B. Sc. Part II Fisheries
[Introduced from June 2014 onwards]

Semester III

Paper I - (Fishery Biology I)

A) Lectures / contact hours per unit - 11
B) Contact hours per practical – 04

UNIT-I

1. An introduction to Fisheries: 04
1.1 History in brief.
1.2 Inland, marine, capture and culture fisheries.
1.3 A broad outline of fishery activity:
i. Fishing.
ii. Processing
iii. Marketing
1.4 Importance of fisheries.

2. Taxonomy of Shell-fish: **0**3
2.1.Classification and General characters of Crustacea and Mollusca.

3. Taxonomy of Fin-fish: 05
3.1 General outline of the classification.
3.2 Chondrichthyes ,Osteichthyes and Dipnoi.

UNIT-II

4. External Morphology of : **0**4
4.1 Bivalve- Unio.
4.2 Typical cartilaginous fishes - Scoliodon
4.3 Typical bony fish- Labeo
4.4 Typical lung fish - Protopterus.

5. Internal Anatomy of Fin fish : Scoliodon **0**7
With reference to –
5.1 Digestive system
5.2 Circulatory system
5.3 Excretory and reproductive system
5.4 Brain

UNIT – III

6. Internal Anatomy of Fin fish : Labeo 07
With reference to –
6.1 Digestive system
6.2 Circulatory system
6.3 Excretory and reproductive system
6.4 Brain

7. Economic importance of the following: 04
Sponges, Prawn, Unio, Oyster, Scoliodon, Harpodon, Pomphret, Sardine, Labeo and Catla

UNIT – IV

8. Study of the following general topics : 11
8.1 Study of fins: Evolution of paired and unpaired fins in fishes
8.2 Swim bladder.
8.3 Migration in fishes.
8.4 Locomotion in fishes : Carangiform, Anguilliform and Ostraciform
8.5 Lung Fishes.

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Total periods 45

N.B. -Figures to the right indicate the number of lectures.

Semester III

Paper – II (Fish Physiology – I)

UNIT – I

1. Nutrition: 06

1.1 Food and Feeding.
1.2 Physiology of digestion.
1.3 Assimilation.

2. Respiration: 07

2.1 Types of gills.
2.2 Mechanism of respiration.
2.3 Accessory respiratory organs- Anabas, Clarias and Saccobranchus.

UNIT- II

3. Circulation: 06

3.1 Composition and functions of blood
3.2 Structure of heart in Scoliodon and Labeo
3.3 Mechanism of circulation in Scoliodon and Labeo

4. Excretion: 06

4.1 Osmoregulation in freshwater, marine and diadromous fishes.
4.2 Structure and function of kidney.
4.3 Excretory function of gills.

UNIT- III

5. Reproduction : 10

5.1 Modes of Reproduction:
Oviparity,Viviparity, Ovo- viviparity and Hermaphroditism.
5.2 Maturity stages in gonads:
i) Resting phase (immature)
ii) Early maturing phase.
iii) Advanced maturing phase.
iv) Matured phase.
v) Spawning phase.
vi) Spent phase.

UNIT- IV

6.Sense organs : 10

6.1 Olfactory Organs:
6.2 Taste buds.
6.3 Eye.
6.4 Membranous labyrinth.
6.5 Lateral line system.
6.6 Ampullae of Lorenzini.
6.7 Weberian ossicles.

Total periods -45

N.B- Figures to the right indicate number of lectures.

Fisheries Semester IV

Paper III - Inland Fisheries

UNIT- I

1. Freshwater Habitat : 05

1.1 Introduction.

1.2 Characters and classification of :

Ponds, Lakes, Streams, Rivers and Reservoirs.

2. Freshwater Ecosystems in Ponds , Rivers and Reservoirs. 08

With respect to:

2.1 Food chain.

2.2 Food web.

2.3 Primary productivity.

UNIT- II

3. Inland Capture Fisheries: 10

3.1 Riverine capture fisheries.

3.2 Reservoir capture fisheries.

3.3 Lacustrine capture fisheries.

UNIT- III

4. Fishing Crafts and Gears: 12

4.1 Fishing Crafts:

Rafts, Catamaron, Canoes, Machwa, Trawler.

