

**D R. BABASAHEB AMBEDKAR
MARATHWADA UNIVERSITY,
AURANGABAD.**



Syllabus of

B.Sc. Second Year

[Fishery Science]

[Semester-III & IV]

(Effective from June-2010 & onwards)

B.Sc. –II (Fishery Science)

III & IV Semester Course Structure

Semester	Theory Paper	Paper	Practical Paper	Paper No.
1	2	3	4	5
III	Capture Fisheries	IX	Based on Theory-IX	XI
	Culture Fisheries -I	X	Based on Theory-X	XII
IV	Fish Technology & Population Dynamics	XIII	Based on Theory-XIII	XV
	Culture Fisheries - II & Aquarium Management	XIV	Based on Theory-XIV	XVI

B.Sc. (Fishery Science)

Semester – III

Capture Fisheries

Paper – IX

- Unit – A**
- 1) **Inland Fisheries resources of India.**
Riverine Fisheries – The Ganga river system,
Brahmputra river system, East coast river system,
West coast river system.
Reservoir fisheries
Cold water fisheries (8)
 - 2) **Estuarine fisheries resources of India -**
Principle fisheries of brackish water
Fisheries of Chilka, Pulicat and Kolleru lake (6)
- Unit – B**
- 1 **Marine capture fisheries resources of India -**
Commercially important fisheries in India
(Taxonomy; distribution, food and feeding and
catch trends of the following fisheries)
Oil Sardine fishery
Mackerel fishery
Bombay duck fishery
Pomfret fishery
Sole fishery
Hilsa fishery (20)
- Unit - C**
- 1 **Fisheries of Non fish organisms**
Prawn and Shrimp capture fishery
Crab capture fishery
Molluscan fisheries
Chank fisheries (11)

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Semester – IV

Culture Fisheries – I

Paper –X

Unit – A	1) Introduction and history of aquaculture	(2)
	2) Purpose, importance and advantages of aquaculture	(2)
	3) Fresh water fish culture	(8)
	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)	(5)
Unit – B	1) Preparation and management of nursery, rearing and stocking ponds	
	Predatory and weed fishes and their control	(2)
	Fertilization of the pond	(2)
	Aquatic weeds and their control	(3)
	Fish food organisms and their production	(2)
	Stocking, artificial feeding and harvesting	(3)
	2) Brackish water fish culture	
	Construction and management of brackish water fish farm	(3)
	Bhasa – Bhada and Non- Gheri farms	(2)
	Milk fish, Mullet and Tilapia culture	(6)
	3) Culture of Air Breathing fishes	(5)
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B.Sc. (Fishery Science)

Semester – IV

Fish Technology & Population Dynamics

Paper – XIII

- Unit – A**
- 1) **Fishing Craft**
 a) Catamaran b) Satpati c) Musula (5)
 d) Machwa e) Tuticorin
- 2) **Fishing Gears**
 A) a)Spear and harpoon b) Fish poison c) Hook and lines d) Fish traps e) Types of nets – Dip net or lift net, Cast net, Purse Seine net, Trawl or Drag net and Bag net.
 B) **Preservation of Gears** (12)
- Unit – B**
- 1) **Preservation and Processing of fish**
 Methods of Fish Preservation – Chilling, (16)
 Freezing, Freeze drying, sun-drying, smoking, salting, brining and canning; use of chemical and radiation.
- 2) **Fish Population**
 Structure of population
 Estimation of fish population
 (Direct / Indirect methods)
 Population dynamics (fluctuations) (04)
- Unit – C**
- 1) **Different stages of wooden boat** – construction (06)
 lofting, setting up the back bone assembly, template fixation, planking, farming, Deck laying, mechanical and electrical installations.
- 2) **Care and maintenance of boats** (02)

B.Sc. (Fishery Science)

Semester – IV

Culture Fisheries – II & Aquarium Management

Paper – XIV

- Unit – A**
- 1) **Mari Culture**
Cultivable Crustacean resources and their culture (6)
i) Prawn
ii) Crabs
Cultivable Molluscan resources and their culture
i) Mussels ii) Edible oyster iii) Pearl oyster
Sea weed culture (08)
- 2) **Fish Culture Methods -**
Pen culture
Cage culture
Sewage fed fish culture (6)
- Unit – B**
- 1) **Integrated fish farming practices**
Paddy cum fish culture
Poultry cum fish culture
Live stock fish culture (6)
- Unit – C**
- 1) **Aquarium Management**
Setting of aquarium (Gravels/Pebbles, Plants, Fishes and Ornamental objects) (6)
Selection of aquarium fishes and plants (5)
Maintenance of Aquarium – Cleaning, Water quality, Control of algal growth Common diseases and treatment of aquarium fishes (5)
(03)

