# DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD.

# SYLLABUS

## B.Sc. (FISHERY SCIENCE)

## I & II SEMISTER

# DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD.

## B.Sc. [FISHERY SCIENCE]

## I & II SEMESTER COURSE STRUCTURE

| Semester | Theory Paper | Paper No. | Credits | Practical Paper | Paper no. | Credits | Total Credits |
|---|---|---|---|---|---|---|---|
| 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. |
| I | Marphology & Taxonomy | I | 03 | Based on Theory – I | III | 1.5 | |
| | Anatomy & Physiology of Teleosts | II | 03 | Based on Theory – II | IV | 1.5 | |
| | | | **06** | | | **03** | **09** |
| | | | | | | | |
| II | Fish Ecology & Adaptations | V | 03 | Based on Theory – V | VII | 1.5 | |
| | Fish Pathology & Parasitology | VI | 03 | Based on Theory – VI | VIII | 1.5 | |
| | | | **06** | | | **03** | **09** |

# B.Sc. (Fishery Science) Semester – I

# Morphology and Taxonomy - Paper – I

## Unit – A

1. **Introduction and external characters of Fishes**

2. **Form and Locomotion :**
   Fins and locomotion, Types of locomotion, speed of travels.

3. **Median and Paired fins :**
   Types of caudal fins, pectoral and pelvic fins and their origin, Gill arch theory and Fin Fold Theory.

**1 Credit**

## Unit – B

1. **Epidermis and Exo-Skeleton :**
   Structure and functions of the skin, Types of scales and their functions.

2. **Origin and Evolution of Fishes :**
   Introduction, Origin of Cartelagenous and bony fishes, Evolution of Fishes.

3. **General Characters, Identifications and Systematic position of fishes among Chordates.**

**1 Credit**

## Unit – C

1. **Broad out line classification of fishes :**
   Introduction, Classification (Berg, Romer, Berlin and Aram Bourg, Green Wood et.al, Lander and Lien and Pough et.al.)

2. **Cyclostomes :**
   Petromyzontia, Myxinodea, Lampreys and Hag fishes.
   Affinites of Cyclostomes.

3. **Elasmobranchs :**
   General characters of sharks and rays.

   **Holocephali :**
   Salient features and its affinities

   **Dipnoi :**
   General characters and affinities.

   **Teleostomes :**
   Characteristic features upto major orders.

**1 Credit**

**Total 3 Credits**

# B.Sc. (Fishery Science) Semester – I
# Anatomy and Physiology - Paper – II

**Unit – A**

1. **Axial Skeleton**
2. **Visceral and Appendicular Skeleton**
3. **Alimentary Canal and associated digestive glands, physiology of digestion.**

**1 Credit**

**Unit – B**

1. **Structure and function of gills, physiology of respiration, accessory respiratory organs.**
2. **Structure and function of heart, Arterial and Venous system, blood and its components.**
3. **Structure and function of kidney, Osmoregulation.**

**1 Credit**

**Unit – C**

1. **Male and Female Reproductive Organs, Maturation and Spawning.**
2. **Structure of Brain, Cranial Nerves and Spinal Nerves.**
3. **Endocrine glands in Fishes :**
   Structure and Functions of Pituitary gland and Thyroid gland.

**1 Credit**

**Total 3 Credits**

# B.Sc. (Fishery Science) Semester – I
# **(Practical based on Theory - Paper – I)**
## Paper - III

1. **Identification and Classification of Fishes from :**

   a) Holocephali (Three from each class)

   b) Dipnoi (Three from each class)

   c) Elasmobranchs (Three from each class)

   d) Teleosts (Three from each class)

2. **Different types of mouths in fishes.**

3. **Different types of Caudal fins, Pectoral and Pelvic fins.**

4. **Temporary and Permanent mounting of scales.**

   a) Placoid Scales

   b) Cycloid Scales

   c) Ctenoid Scales

**1.5 Credit**

# B.Sc. (Fishery Science) Semester – I
# **(Practical based on Theory - Paper – II)**
## Paper - IV

1. **Dissection : (Any local available bony fish)**

   a) Digestive system
   b) Respiratory System :
      Gills and accessory respiratory organs
   c) Heart, Afferent and Efferent Branchial vessels
   d) Brain, Cranial nerves
   e) Male and Female Reproductive System

2. **Histology :**

   T.S. of Stomach
   T.S. of Intestine
   T.S. of Liver
   T.S. of Kidney
   T.S. of Ovary
   T.S. of Testis
   T.S. of Pituitary gland

3. Detection of Digestive Enzymes :

   i) Proteases
   ii) Amylase
   iii) Lipase

**1.5 Credit**

# B.Sc. (Fishery Science) Semester – II
# **Fish Ecology and Adaptations**
# Paper - V

## Unit – A

1. **Introduction of Ecology**
   * Primary productivity of water mass and fish Production
   * Tropic levels of Fish in Food Chain
   * Pyramid of numbers
   * Predator – Prey relationship

2. **Ecology of Fresh Water**
   Ecology of managed Fish Farm, Ponds, Rivers, Streams, Reservoirs and Lakes

3. **Ecology of Brackish and Marine water**

**1 Credit**

## Unit – B

1. **Water Pollution :**
   Introduction, causes of pollution, Type of pollution, Effect of pollutant on fishes, Preservation and Control of water pollution.

