SRI VENKATESWARA UNIVERSITY - TIRUPATI
B.Sc., (HONOURS) IN AQUACULTURE (MAJOR)
III SEMESTER
(W.E.F. Academic Year 2024 - 25)

COURSE NO.: 5 - BASIC PRINCIPLES OF AQUACULTURE

credits :3

COURSE OUTCOMES:

Co1: Understand the concept of blue revolution, analyse the history and compare the present status of aquaculture at global, national and state levels and its significance over agriculture.
Co2: Acquire knowledge in the different types of aquaculture, culture systems and culture methods in practice worldwide.
CO3: Gain knowledge in the different types of culture ponds.
Co4: Understand the arrangement of different types of ponds in a fish farm and design an ideal fish farm
CO5: Comprehend the best management practices to be adopted in aquaculture for good yield and acquire the skill in the analysis of water and soil parameters of a culture pond.

SYLLABUS

UNIT-I (Introduction)

1. Definition and History of Aquaculture
2. Concept of Blue Revolution and PradhanMantri MatsyaSampadaYojana (PMMSY)
3. Present status of Aquaculture at global level, India and Andhra Pradesh
4. Aquaculture versus Agriculture; Present day needs with special reference to Andhra Pradesh

UNIT-II (Types of Fish Ponds)

1. Lotic and lentic systems, streams and springs Classification of ponds based on water resources – spring, rain water, flood water, well water and water course ponds
2. Functional classification of ponds – head pond, hatchery, nursery, rearing, production and stocking
3. ponds; quarantine ponds, isolation ponds and wintering ponds

UNIT- III (Design and Construction of Aqua Farms)

1. Important factors in the construction of an ideal fish pond – site selection, topography, nature of the soil, water resources
2. Lay out and arrangement of ponds in a fish farm
3. construction of an ideal fish pond – space allocation, structure and components of barrage Pond

UNIT-IV (Aquaculture Systems and Practices)

1. Types of aquaculture Fresh water aquaculture - Brackish water aquaculture - Mari culture
2. Aquaculture Systems – Pond, Raceways, Cage, Pen, Rafts, Running water, Water Re-circulating Systems, Biofloc Technology and 3-C System

3. Pond culture practices- Traditional, Extensive, Modified Extensive, Semi-Intensive, Intensive & Super-intensive systems of fish and shrimp and their significance.

4. Fin fish culture methods - Monoculture, Poly culture and Monosex culture and Integrated fish farming.

UNIT-V (Management Factors of Culture Ponds, Pre-stocking Management)

1. Dewatering, drying, ploughing/desilting

2. Predators, weeds and weed fish in culture ponds - Advantages and disadvantages of weed plants; Toxins used for weed control and control of predators. Liming and fertilization;

3. Algal blooms and their control

4. Stocking Management – Stocking density and stocking

5. Post-stocking Management, Feeding: Role of nutrients

6. Water quality: Physico-chemical conditions of soil and water optimum for culture –

temperature, depth, turbidity, light, water and shore currents, PH, DOD, CO_2, NH_3, NO_2

. Verified and Approved by Dr.M.VANI HOD & BOS Chairperson (Zoology)

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COURSE NO.: 5 - BASIC PRINCIPLES OF AQUACULTURE

Practical Syllabus

credits :1

1. Estimation of Carbonates, Bicarbonates in water samples
2. Estimation of Dissolved Oxygen
3. Estimation of Ammonia in water.
4. Estimation of Total Hardness of water sample.
5. Study of beneficial and harmful algal species
6. Collection, identification and isolation of zooplankton and phytoplankton
7 Collection and study of aquatic weeds, aquatic insects, weed fish and larvivorous fish
8. Field visit to hatchery, nursery, rearing and stocking ponds of aqua farms.

PRESCRIBED BOOKS:

1. Jhingran VG 1998. Fish and Fisheries of India. Hindusthan Publishing Corporation, New Delhi
2. Pillay TVR, 1996. Aquaculture Principles and Practices, Fishing News Books Ltd., London

REFERENCES:

1. Pillay TVR &M.A.Dill, 1979.Advances in Aquaculture. Fishing News BooksLtd., London
2. Stickney RR 1979. Principles of Warm Water Aquaculture.John Wiley &SonsInc. 1981
3. Boyd CE 1982. Water Quality Management for Pond Fish Culture.Elsivier Scientific Publishing
4. Bose AN et.al, 1991. Costal Aquaculture Engineering. Oxford & IBH Publishing Company.

REFERENCES

1. Boyd CE. 1979. *Water Quality in Warm Water Fish Ponds*. Auburn University
2. Boyd, CE. 1982. *Water Quality Management for Pond Fish Culture.* Elsevier Sci. Publ. Co.
3. FAO. 2007. *Manual on Freshwater Prawn Farming*.

