Year 2022-23 and onwards.

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

University Campus,
Aurangabad-431 004.
Ref.No. SU/B.Sc./2022/8428-35
Date:-29.08.2022.

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Deputy Registrar,
Academic Section

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Copy forwarded with compliments to :-

1] **The Principal, concerned affiliated College,**
Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.

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

JS*29082022/-

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

Undergraduate Bachelor Degree Program in Science (B. Sc.)

Fishery Science (Optional Subject)

Course Structure and Curriculum

(Outcome based Curriculum)

Choice Based Credit System

(Effective from Academic Year 2022-23)

Dr. Babasaheb Ambedkar Marathwada University

Aurangabad – 431004 (MS) India

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

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
Semester Pattern Curriculum under
Choice based Credit System (CBCS)
Faculty of Science and Technology
Department of Fishery Sci.
Course Structure and Examination Scheme
B.Sc. First Year (Semester–I)

Class/ Semester	Code	CourseTitle	Credits	Period/week	Examination Scheme			
					Maximum Marks	UA	CA	MinimumPassing
B.Sc. F.Y SemesterFirst	FISH-101	Taxonomy and Anatomy of Fish	2	(3/week)	50	40	10	20
	FISH-102	Study of Cultivable Freshwater fishes	2	(3/week)	50	40	10	20
	FISH-103	PracticalPaperbasedonPaper101&102	1.5	(3/weekBatch)	50	50Annual Exam	-	20

B.Sc.FirstYear(Semester–II)

Class/ Semester	Code	CourseTitle	Credits	Period/week	Examination Scheme			
					Maximum Marks	UA	CA	MinimumPassing
B.Sc. F.Y Semester Second	FISH-104	Limnology	2	(3/week)	50	40	10	20
	FISH-105	Endocrinology and Physiology of Fishes	2	(3/week)	50	40	10	20
	FISH-106	PracticalPaperbasedonPaper104 &105	1.5	(3/week Batch)	50	50Annual Exams	-	20

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

DR BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY AURANGABAD

Choice Based Credit System (CBCS) Course Structure (New Scheme)

B. Sc. First year (I - SEMESTER)

Semester Pattern effective from 2022-2023

FISHERY SCIENCE

CCFS I (Section –A)

Paper - I

TAXONOMY AND ANATOMY OF FISH

Credits: 02 (MARKS: 50) **PERIODS: 45**

1) Introduction, definition, scope and importance of fishery sci. **15**

* Classification of fishes (Berg, 1940) up to class level.
* Cyclostomes: Superclass Agnatha (Jwaless fish) petromyzontia, Myxinoidea. Affinities of Cyclostomes.
* Elasmobranches: Superclass Gnathostomata . General Characters of Shark and Ray's .
* Holocephali :Silent features and it's Affinities.
* Depnoi :General Characters and Affinities
* Teleostomes ; class Osteichthyes Characteristics Features Upto Major Order .

2) Importance of Taxonomy - **10**

* Kinds Of Classification - phenetic , natural , cladistics and evolutionary classification
* Zoological Nomenclature - International Code of Zoological Nomenclature : Typification , Type And Its Kinds - Primary Types - Allotype , Holotype , lectotype , Paratype and Syntype

3) . Basic methods used in taxonomic studies - **10**

* . Morphometric, meristic, descriptive, karyotypes and biochemical
*. Study of morphometric characters in fishes.
* Study of meristic characters in fishes
* Study of different types of scales

4) Fish Anatomy **10**

*. General Anatomy Of a Shark and Ray
* Axial Skeleton
* Visceral And Appendicular Skeleton

DR BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY AURANGABAD
Choice Based Credit System (CBCS) Course Structure (New Scheme)
B. Sc. First year (I - SEMESTER)
Semester Pattern effective from 2022-2023
FISHERY SCIENCE
CCFS I (Section –A) Paper II
Study of Cultivable Freshwater fishes.