2. **Migration of Fishes**

3. **Adaptations of Fishes to Environment**

   a) Density and pressure of the water

b) Salinity
c) Temperature
d) Salt Content
e) Gases in solution
f) Light
g) pH

**1 Credit**

**Unit – C**

1. **Adaptation in the Hill stream Fishes**

2. **Adaptation in Deep Sea Fishes**

3. **Adaptation in Exotic Fishes**

**1 Credit**

**Total 3 Credits**

# B.Sc. (Fishery Science) Semester – II
# **Fish Pathology and Parasitology**
## Paper - VI

**Unit – A**

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**

**1 Credit**

**Unit – B**

1. **Nutritional diseases and aliments from environmental factors**

2. **Disease caused by parasites and pathogens and its control measures**

3. **Fungal Diseases, Bacterial Diseases**

**1 Credit**

**Unit - C**

1. **Protozoan Diseases**

2. **Worm Diseases**

3. **Crustacean Diseases**

**1 Credit**

**Total 3 Credits**

# B.Sc. (Fishery Science) Semester – II
# **(Practical based on Theory Paper – V)**
# Paper - VII

1. **Identification of Fishes from different habitat**

   1) Fresh water habitat (Any Three)

   2) Brackish water habitat (Any Three)

   3) Marine water habitat (Any Three)

2. **Identification of Fishes with special reference to the adaptive characters of the following.**
   Exocoetus, Hippocampus, Echienus, Pristis, Hemirampus, Zygaena, Trygon, Torpedo, Cynoglossus, Fistularia, Diadon, Tetradon, Ostracian, Lophius.

3. **Water Analysis**

   Estimation of **$O_2$, $CO_2$, Alkalinity**

   Find out the values of **pH** from different solution

**1.5 Credit**

# B.Sc. (Fishery Science) Semester – II

## (Practical based on Theory Paper – VI)

Paper - VIII

1. **Identification of Fish Parasites Cestodes and Nematodes.**

2. **Identification and description of the following parasites**
   Dactalogyrus, Gyrodactylus, Tape worm, Hirudenaria, Argulus, Ichthiopthtrius, Trochodina, Eimera, Larnea.

3. Collection of Parasites

**1.5 Credit**

# List of Books Recommended for Paper – I & II


1. Khanna S.S. and H.R.Singh (2003): A text book of fish biology and fisheries. Narendra publishing house, New Delhi – 110 006.
2. Pandey A.K. and Sandhu G.S. Encyclopedia of fishes and fisheries of India Vol. I & IV, Amol publication, New Delhi.
3. Smith, L.S. Introduction of fish physiology. Narendra publishing house, New Delhi.
4. Yadhav, B.N. Fish endocrinology. Daya Publishing House, New Delhi.
5. Matty, A.J. and C. Room. Timber Press, Protland, Oregon.
6. Hoar and Randall. Fish endocrinology Vol. I to VII. Academic press, INC (London) Ltd.
7. Yadhav, B. N. Fish & Fisheries, Daya Publishing House, New Delhi.
8. Khanna S.S. An Introduction to Fishes. Central Book Depot, Allahabad.
9. Norman, J. R. A History of Fishes. Earnest Benn. Ltd. London.
10. Reddy K.R. and M.G. Babare. A manual in fishery science.
11. Reddy K.R. and M.G. Babare. A general topics in fishery science.
12. Sharma P.D. Ecology and Environment. Rastogi Publications, Merrut.
13. Srivastava, C.B.L. A text book of fishery science and Indian fisheries, Kitab Mahal, Delhi.
14. Nikolsky, G.Y. The ecology of fishes. Academic Press, London.
15. Biswas K.P. Prevention and control of fish and prawn diseases. Narendra publishing house, New Delhi.
16. Weatherley A. H. Growth and ecology of fish populations, Academic Press, London.
17. C.Van Duitan. Diseases of fishes Jr. book Lt. London.
18. Wench. Limnology.
19. Gotterman et.al., Methods of physical and chemical analysis.
20. Santaram, R. P. Velayutham and G. Tegateesan. A manual of fresh water ecology. Daya publishing house, New Delhi.
21. Medical Parasitology – T. C. Chang.