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III SEMESTER
(W.E.F. Academic Year 2024 - 25)

COURSE NO.: 5 - BASIC PRINCIPLES OF AQUACULTURE

MODEL QUESTION PAPER

SECTION – A

Answer any five of the following 5 X 4 = 20

1.
2.
3.
4.
5.
6.
7.
8.

SECTION – B

Answer any FIVE of the following 5 X 10 = 50

UNIT – I

9. a .

OR

b

UNIT – II

10.a OR

b

UNIT – III

11.a. .

OR

b

UNIT – IV

12 a.

OR

b. .

UNIT – V

13.a.

OR

b.

III SEMESTER

COURSE NO.: 5 - BASIC PRINCIPLES OF AQUACULTURE

MODEL PRACTICAL QUESTION PAPER

1. EXPERIMENT -1	15X1= 15
2. EXPERIMENT-2.	15X1 =15
3. Field Visit	10 x1 =10.
	10 x 1 =10
4. Certified Record	
	---
	50 Marks

SRI VENKATESWARA UNIVERSITY - TIRUPATI
B.Sc., (HONOURS) IN AQUACULTURE (MAJOR)
III SEMESTER
(W.E.F. Academic Year 2024 - 25)

COURSE NO.: 6 - CAPTURE FISHERIES

credits :3

Course Outcomes:

CO1: Understand the EEZ concept & its implementation in fisheries

CO2: Knowledge on Fish Distribution

CO3: Acquire Knowledge on the Riverine systems of India

CO4:Gain Knowledge on Reservoir Fishery

Unit I : Fish Catch Statistics :-

1.1 Fish production of the world both inland and marine, contribution of different countries, position of India in the Fish Catches.

1.2 The EEZ concept & its implementation in fisheries. The Indian EEZ, Fishery survey in India

Unit II : Fish Distribution .

2.1 General account of the distribution

2.2 Biology and fishery of important fishes and other aquatic animals of India,

2.3. Economically Important Fresh Water Fishes of Andhra Pradesh.

Unit-III Riverine Fishery I :-

3.1 Important characters of Streams.

3.2 Different riverine systems in India, and their fishery: The Ganga River System, the Brahmaputra river system,

Unit-IV Riverine Fishery II :-

4.1 The East Coast River System.

4.2 The West Coast River System, River Jhelum of the Indus River System, Fisheries of trout and Mahseer, Problems and management.

Unit-V Reservoir Fishery (Lacustrine Fishery) :-

5.1 Definition of a Lake, Origin and classification of lakes.

5.2 Kolleru Lake and its fishery.

5.3 Different reservoirs of River systems in India with special reference to NagarjunaSagar,

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III SEMESTER
(W.E.F. Academic Year 2024 - 25)

COURSE NO.: 6 - CAPTURE FISHERIES

credits :1

PRACTICALS

1. Identification of Freshwater fishes based on colour, Pigmentation, morphometric and meristic characters and other characters relavent to the group.
2. Identification of fry and fingerlings of Indian Major Carps.
3. Examination of Commercially Important Freshwater fishes and prawns, from the point of view of ecology and fishery.
4. Knowledge of common types of Freshwater craft and gear on models provided in the department.

Field Work : Visit to fish landing centers of rivers, lakes and reservoirs.

REFERENCE BOOKS :-

1. Jhingram, V.G. Fish and Fisheries of India. Second edition 1983, Hindustan Pub.Co. Picker,

2. W.E. Methods for assessment of Fish Production in Fresh Waters. Blackwell Scient. Publ. 1970

3. Bal, D.V. and VeerabhadraRao, K. Marine Fisheries, Tata MC Grawhill Publications, New Delhi.

4. Srivastava, U.K. et.al. Freshwater aquaculture in India, Oxford and IBH Publ. Co. New Delhi 1980

5. C.B.L. Srivastava – A text book of Fishery Science and Indian Fisheries. KitabMahal Agencies, Patna.

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III SEMESTER
(W.E.F. Academic Year 2024 - 25)

COURSE NO.: 7 - FRESH WATER AQUACULTURE

credits :3

Course outcomes:

1. Learn the Status, Scope and Prospects of fresh water aquaculture in the world, India and AP.
2. Learn about Major Cultivable Indian Carps and Exotic fish Species introduced in India
3. Know about recent developments in the culture of clarius, anabas and murrels and special systems of aquaculture.
4. Gain knowledge of commercially valuable Fresh water prawns of India and their culturing methods.

UNIT-1: Introduction to Freshwater Aquaculture

1.1 Status, scope and prospects of fresh water aquaculture in the world, India and AP
1.2 Different fresh water aquaculture systems

UNIT-II: Carp Culture

2-1 Major cultivable Indian carps – Labeo, Catla and Cirrhinus& Minor carps
2-2 Exotic fish species introduced to India – Tilapia, Pangassius and Clarius sp.

