

Department of Higher Education, Govt of M. P.

Under Graduate Annual System Syllabus

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As recommended by Central Board of Studies in Aquaculture and Environment.

Class - B.Sc. First Year
Subject - Aquaculture and Environment
Paper - I Ecology.

M M : 42^{1/2} Regular
: 50 Private

UNIT - 1.

1. The Ganga, The Brahmaputra and The Krishna rivers system : General Ecology.
2. The Narmada, The Kaveri and Tapti River n: General Ecology.
3. General Information regarding important reservoirs of MP for Fishery development. Ex. Narmada Sagar, Gandhi Sagar, Baragi, Tawa and Barna reservoirs.
4. Paddy Cum fish culture.
5. Oyster culture.

UNIT - 2.

1. Origin and evolution of fishes.
2. General Characters and outline classification of fishes upto orders.
3. Common culturable fishes in freshwater.
4. Common culturable fishes in brackish water.
5. Different types of aquaculture practices in India.

UNIT - 3.

1. General Account of external features of fish and its morphometry.
2. Digestive system in any major carp.
3. Construction of fish farms.
4. Management of hatcheries and nurseries and Management of stocking ponds.
5. Fishing Methods.

UNIT - 4.

1. Nervous System.
2. Endocrine System.
3. Urinogenital System.
4. Different Breeding Method of fish.
5. Skeletal system of fish.

UNIT - 5.

1. Methods of Phytoplankton and Zooplankton culture.
2. Frog culture.
3. Embryology of Major carps.
4. Preservation and processing of fishes.
5. Exotic fishes culture.

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As recommended by Central Board of Studies in Aquaculture and Environment.

Class - B.Sc. First Year
Subject - Aquaculture and Environment
Paper - II Ecology.

MM : 42^{1/2} Regular
: 50 Private

UNIT - 1.

1. An introduction of aquatic environment.
2. Abiotic factors in inland water,
3. Trophic structure in aquatic ecosystem.
4. Food web in ecosystem and its importance.
5. Ecological pyramids in a aquatic ecosystem.

UNIT - 2.

1. Biotic factors of inland water bodies : Primary & secondary productivity.
2. Control methods of aquatic macrophytes .
3. Soil and its properties in relation to water quality & productivity.
4. Biotic community – Concept and examples.
5. Biological indicators of ecosystem health.

UNIT - 3.


1. Methods to study fish population in inland water.
2. Ecology of lentic water.
3. Ecology of lotic water.
4. Water pollution and its effects on fish life.

UNIT - 4.

1. Causes of water pollution.
2. Effects of pollutants on aquatic life and precautions.
3. Concept of ecosystem – structure and functions with examples.
4. Productivity of inland water in relation of fish production.
5. Fish yield estimation : different models used.

UNIT - 5.

1. Identification and classification of aquatic insects.
2. Method used to control the aquatic insects in a typical pond.
3. Energy and food chain in ecosystem.
4. Grazing food chain in ecosystem.
5. Detritus food chain in ecosystem.


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As recommended by Central Board of Studies in Aquaculture and Environment.

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Class	-	B.Sc. First Year
Subject	-	Aquaculture and Environment
Paper	-	Practical

Exercises :

1. Visits to lakes and reservoirs and ponds of M.P.
2. Exercise in extraction of pituitary gland.
3. Study of Internal organs of Major Caprs.
4. Fish Food organism
5. Osteology of fish
6. Histology of fish
7. Study of Phytoplankton and zooplankton
8. Study of Biological indicators.
9. Study of fish population.
10. Study of sources of water pollution

Distribution of Marks for practical examination

Marks : 50

1. Dissection of fish (internal organs)	10
2. Determination of pH of water / Temperature / Dissolved Oxygen / Turbidity.	10
3. Systematic identification of fresh – water local water bodies – Area, Average depth in present used desamol and Perianmol	10
4. Fish morphometry : general parameters	10
5. Project	5
6. Practical Record and collection	5

C. C. E. (Regular only) 15 Total

Quarterly 5

Six monthly 10

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As recommended by Central Board of Studies in Aquaculture and Environment.

Class - B.Sc. First year.
Subject - Aquaculture and Environment

RECOMMENDED BOOKS

1. Fundamentals of Ecology – by Odum.
2. Ecology – by H. R. Singh.
3. Limnology – by Welch – I and II Volume.
4. Limnology – by Goldman.
5. Fundamental of Ichthyology – by S. P. Biswas.
6. Fish and Fisheries – by B. N. Yadav.