Credits: 02 (MARKS: 50) **PERIODS: 45**

1) Major species cultured and Traits of important cultivable fresh water finfishes. 15

* Fresh water aquaculture resources - ponds, tanks, lakes, reservoirs, etc.
* Criteria for selection of candidate species for fresh water aquaculture.
* . Water quality management.
* Exotic fish species introduced to India and its impact on indigenous fish fauna.
* . Culture methods of Indian major carps, Medium & minor carps, catfish and exotic carps -competition and compatibility.
* . Food and feeding habits of fresh water important fishes. B.Sc. (Fishery Science)

2) AQUACULTURE 15

* Introduction and history of aquaculture (2)
* Purpose, importance and advantages of aquaculture
* Fresh water fish culture
* Planing, layout and construction of fish farm
* Procurement of fish seed by induced breeding technique and hatcheries (Happa, Chinese hatchery, CIFE D-80 & D-86 model)
* Characteristics of cultivable species (major carps and Exotic carps)

3) Preparation and management 15

* Preparation and management of nursery,rearing and stocking ponds
* Predatory and weed fishes and their control
* Fertilization of the pond
* Aquatic weeds and their control
* Fish food organisms and their production
* Stocking, artificial feeding and harvesting

DR BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY AURANGABAD

B. Sc. First year (I & II SEMESTER)

SUBJECT – FISHERY SCIENCE

PAPER V: PRACTICAL SYLLABUS

Practical Paper: CCFS P-I (III)

PAPER 103: PRACTICAL SYLLABUS

Credits: 1.5

1)Identify, classify and describe following fishes :

a)Teleosts b) Elasmobranchs

c) Dipnoi d) Holocephali

2) Indian major carps

a) Catla catla b) Cirrhina mrigala c)Labeo rohita

3) . Exotic carps

a) Cyprinus carpio b) Ctenopharyngodon idella c) hypothalmyethys molitrix

4) . Adaptation in fishes

a) Torpedo b) Trygon c) Tilapia d)Pterois

5) Permanent mounting of fish scales and submission of prepared slides

a) Placoid b) Cycloid c) Ctenoid

6) Fish identification techniques (any locally available fish)

a) Study of any five morphometric characters b) Study of any five meristic characters

7) Preparation of pituitary gland extract and injection techniques, dosage of synthetic hormones to fishes for induced breeding.

8) Identification of spawn, fry and fingerlings of Indian major carps.

9) Skeleton study

a) Trunk vertebra b) caudal vertebra c) pectoral girdle d) pelvic girdle

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY AURANGABAD

Choice based Credit System (CBCS) Course Structure (New Scheme)

B.Sc. First Year (II – SEMISTER)

Semester Pattern effective From 2022- 2023

FISHERY SCIENCE – CCFSI (Section – A)

Paper – IV – LIMNOLOGY

Credits – 02 (Marks – 50) Periods – 45

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1) Limnology **14**

1. Introduction
2. Development of Limnology
3. Inland waters, distribution of inland waters.
4. Ponds, Laker, Streams, River.

2) Physical Limnology **08**

1. Nature of Inland water environment
2. Physical Characteristics – Pressure, compressibility Density, Mobility, Buoyancy, Movement of water, Surface film, Temperature, thermal, Stratification, Light, Colour, Colour and Tu

3) Chemical Limnology **05**

1. Dissolved gases: Oxygen, Carbon dioxide and other dissolved gases.
2. Dissolved solids and Dissolved organic matter

4) Biological Limnology **12**

I) Classification of organisms in water

a) Distribution of Plankton

b) Food of Plankton organisms

5) Nekton **03**

Nekton – composition, distribution movements.

