

**Govt. Degree College Baramulla
(Autonomous)**

SEMESTER 3rd

COURSE - MAJOR/MINOR

Subject: Industrial Fish and Fisheries

Title: Capture Fisheries

Code: IFF322N

Credit: (4+2) Theory: 04; Practical: 02

Contact Hours: 64 (Theory) + 64 (Practicals)

Part 1: Theory (4 Credits)

Course Objectives:

- *To introduce students to the basic concepts of capture fisheries.*
- *To provide knowledge about freshwater fisheries of rivers, lakes, reservoirs and streams.*
- *To understand the basic concepts of Estuarine and Marine Fisheries.*

Expected learning outcomes:

On completion of the course, the student should be able to understand:

- *The status and importance of capture fisheries.*
- *Differentiate between freshwater, Brackishwater and Marine fisheries*
- *Proper management practices of capture fisheries*

Capture Fisheries

UNIT I: Introduction – Inland capture fisheries

- 1.1 Capture fisheries and its importance
- 1.2 Inland capture fisheries resources of India
- 1.3 Riverine fisheries with special reference to that of Ganga, Brahmaputra and Indus river system.
Fisheries of River Jhelum
- 1.4 Cold water fisheries (Trout and Mahseer)

UNIT II: Lacustrine and Reservoir fisheries

- 2.1 Lacustrine fisheries - Origin, Classification, Ecology and productivity of lakes
- 2.2 Fisheries of Wular lake and Dal lake
- 2.2 Reservoir fisheries with special reference to reservoirs of J&K (Ranjeet Sagar, Uri Hydel power project reservoir and Bhagliar Reservoirs)
- 2.4 Fish passages and their importance

UNIT III: Brackishwater Fisheries

- 3.1 Brackish water fisheries resources of India
- 3.2 Fisheries of Brackish water lakes (Chilka and Pulicat Lake)
- 3.3 Estuarine fisheries with special reference to Hoogly Matlah Estuary
- 3.4 Fisheries resources of Backwaters

UNIT IV: Marine Fisheries

- 4.1 Marine fisheries resources of India

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4.1.1 Inshore fisheries

4.1.2 Off- shore fisheries

4.2 Concept of EEZ

4.3 Fisheries of important finfishes – Oil Sardine, Indian mackerel, Bombay duck and Tuna.

4.4 Fisheries of important shellfishes – Shrimps (White prawn & Tiger prawn), Lobsters, Crabs and Pearl oysters

Part 2: Laboratory Course (2 Credits)

Course Objectives:

- To study different fish harvesting methods.
- To study the procedure of collection and recording of fish/fisheries data
- To demonstrate the external morphology of Inland, Brakishwater, Marine fish species

Learning outcomes:

On completion of the course, the student must be well aware of:

- Various methods of collection of fish and fisheries data from natural resources
 - Identification and working of different fishing gears
 - The knowledge of identification characters of commercially important capture fish species.
1. Morphological study of Inland, Brakishwater, Marine fishes – *Catla catla*, *Labeo rohita*, *Cirrihinus mrigal* *Tor putitora*, *Onchorhynchus mykiss*, *Salmo trutta*, *Schizothorax*, *Chanos chanos*, *Sardinella longiceps*, *Tunnas*, etc.
 2. Design and working of fishing gears.
(a) Fishing Rods (b) Cast Net (c) Drag net (d) Gill net
 3. Field Visits to observe fishing and collect field data regarding species composition, craft, gear and field problems regarding Riverine, Reservoir and Cold water fisheries.

SUGGESTED READINGS

1. Jhingran, V.G: Fish and Fisheries of India, 1997
2. Jayakumar, N, Ahilan, B and Felix S : Inland Fisheries, 2000
3. Khanna, S.S and Singh, H.R : A textbook of Fish Biology and Fisheries, 2005
4. Mishra, R: Practical Manual of Craft, Gear and Fishing Technology, 2019
5. Singh, H.R and Lakra, W.S, Coldwater Aquaculture and Fisheries, 2000
6. Bal, D.V and Rao K.V, Marine Fisheries of India, 2002
7. Kurian, C.V and Sevastiah, V.C, Prawn and Prawn Fisheries of India, 2003
8. Parihar, R.K: A Handbook Of Fish Biology & Indian Fisheries
9. Gupta, S.K. Gupta, P.C. General and Applied Ichthyology, 2006
10. Pandey, Kamleshwar, Shukla, J.P: Fish and Fisheries, 2018

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Semester 3rd

Skill Enhancement Course

Subject: Industrial Fish and Fisheries

Title: Commercial Fish Farming –III (Cold water Aquaculture)

Code: IFF322S

Credit: (2+2) Theory: 02; Practical: 02

Contact Hours: 32 (T) + 64 L)

Part 1: Theory (2 Credits)

Course Objectives:

- *To provide basic knowledge about the cold water fisheries with special reference to the Valley of Kashmir.*
- *To provide knowledge about culture and breeding of cold water fish species – indigenous as well as exotic.*

Expected Learning outcomes:

This course will be helpful in generation of self-employment by rearing of cold water fishes in backyard ponds on small as well as large scale. Also the stakeholders can avail different government schemes for establishing trout culture unit.