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Under Graduate Annual System Syllabus

As recommended by Central Board of Studies in Aquaculture and Environment.

Class - B.Sc. Second Year
Subject - Aquaculture and Environment
Paper - I Aquaculture.

M M : 42^{1/2} Regular

: 50 Private

UNIT - 1.

1. Morphometry of pond.
2. Basic consideration in the selection of species for culture.
3. Classification of freshwater fishes.
4. Management of fish ponds.

UNIT - 2.

1. Weed fishes and their eradication.
2. Fish enemies and their control.
3. Classification of fishes on the basis of their feeding habits.
4. Estimation of age and growth in fishes.
5. Classification of prawns.

UNIT - 3.

1. Fish stock improvement by hybridization technique.
2. Parental care in fishes.
3. Pig cum fish culture.
4. Fish cum duck culture.

UNIT - 4.

1. Nutritional requirements of cultivable fishes.
2. Fish feed formulation.
3. Nutritive value of some important Indian fishes.
4. Culture of murrels (Channa).
5. Culture of clarias batrachus.

UNIT - 5.

1. Economic importance of fishes.
2. Economics of aquaculture.
3. Pearl culture.
4. Aquarium and its maintenance.
5. Composite fish culture.

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As recommended by Central Board of Studies in Aquaculture and Environment.

Class - B.Sc. Second Year
 Subject - Aquaculture and Environment
 Paper - II Aquatic Environment.

MM : 42^{1/2} Regular
 : 50 Private

UNIT - 1.

1. Pollution due to industrial effluents.
2. Treatment methods of industrial effluents.
3. Physico – chemical parameters of water.
4. Role of microorganism in nutrient cycle : N & P.
5. Methods of water quality testing.

UNIT - 2.

1. Fish depletion and fish conservation & Endangered Species.
2. Concept of environment biology.
3. Biotic environment intraspecific.
4. Impact of climate change on fisheries.

UNIT - 3.

1. Water resources and its management : lakes, ponds, rivers.
2. Water resources conservation.
3. Aquatic microbiology.
4. Soil pollution.
5. Sewage treatment process.

UNIT - 4.

1. Impact of growing population on natural resources.
2. Aquatic Biodiversity its importance and conservation.
3. Soil conservation.
4. Disaster management : emphasis on water related disasters.

UNIT - 5.

1. Environmental education.
2. Deforestation : its causes and impact.
3. Conservation of natural resources.
4. Global Warming, Green house gases, acid rain and ozone crisis.

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As recommended by Central Board of Studies in Aquaculture and Environment.

Class - B.Sc. Second Year
Subject - Aquaculture and Environment
Paper - Practical

Exercises :

1. Identification of fish predators.
2. Age determination.
3. Water analysis – pH , Alkalinity, Hardness, D. O., CO₂ , Chlorine.
4. Exotic Fishes.
5. Algae, planktons, hydrophytes.
6. Histology of fish
7. Classification of fishes.
8. Identification of fishes.
9. Field study to visit at aquaculture centre.
10. Identification of prawns.
11. Project.

Distribution of Marks for practical examination

Marks : 50

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|--|----|
| 1. Identification of fishes of local fauna up to family. | 10 |
| 2. Water analysis. | 6 |
| 3. Histology of Important fish organs. | 12 |
| 4. Identification of Plankton and Predators. | 12 |
| 5. Record and collection | 5 |
| 6. Project report / Field visit. | 5 |

C. C. E. (Regular only) 15 Total

Quarterly 5

Six monthly 10

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Class - B.Sc. Second year.
Subject - Aquaculture and Environment

RECOMMENDED BOOKS

1. Tropical fish farming – by Dr. D. K. Belsare.
2. A manual of fish water aquaculture – by R. S. Santhanam.
3. Fishes of India – by C. B. L. Srivastava.
4. Fish and Fisheries of India – by Jhongaraih.
5. An introduction of fishes – by S. S. Khanna.
6. Aquaculture – by Bardach.
7. Fish Disease – by Dugan.
8. Fisheries of U.P., Bihar – by Gopalji Srivastava.
9. Fishes – by Qureshi and Qureshi.
10. Fundamentals of Ecology – by Odum.
11. Ecology – by H. R. Singh.
12. Intensive fish farming – by Shepard.
13. Limnology – by Welch – I and II Volume.
14. Physical and Chemical Analysis of Water - by Trivedi.
15. Limnology – by Goldman.
16. Adoni A. D. – Freshwater
17. Introduction to inland fisheries – by Kamaldeep Kour, Asha Dhawan.
18. Fundamental of Ichthyology – by S. P. Biswas.
19. Fish and Fisheries – by B. N. Yadav.
20. A. T. B. of Fish Biology and Fisheries – by S. S. Khanna, H. R. Singh.
21. Freshwater Aquaculture – by R. K. Rath.