6) Benthos **03**

Classification of benthic regions, Zones and distribution

DR BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY AURANGABAD
Choice Based Credit System (CBCS) Course Structure (New Scheme)
B. Sc. First year (II - SEMESTER)
Semester Pattern effective from 2022- 2023
FISHERY SCIENCE
CCFS I (Section –A) Paper-V
ENDOCRINOLOGY AND PHYSIOLOGY OF FISHES
Credits: 02 (Marks: 50)
Periods: 45

ENDOCRINOLOGY 20

1. History of endocrinology
2. Hypothalamus as a neuroendocrine organ
3. Fish pituitary gland: Structure and functions of different cells involved
4. Role of fish pituitary gland in reproduction
5. Structure and function of other endocrine glands of fishes: Pineal, Thyroid, Adrenal, Islets of Langerhans, gonads, etc
6. Hormonal regulation in Carbohydrate, Protein and Calcium Metabolism
7. Study of hypophysation technique and different commercial synthetic hormones used for induced breeding of fishes

Physiology 25

1. Water as a biological medium for fishes
2. Gas exchange, circulation, excretion and osmoregulation in fishes.
3. Digestive fish physiology
4. Standard and active metabolism in fishes.
5. Effect of environmental factors on physiology of fishes
6. Stress related physiological changes in fishes
7. History of artificial reproduction in fishes
8. Different methods used for isolation of fish pituitary gland
9. Preparation of crude fish pituitary gland extract and preservation techniques
10. Methods of administration of crude pituitary gland extract in fish for induce breeding Hardy-Weinberg'sLaw.

B. Sc. Second Semester
Course Code - Fish- 106
FISHRY Paper:VI
Practical Based on
LIMNOLOGY, ENDOCRINOLOGY AND PHYSIOLOGY OF FISHES

Credits1.5

1. **Agnatha:**Study of specimens:*Petromyzon,Myxine*
2. **Fishes:**Study of specimens: *Scoliodon, Sphyrna, Pristis, Torpedo, Chimaera, Mystus,Heteropneustes, Labeo, Exocoetus, Echeneis, Anguilla, Hippocampus, Tetrodon/ Diodon,Anabas, Cyannoglossus.*
3. **Dissection of wallago attu / any locally available teleost.Dissection – digestive system, urinogenital system (male & female),Ventral aorta and afferent branchial arteries, brain, weberian ossicle, airbladder**
4. Estimation of oxygen consumption of fish
5. Estimation of ammonia excretion of fish
6. Different methods used for blood collection of fish
7. Estimation of different blood parameters of fishes

SuggestedReadings:

LIST OF REFERENCE BOOK

1) General and applied ichthyology – S.K. Gupta, P.G. Gupta, S. Chand Publishing company, New Delhi.

2) An introduction to fishes – S.S. Khanna, Central Book Depot, Allahabad.

3) A text book of fish, fisheries and technology – K. P. Biswas, Narendra publishing house, New Delhi.

4) A manual of aquaculture – Santhanam, Narendra publishing house, New Delhi.

5) Fish and fisheries – Pandey, Shukla, rastogi publication, Merrut.

6) Inland fisheries (ecology and management) – R.L. welcome. Discovery publishing house, New. Delhi.

7) Manual of Fishery Science - A .D. Mohekar, S.M. Kamble, H.K. Bhagwan, D.N. Chinte . Geeta Pralashan ,Hyderabad.

8) A text book of fishery science and Indian fisheries – C.B.L. Shrivastava. Kitab mahal Allahabad.

9) A manual of fishery science – A.D. Mohekar, K.R. Reddy, M.G. Babre. Manjusha publication, Naldurg (M.S.)

10) Applied fishery science – vol. I, II S.M. Shafi. Atlantic publishers and distributors, New Delhi

11) An introduction to Indian fisheries – Mrs. Uma Sharma, S.P. Grover. Bisensingh, Mahendra Pal Singh, Cannot place, Deharadunn.