4.2 Fishing Gears :

Hooks and Lines, Cast net, Gill net, Trap net,

Rampani net and Trawl net.

UNIT- IV

4.3 Maintenance of Fishing Crafts and Gears. 03

5. Water Pollution: 07

5.1 Types of water pollutants.

5.2 Effects of pollutants on fishes.

5.3 Preventive measures.

Total periods 45

N.B- Figures to the right indicate number of lectures

Semester IV

Paper IV (Aquaculture)

UNIT- I

1. Introduction to Aquaculture: 05

1.1 Basic Aquaculture- Definition and scope.
1.2 History of Aquaculture- Origin and growth.
1.3 Present national and global scenario.
1.4 Comparison of aquaculture and agriculture.

2. Types of aquaculture: 07

2.1 Semi Intensive, Intensive and Extensive aquaculture.
2.2 Pond culture.
2.3 Pen and cage culture.
2.4 Running water culture.

UNIT- II

3. Criteria for selection of aquaculture species. 03

4. Major species for freshwater aquaculture. 03

5. Prerequisites of site selection: 04

5.1 Topography
5.2 Soil type.
5.3 Water supply.

UNIT- III

6. Layout of Fish farm: 04

6.1 Types of ponds.
6.2 Construction of pond.

7. Physico- chemical conditions of fish pond: 07

7.1 Physical conditions: Depth, Temperature, Turbidity, Light.
7.2 Chemical conditions: Oxygen, Carbon dioxide, PH , Organic and inorganic contents.

UNIT– IV

8. Freshwater Plankton: 06

8.1 Definition and classification
8.2 Morphological study of :
a) Phyto- plankton
b) Zoo-plankton
8.3 Importance of plankton

9. Aquarium Fishery: 06

9.1 Setting of an aquarium.
9.2 Common aquarium fishes:
a) Angel fish.
b) Gold fish.
c) Guppy fish.
d) Gourami.
e) Swordtail Fish.
f) Molly. ---------
9.3 Maintenance

Total periods -45

N.B- Figures to the right indicate number of lectures.

List of Recommended Books :

1) Fish and Fisheries of India : V. G. Jhingran. Hindustan Publication Corp. (India), Delhi.

2) Tropical Fish Farming : D. K. Belsare. Environmental Publi. Karad, Maharashtra.

3) Aquaculture : J. E. Bardach. J. H. Ryther and W. O. McLarney.

4) Textbook of Fish Culture : Breeding and Cultivation of Fish. Mare. Huet.

5) Freshwater Fish Pond Culture and Management. M. Chakrof.9

6) Text Book of Aquaculture. M. S. Reddy.

7) Encyclopaedia of Fishes and Fisheries of India. A. K. Pandey. G. S. Sandhu Vol. IV.
Anmol Publi. New Delhi.

8) A Handbook of Fish Farming : S. C. Agarwal, Narendra Publication House, Delhi.

9) A Textbook of Fishery Science and Indian Fisheries : C. B. Shrivastav. Kitab Mahal, New Delhi.

10) A Manual of Freshwater Acquaculture : R. Santhanam. N. Sukumaran and P. Natrajan.

11) Methods of Physical and Chemical Analysis of Water : Gotterman et.al.

12) An Introduction to Fishes : S. S. Khanna. Central Book Depot. Allahabad.

13) Manual of Methods in Fish Biology : S. P. Biswas.

14) Manual in Fishery Science : K. R. Reddy and M. G. Babare.

15) Aquarium System : 1981 : A. D. Hawkins. Academic Press.

16) Aquarium Fishes and Plants : K. Bajaj and R. Zukal Himalayan Publication.

17) Freshwater Aquarium : J. A. Dawas. Robort Royce. Ltd.

18) Ecology - P.D. Sharma.