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Under Graduate Annual System Syllabus

As recommended by Central Board of Studies in Aquaculture and Environment.

Class - B.Sc. Third Year
Subject - Aquaculture and Environment
Paper - I Fisheries

M M : 42^{1/2} Regular

: 50 Private

UNIT - 1.

1. Tank culture of fishes.
2. Culture of common ornamental fishes.
3. Cage culture, Pen culture.
4. Cat fish culture.
5. Culture of cray fish (astacus).

UNIT - 2.

1. Fisheries of different marine states of India.
2. Costal aquaculture in Indonesia, Taiwan and Philippines.
3. The Anemic Ice fishes : Examples Antarctica.
4. Culture of trout & Mussels.
5. Chank Fisheries.

UNIT - 3.

1. Venomouse fishes.
2. Sound producing organs in fishes.
3. Coloration in fishes.
4. Oceanography : General introduction.
5. Benthic animals and plants.

UNIT - 4.

1. Swim bladder and weberian ossicles in fishes.
2. Sense organs in fishes. (eye and olfactory organs)
3. Acausto – lateralis system in fishes.
4. Commercial value of Algae.
5. Aquatic fungi.

UNIT - 5.

1. Fisheries export.
2. Inland fishery states with emphasis on fisheries development
3. Migration in fishes.
4. Electric organs in fishes.
5. Aquaponics.

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Class - B.Sc. Third Year
Subject - Aquaculture and Environment
Paper - II Limnology

M M : 42^{1/2} Regular
: 50 Private

UNIT - 1.

1. Ecology of lakes.
2. Brackish water ecology.
3. The scope of ecology in fisheries development.
4. Ecology of rivers and streams in relation to aquaculture.

UNIT - 2.

1. Water cycle.
2. General geography in relation to aquaculture in M. P.
3. N and C cycle.
4. Water pollution control Act. 1974., Biodiversity Act 2000.
5. Pesticidal effects on fishes.

UNIT - 3.

1. Nekton, Benthos and blue green Algae.
2. Hill stream Fishes.
3. Deep sea fishes.
4. Larvivorous fishes.

UNIT - 4.

1. The role of Micro-organisms in recycling nutrients in lakes.
2. Fish diseases and its control.
3. Cynobacteria.
4. Viruses.

UNIT - 5.

1. Bio-diversity in different waters : lotic & lentic system.
2. Water borne diseases.
3. Limnology; importance in fisheries.
4. Food, competition and Niche.
5. Phosphorus and sulphur cycles in environment.

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Class	-	B.Sc. Third Year
Subject	-	Aquaculture and Environment
Paper	-	Practical

Exercises :

1. Visit to a river and /or lakes to observe general environmental conditions
2. Observe and record sources of pollution of local water resources
3. Collection and identification of benthos and blue green algae from local water bodies
4. Analysis of limnological parameters of water from local water bodies
5. Study of morphometry of local commercial fishes
6. Dissecting fishes to study reproductive system in different local fish species
7. Collection and identification of local aquatic macrophytes.
8. Identify diseased fishes if available in local
9. Compare biodiversity of different water resources in local area.

Distribution of Marks for practical examination Marks : 50

1.	Dissection of reproductive system and blood vascular system of fish.	10
2.	Aquatic Microorganisms.	5
3.	Migratory fishes.	5
4.	Testing of pH of Soil.	5
5.	Estimation of DO, CO ₂ , Cl ₂ , alkalinity.	10
6.	Morphometry of fish.	5
7.	Field work and project report.	5
8.	Record and collection	5

C. C. E. (Regular only) 15 Total

Quarterly 5

Six monthly 10

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Class	-	B.Sc. Third year.
Subject	-	Aquaculture and Environment

RECOMMENDED BOOKS

1. An introduction to Ecology – by P. D. Sharma.
2. An Introduction to fishers - by S. S. Khanna.
3. Fish and fisheries – by V. G. Jhingvan.
4. Fish and fisheries – by Parihar.
5. Priyavarn and Pradushan (in Hindi) – by Dr. Arun Raghuwanshi.
6. Ecology – by P. D. Sharma.
7. Aquaculture Technology and Environment – by Jadhav Ujjavala.
8. Fish and fisheries – by B. N. Yadav.
9. Fish and fisheries – by Naga Raja Rao.

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