UNIT I: Basics of Cold water Aquaculture

(15 Contact hours)

- 1.1 Cold water fisheries and its resources in India
- 1.2 Important coldwater fishes of India and their distribution
 - 1.2.1 Indigenous – Mahseer and Schizothorax
 - 1.2.2 Exotic - Trout
- 1.3 Culture of Mahseer – Artificial breeding, Hatchery Management, Larval rearing, Nursery rearing and growout rearing
- 1.4 Polyculture of exotic carps in mid hill region based on three Chinese carps – Silver carp, grass carp and common carp.

Unit II: Trout farming

(15 Contact hours)

- 2.1 History of introduction of Trout in India
- 2.2 Introduction and propagation of trout fisheries in Kashmir
- 2.3. Site selection and Layout of trout fish farm
- 2.4 Cultural practices of trout
 - 2.4.1 Maintenance of brood stock
 - 2.4.2 Artificial breeding, stripping, fertilization, incubation, hatching
 - 2.4.3 Nursery rearing

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2.4.4 Raceway rearing – different types of raceways

2.4.5 Feeding of trout at different stages.

2.5 Govt. assistance in establishing trout farm in J&K

Part 2: Laboratory Course (2 Credits)

1. Study of Morphological characters of cold water fishes – Indigenous and exotic
2. Identification of eggs, larval and post larval stages of different cold water fish species – Mahseer, Schizothorax and Trout.
3. Design and management of aqua-hatcheries (Mahseer & Trout).
4. Field visit to various fish farms and hatcheries to observe cultural and breeding practices of Mahseer and Trout and submission of report thereafter.

Books Recommended:

1. Singh, H.R and Lakra, W.S: Coldwater Aquaculture and Fisheries,2000
2. Food and Agriculture Organization of the United Nations Rome: Cold water fisheries in the trans-Himalayan countries, 2002
3. Jhingran, V.G and Sehgal K.L: Coldwater fisheries of India, Inland Fisheries Society of India, 1978
4. Springer: Fisheries and Aquaculture of the Temperate Himalayas, May 2023
5. Parihar, R.K: A Handbook Of Fish Biology & Indian Fisheries
6. Gupta, S.K. and Gupta, P.C : General and Applied Ichthyology,2006
7. Pandey, Kamleshwar,. Shukla, J.P: Fish and Fisheries, 2018

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COURSE – MULTIDISPLINARY COURSE

Subject: Industrial Fish and Fisheries

Title: APPLIED FISHERIES

CREDIT: 03

Code: IIF022I

CONTACT HOURS: 48

Course Objectives:

- *To provide Basic knowledge about the basic and applied fisheries*
- *To provide knowledge about aquaculture, ornamental fisheries and fish products*

Learning outcomes:

This course will be helpful in generation of self-employment by encouraging entrepreneurship in fish farming, aquarium construction and management and diversification of fish products

Unit 1 - Fish Biology and Aquaculture

(15 Contact hours)

- 1.1 – General characters of fishes
- 1.2 – Nutritional value of fish
- 1.3 – Definition and scope of fisheries
- 1.4 - Definition and History of Aquaculture
- 1.5 - Prestocking management - Removal of weeds, removal of insects, liming
- 1.6 - Procurement and stocking of seed
- 1.7 - Post stocking management - Supplementary feeding, harvesting

Unit 2 – Ornamental Fisheries

(15 Contact hours)

- 2.1 – Aquarium and its types – All glass aquarium, Framed aquarium, Public aquarium
- 2.2 – Construction of Home aquarium
- 2.3 – Accessories used in aquarium – Aerator, Filter, Thermostat
- 2.4 – Setting of aquarium tank
- 2.5 – Common Aquarium fishes – Gold fish, Koi carp, Guppy, Sword tail, Gourami
- 2.6 – Maintenance of Aquarium – feeding, cleaning of aquarium tank and accessories

Unit 3 – Fish Products

(15 Contact hours)

- 3.1 – Preparation of fish products
 - 3.1.1 Fish cutlets,
 - 3.1.2 Fish balls,
 - 3.1.3 Fish wafers
 - 3.1.4 Fish fingers
 - 3.1.5 Fish wada
 - 3.1.6 Fish papad
 - 3.1.7 Fish pickle
- 3.2 – Extraction of fish oil
- 3.4 – Preparation and uses of fish meal

Books Recommended:

1. A Handbook Of Fish Biology & Indian Fisheries by R.K parihar
2. General and Applies Ichthyology by Gupta and Gupta
3. Fish and Fisheries by Panday and Shukla
4. A Manual of Fisheries Sciences by Tun tun Singh
5. Post-harvest Technology of Fish and Fish Products by Balachandran