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Semester – III

Practical based on Theory

Paper – IX

- Unit – A**
- 1) **Study of Inland Capture Fishes** (06)
 - a) Major carps (Any Three)
 - b) Other carps (Any Three)
 - c) Cat fishes (Any Three)
 - d) Clupeids (Any Three)
 - e) Other miscellaneous fishes (Any Three)
 - 2) **Study of Marine and brackish water Fishes** (05)

Hilsa ilisha, Rastrelliger kanagartha, Sardinella longiceps, Harpodon nehereus, Pampus – argenteus, Cynolossus spp. Trichurus sp. Scoliodon, Trygon, Pristis, Pangassium and Polynemous sp.
 - 3) **Study of Non Fish organisms** (04)

Prawns, Lobsters, Crabs, Shrimps, Mollusca, Chank, Sea weed (Gracillaria, Sargassum, Digenia)
 - 4) **Collection of fish species from different areas.** (15)

The same should be submitted at the time of practical exam.

B.Sc. (Fishery Science)

Semester – III

Practical based on Theory Paper – X

Paper no. XII

- Unit – A**
- 1) **Identification, Classification and Culturable significance of the following**
 - a) Fresh water fishes – (04)
Catla catla, Labeo rohita, Cirrhina mrigala
Cyprinus carpio, Channa Sp. Notopterus
sp., Clarius batrachus, Heteropheustes
fossilis.
 - b) Brackish Water Fishes – (01)
Tilapia mossambica, Mugil cephalus,
Chanos chanos.
 - c) Non fish organism – (03)
 - i) Prawns – Macrobrachium rosenbergii
and Penaeus sp.
 - ii) Lobsters
 - iii) Mussels – Mytilus Sp.
 - 2) Identification and Mounting of plankton – (03)
 - i) Phytoplankton (Any Three)
 - ii) Zooplankton (Any Three)
 - 3) Identification of Aquatic insects – (04)
Dragonfly (Nymph), Anisop, Ranatra, Balostoma,
Dytiscus
 - 4) Submission of Plankton slides and collection of (15)
fish species, fish food and fertilizers.

B.Sc. (Fishery Science)

Semester – IV

Practical based on Theory Paper – XIII

Paper no. IX (XV)

- 1) Study of fishing crafts (Models) Catamaran, Machwa, Satpati, Masula, and Tuticorine Type. (02)
- 2) Study of fishing gears (Models) Harpoon, Hook and lines, Dip net, Cast net Gill net, Drag net. (02)
- 3) Preservation of fish by sun drying and salting.
- 4) Identification of fishing materials (02)
 - a) Types of floats and sinkers
 - i) Glass
 - ii) Aluminium, Steel, HDP, Lead, Iron Chain
 - b) Fishing gear accessories –
 - i) Anchor shackle, Iron Sooivel, Marline spike, Thimble, G.link, Hook, Purse ring.
- 5) Make the following knots, Hitches and Bends in fishing gear. (02)
 - a) Knot – Overhand knot, Reef knot sheep Shank knot, figure of eight knot.
 - b) Hitches – Rolling hitch, Two half hitch, Marling hitch, Round turn and two half hitch, Clove hitch
 - c) Bends – Single sheet bend, Double sheet bend, Fishermen bend. (03)
- 6) Survey of Inland fishery resources of local reservoir and students should be submit a project report at the time of practical exam.
- 7) Submission of fishing gear

B.Sc. (Fishery Science)

Semester – IV

Practical based on Theory Paper – XIV

Paper no. XVI

- 1) **Identification of predatory and weed fishes.** (01)
 - i) Predatory fishes – Wallago attu, Anabus, Ophiocephallus.
 - ii) Weed fishes – Punctius, Aplocheilus, Rosbora (01)
- 2) **Identification of Aquatic Weeds –** (01)
 - i) Floating Weeds – Pistia, Lemna, Azolla, Wolfia, Eichhornia (Any two)
 - ii) Emergent Weeds – Nelumbium, Nymphoides, Nymphaea (Any one)
 - iii) Submerged Weeds – Vallisneria, (01)
Ceratophyllum, Utricularia, Potamogeton, Hydrilla, Nojons (Any two)
 - iv) Marginal Weeds – Typha, Sagittaria, (01)
Ipomea, Cyperus, Colocasia, (Any two)
- 3) **Removal of fish pituitary gland and preparation of pituitary extraction** (01)
- 4) **Preparation of home aquarium** (02)
- 5) **Identification of balanced and unbalanced aquarium** (02)
- 6) **Preparation of artificial fish food.** (02)
- 7) **Identification of aquarium fishes (Any five)** (02)

Note - 1) Educational tour to fresh water, Coastal water fish Farming & aquarium centre is compulsory, students should submit a study tour report at the time of examination.