Practical course in Fisheries for B.Sc. II (Annual)

Practical- I

UNIT -I

1. Taxonomy of fin fishes;

Classification of the following fishes up to families:

Scoliodon, Pristis, Torpedo, Chimaera, Polypterus, Acipenser, Amia, Lepidosteus, Harpodon, Eel, Labeo, Clarias, Exocoetus,Hippocampus,Ophiocephalus, Anabas, Pleuronectus, Echeneis,Tetradon and Antennarius.

2. Taxonomy of shell fishes:

i. **Crustacea**: Prawn, lobster and crab.

ii. **Mollusca**: Unio, Pearl oyster and Sepia.

UNIT-II

3. Morphology of Scoliodon and Labeo.

4. Dissection of Catla,Mrigal or Cyprinus:

4.1 Digestive system.

4.2 Heart and major blood vessels. **(Demonstration)**

4.3 Brain.

4.4 Weberian ossicles.

4.5 Mountings: Cycloid scale and swim bladder.

5. Demonstration of accessory respiratory organs in 5.1 Anabas.

5.2 Clarias.

5.3 Saccobranchus.

UNIT-III

6. Study of Fin:

6.1 Paired fins: Pectoral and pelvic fins.

6.2 Unpaired fins: Dorsal, ventral and different types of caudal fins.

7. Mounting of the following scales:

Placoid, Cycloid and Ctenoid scales.

8. Study of different types of swim bladders.

UNIT –IV

9. Economic importance of the following:

Sponges, Prawn,Oyster, Bivalve, Scoliodon, Pomphret, Harpadon, Sardine, Labeo.

10. Estimation of total glycogen, protein and lipid in fish organs.

[Note: Sketches, Specimen/photographs may be used]

B.Sc.Part II Fisheries

Practical II

UNIT-I

1. Estimation of the following chemical factors from water sample.

1.1 Dissolved oxygen.

1.2 Free carbon dioxide.

1.3 Alkalinity

1.4 Hardness

2. Determination of primary productivity

UNIT-II

3. Study of Crafts and Gears:

3.1 Crafts - i. Raft. ii. Catamaran. iii. Dugout canoe. iv.Trawler

3.2 Gears - i. Cast net. ii. Gill net. iii.Rampani net.

iv. Trawl net.

UNIT-III

4. Study of planktons:

4.1 Quantitative estimation of plankton.

4.2 Qualitative estimation of zoo-plankton.

5. Study of life cycle in Labeo- Egg and sperms, fertilized egg, hatchling, fry, fingerling and adults.

UNIT-IV

6. Aquarium fishery:

6.1 Demonstration of tank fabrication.

6.2 Setting of an aquarium.

6.3 Aquarium fishes: i) Angel. ii) Gold fish. iii) Guppy.

iv) Gouramy. v) Molly. vi) Swordtail fish.

7. Visit to fish seed production center/local fish market and

submission of the report.

Distribution of Marks for Theory Examination for Fisheries Paper I, II, III and IV

Common Nature of Question paper as per Science Faculty.

Distribution of Marks for Practical Examination(from 2013 onwards)

Practical – I

1. Dissection – Major	12
2. Demonstratin – Minor	06
3. Temporary Mounting	07
4. Estimation of glycogen / protein / lipid	10
5. Identification	10
6. Journal	05

Total marks 50

N.B.Figures to the right indicate full marks.

Practical – II

1. Estimation of dissolved O2/ Free CO2.	10
2. Estimation of Alkalinity/Primary Productivity/Hardness	10
3. Mounting / Quantitative estimation of Planktonic Forms	05
4. Identification	10
5. Tour Report	10
6. Journal	05

Total marks 50

N.B.Figures to the right indicate full marks.

B.Sc. II : Fisheries Equivalence to Old Syllabus

Old Paper – Sem-III – Paper I : Fishery Biology I and Paper II Fish Physiology I
New Paper, Sem-III – Paper I : Fishery Biology I and Paper II Fish Physiology I
Old Paper – Sem-IV– Paper III : Inland Fisheries and Paper IV Aquaculture
New Paper , Sem-IV– Paper III : Inland Fisheries and Paper IV Aquaculture