Unit-III

3.1 Composite fish culture system of Indian and exotic carps
3.2 Impact of exotic fish, Compatibility of Indian and exotic carps and competition among them

UNIT-IV: Culture of air-breathing and cold water fish

4-1 Recent developments in the culture of clarius, anabas, murrels,
4-2 Advantages and constraints in the culture of air-breathing and cold water fishes- seed resources, feeding, management and production
4-3 Special systems of Aquaculture- brief study of culture in running water, re- circulatory systems, cages and pens, sewage-fed fish culture

<u>UNIT-V</u>: Culture of Prawn

5-1 Fresh water prawns of India - commercial value
5-2 Macrobrachiumrosenbergii and M. Malcomsonii– biology, seed production, pond preparation,
stocking, management of nursery and grow-out ponds, feeding, mprphotypes and harvesting

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COURSE NO.: 7 - FRESH WATER AQUACULTURE.

credits :1

1. Identification of important cultivable carps.
2. Identification of important cultivable air-breathing fishes .
3. Identification of important cultivable freshwater prawns.
4 Identification of different life history stages of fish.
5 Identification of different life history stages of fresh water prawn.
6 Identification of commercially viable crabs – Scylla cerrata, Portunuspelagicus, P.sanguinolentus, Neptunuspelagicus, N. Sanguinolentus .
7. Identification of lobsters – Panuliruspolyphagus, P.ornatus, P.homarus, P.sewelli, P.penicillatus.
8. Identification of oysters of nutritional significance – Crossostreamadrasensis, C.gryphoides, C. cucullata, C.rivularis ,Picnodanta .
9. Identification of mussels and clams.
10. Identification of developmental stages of oysters.

PRESCRIBED BOOK(S):

1 Jhingran VG 1998.Fish and Fisheries of India.Hindusthan Publishing Corporation, New Delhi

REFERENCES:

1. Santharam R, N Sukumaran and P Natarajan 1987. A manual of aquaculture, Oxford-IBH, New Delhi
2. Srivatsava 1993. Fresh water aquaculture in India, Oxford-IBH, New Delhi
Marcel H 1972.Text book of fish culture.Oxford fishing news books.

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III SEMESTER

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III SEMESTER
(W.E.F. Academic Year 2024 - 25)

COURSE NO.: 8 - BRACKISH WATER AQUACULTURE

credits :3

Course Outcomes:

CO1:Knowledge on development and present status of brackish water farming in India.

CO2::Learn about the types of culture systems

CO3:Gain knowledge on commercial value of prawns in India

CO4:Know about the biology of important shrimps

CO5:Know about the species of crabs and edible oysters cultured

Unit – I Introduction

1.1 Introduction, History, Development and present status of brackish water farming in India.
1.2 Brackish water as a medium for aquaculture, ecological factors – Abiotic and biotic factors.
1.3 Types of culture systems – Traditional, extensive, semi-intensive and intensive culture systems of shrimp, their management and economics.

Unit – II Culture of brackish water prawns

2.1 Culture practices of Penaeusmonodon/ P.vannamei
2.2 Brackish water prawns of India – Commercial value.
2. Morphotypes and harvesting

Unit – III Biology of Shrimp

3.1 Biology of Penaeusmonodon,
3.2 Biology of P.indicus
3.3 Biology of P.vannamei.

Unit – IV Management practices

4.1 Nutritional requirements of cultivable prawns.
4.2 Natural food and artificial feeds and their importance in shrimp culture
4.3. Pond preparation, stocking, of Hatchery, Nursery, grow out ponds. and harvesting of shrimp.

Unit – V Culture of Brackish water species

5.1 Species of crabs cultured, biology and culture technique, prospects in India.
5.2 Species of edible oysters, culture techniques used for farming edible oysters.
5.3 Important species of pearl oysters and method of artificial pearl production.

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III SEMESTER
(W.E.F. Academic Year 2023 - 24)

COURSE NO.: 8 - BRACKISH WATER AQUACULTURE

credits :1

Identification of cultivable fresh water and marine water prawns (any 3 each)
Identification of marine crabs and oysters of commercial importance (any 2 each).
3. Identification of Phytoplankton and Zooplankton (any 5 each).
4. Identification of different live feed organisms for shrimp larvae (any 4)
5. Identification of larval stages of prawn. 6. Demonstration of eye stalk ablation in penaeusmonodon.

REFERENCES :

1. Pillay, TVR. Aquaculture principles and practices, Fishery News (Books) Ltd., London 1990.

2. Prawn and prawn fisheries by Kurain and Sebestain.

3. Shankar KM & Mohan CV 2002. Fish and Shell Fish Health Management UNESCO. Publ. Sundermann CJ 1990.

4. Johnson SK 1995. Hand book of shrimp diseases Texas A & M university, Texas.

5. Guland J.A. (ed) 1984. Penaeid Shrimps – Their Biology and Management.

6. Raymond T et al., 1990. Crustacean Sexual Biology, Columbia University Press, New York.

7. Identification and mounting of appendages of prawn / shrimp.

8. Field visit to prawn / shrimp hatchery

9. Field visit to prawn / shrimp culture ponds.

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III SEMESTER

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