B.Sc. - II Year (Fishery Science)

List of Books Recommended for Paper V & VI

- 1) Jhingran V. G. fish and fisheries of India. Hindustan publication Corpn.(India)Delhi.
- 2) John E.Bardach, John H.Ryther and William O. Mc. Larney Aquaculture.
- 3) Rath R.K. Fresh water Aquaculture. Scientific publishers, Jodhpur-342001 India.
- 4) M.Srinivaswa Reedy and K.R.S. Sambasiva Rao. Tex book of Aquaculture. Discovery publication House, New Delhi – 110002.
- 5) Vankhede G. N. And S. V. Deshmukh. Fresh Water Aquaculture Development and Management. Sarup and Sons, New Delhi-110002.
- 6) R.Santhanam, N.Sukumaran and P. Natrajan Fresh Water Aquaculture. Oxford & IBH publishing Co.Pvt. Ltd. New Delhi – 1100 01.
- 7) Pandey, A.K. and G.S. Sandhu. Encyclopaedia of Fishes and Fisheries of India (Vol.III & IV) Anmol Publications, New Delhi – 1100 02.
- 8) Khanna S.S. and H.R. Singh A Text book of Fish Biology & Fisheries Narendra Publication House, Delhi – 1110 006.
- 9) Belsare, D.K. Tropical Fish Farming Environmental publications, Karad – 415 110.
- 10) Srivastava C.B.L. Fishery Science and Indian Fisheries KitabMahal, New Delhi- 110 002.
- 11) Satyanarayan V.A. Symposium on Fish Culture, A Practical and Comprehensive guide on Inland Fish Farming compiled Narendra publishing house, Delhi – 1100 06.
- 12) Marcel Huet. Text book of fish culture Fishing News book. Ltd. Fornham, Surreys England.
- 13) Evira A. Baluyut, Aquaculture System and practices. A selected review. Daya publishing house, Delhi – 110 035.
- 14) Chakroff, M fresh water pond culture and management Scientific publishers, Jodhpur 342001.
- 15) Biswas K.P.A. Text book of Fish, Fisheries and Technology (2nd Edn.) Narendra Publication House – Delhi – 1100 06.
- 16) Bal, D.V. & Rao K. V. Marine Fisheries of India (1st Revised Edition) Tata Mc Graw –Hill Publication Company Ltd. New Delhi – 110 020.
- 17) Moorjani, M.N. Fish processing in India ICAR Publ. New Delhi – 1100 01.
- 18) Pandey, A.K. and G.S. Fish Farming Hand book. AVI Publ. Company West port, connectient.
- 19) Santhanam R. Velajutham and G. Jegatheesan. A manual of Fresh water ecology. Daya Publ. House. Delhi – 110006.

- 20) Chakrabarthy N.M. Biology Culture & production of Indian Major Carps A review. Narendra publ. House Delhi – 110006.
- 21) Mohekar A. D., Dr. K.R.Reddy and Dr. M.G. Babare. A Manual of Fishery Science, Manjusha publ. Naldurg -413 602.
- 22) Hall C.B. Pond and Fish Culture. Agro Botanical Publishers (India) Bikaner – 334003.
- 23) Chond S. L. Hypophysation of Indian Major Carps. Satish book Enterprise, Motikatra Agra-3
- 24) Benyami. Fishing with light. FAO by Fishing News books ltd. Surrey, England.
- 25) Winton and Winton Fish & fish Products. Allied Scientific Publisher, Bikaner.
- 26) Francis Cherunilam Fisheries; Globe perspective and Indian Development Himalaya publication Akola.
- 27) Maloo, R.A. A Practical approach to fresh water fish culture (Vol-I) Bharathi Publication Akola.
- 28) John C. Sainsbury. Commercial Fishing methods, An Introduction to Vessels and gear fishing news (Books) Ltd. Surey, England.
- 29) Reddy A. K. Chandra Prakash, R.P. Unyal Gaint Freshwater prawn culture CIFE, Versoa, Mumbai. -400061.
- 30) Dutta R. Tropical Fish; Setting up and maintaining Freshwater and Marine Aquaria 1972 Octopus books Ltd.
- 31) Hawkins A. D. (1981) Aquarium System, Academic Press.
- 32) Harnam P. Ward Lock (1981) Living Aquarium.
- 33) Rataj. K. and R. Zukal (1971) Aquarium Fishes and plants. Himalaya publication house.
- 34) Raw L.P. (1956) Ornamental Fish for Garden ponds and Home aquariums. Home aquarium.
- 35) Collins Guide to Aquarium Fishes and plants. 1969 Schiolz A Collins.
- 36) Vogl and H. Wermuth. Thames (1963) Complete Aquarium.
- 37) Dawas J.A. (1984) Freshwater Aquarium Robert Rovce Ltd.
- 38) Latha Shenoy (1987) Manual on Fishing Technology.
- 39) Latha Shenoy, Y Shreekrishna, S. Kamat (2004), Practical Course manual Fishing craft and Gear Technology.
- 40) CIFNET (1979) Hand book on basic Principles of construction & repairs of fishing nets.
- 41) FAO (1972) Catalogue of Fishing gears design. Fishing News books, pp 155.