12) An introduction to fishes – H.S.L. Bhamrah and K. Juneja. Anmol publication, New Delhi

13) Fish and fisheries of India – V.G. Jhingran. Hindustan publishing corpo. New Delhi

14) Wallago attu (Freshwater shark of India) – B.M. Sinha. Hindustan publishing corp. New Delhi.

15) Fish culture in India – Alikunhi

16) Aquaculture – BardarchRyther, M.C. Larney

17)Hand book of Inland Aquatic Ecosystem Mamagement.

18)S.Jorgensen,J.Tundisi,T.M.Tundisi

19)Limnology:Lake and River ecosystems.
Robert G. Wetzel 3rd edition.

20)Textbook of Limnology.
Gerald Cole, Paul weihe 5th Edition.

Limnology : In the Indian subcontinent
AR ZAFAR, ATIYA KHANUM

FUNDAMENTALS OF LIMNOLOGY
JAYASHREE DATTA MUNSHI
JYOTISWARUP DATTA MUNSHI

21)"A textbook of fish biology and fisheries" by S. S. Khanna and H. R. Singh (Narendra Publication House, New Delhi., 2006)

22)"Introduction to fish physiology" by Lynwood S. Smit (Narendra Publication House, New Delhi., 2003)

23)"Breeding and seed production of finfishes and shellfishes" by Thomas, Rath and Mohapatra. (Daya Publication House, New Delhi., 2003)

24)"Handbook of fisheries and aquaculture" by Dr. S. Ayyappan (Indian Council of Agricultural Research, New Delhi)

Dr.BabasahebAmbedkarMarathwadaUniversity, Aurangabad
SemesterPattern
Curriculum under Choicebased Credit System
(CBCS) Faculty of Science and Technology Department of Fishery Science
Course Structure and Examination Scheme
B.Sc.SecondYear(Semester–III)

Class/Semester	Code	CourseTitle	Credits	Period/week	Examination Scheme			
					Maximum Marks	UA	CA	MinimumPassing
B.Sc. S.Y SemesterThird	Fish-201	Fundamentals of Aquaculture	2	(3/week)	50	40	10	20
	Fish-202	Fish Breeding and seed production	2	(3/week)	50	40	10	20
	Fish-203	PracticalPaper basedonPaper 201	1.5	(3/weekBatch)	50	50Annual Exams.	-	20
	F-204	PracticalPaper basedonPaper 202	1.5	(3/weekBatch)	50	50Annual Exams.		
SkillEnhancementCourse(SEC) (Any One)	Fish-SEC-205	Fabrication of Aquarium(Theory)	1	(1/Week)	50	2	50/20	
	Fish-SEC-206	Induced Breeding of Fishes(Theory)	1	(1/Week)	50			
	Fish-SEC-207	Fabrication of Aquarium(Practical)	1	(1/Week)	50			
	Fish-SEC-208	Induced breeding(Practical)	1	(1/Week)	50			

B.Sc.SecondYear(Semester–IV)

Class/Semester	Code	CourseTitle	Credits	Period/week	Examination Scheme			
					Maximum Marks	UA	CA	MinimumPassing
B.Sc. S.Y SemesterThird	Fish-209	Fish Pathology	2	(3/week)	50	40	10	20
	Fish-210	Coastal Aquaculture and Mariculture	2	(3/week)	50	40	10	20
	Fish-211	PracticalPaper basedonPaper209	1.5	(3/weekBatch)	50	50Annual Exams.	-	20
	Fish-212	PracticalPaper basedonPaper210	1.5	(3/week Batch)	50	50 Annual Exams.		
SkillEnhancementCourse(SEC) AnyOne	Fish-SEC-213	Cryopreservation(Theory)	1	(1/Week)	50	2	50/20	
	Fish-SEC-214	Fish Food(Theory)	1	(1/Week)	50			
	Fish-SEC-215	Cryopreservation(Practical)	1	(1/Week)	50			
	Fish-SEC-216	Fish Food(Practical)	1	(1/Week)	50			