SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALA: VIJAYAWADA-10.
An autonomous college in the jurisdiction of Krishna University, Machilipatnam

DEPARTMENT OF AQUACULTURE

Course Code							
Title of the Course				**Basic Principles of Aquaculture**			
Offered to: (Programme/s)				**II B.Sc. Hons Aquaculture**			
L	**4**	**T**	**0**	**P**	**0**	**C**	**3**
Year of Introduction:	**2024-25**			**Semester:**			**III**
Course Category:	**MAJOR**			**Course Relates to:**	**GLOBAL**		
Year of Introduction:	**2024**			**Percentage:**	**1%**		
Type of the Course:				**SKILL DEVELOMENT**			
Crosscutting Issues of the Course :							
Pre-requisites, if any				Basic knowledge in Aquaculture			

Course Description:

Basic principles of aquaculture gives the knowledge in past and future concepts of aquaculture.
It explains the concept of blue revolution, PMMSY & present status of aquaculture at global, National & state level.
It explains the types of fish ponds in which the aquaculture can be done.
It also helps to gain knowledge in design and construction of aqua farms suitable for culture.
And also explains the important factors to be considered while constructing the pond.
It helps in attaining knowledge in types of aquaculture, aquaculture systems, pond culture practices & fin fish culture methods.
It also explains the management factors of culture ponds such as pre stocking management, stocking management, post stocking management & water quality management.

Course Aims and Objectives:

S.NO	COURSE OBJECTIVES
1	To study the concept of blue revolution and its impact at global, national and state level.
2	To get acquainted with different culture systems and culture methods.
3	To study the different types of ponds used in culture practices.
4	To study the criteria for construction of ideal fish pond.
5	To study the management practices in fish/ prawn culture

Course Outcomes: At the end of the course, the student will be able to…

CO NO	COURSE OUTCOME	BTL	PO	PSO
CO1	Understand the concept of blue revolution, analyse the history and compare the presentstatus of aquaculture at global, national and state levels and its significance over agriculture.	**K2**	**5**	1
CO2	Student will analyse the distribution and biology of important fishes and other aquatic animals in India.	**K4**	**5**	1
CO3	Gain knowledge in the different types of culture ponds.	**K2**	**5**	1

CO4	Understand the arrangement of different types of ponds in a fish farm and design an idealfish farm	**K2**	**5**	1
CO5	Comprehend the best management practices to be adopted in aquaculture for good yieldand acquire the skill in the analysis of water and soil parameters of a culture pond.	**K4**	**5**	1

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyze; K5: Evaluate; K6: Create

CO-PO MATRIX											
CO NO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**
CO1	2							3			
CO2	3							3			
CO3	2							2			
CO4	3								2		
CO5						2					3

Use the codes 3, 2, 1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

Unit – I **9 Hours**

Introduction

1.1 Definition and History of Aquaculture **1Hr**

1.2 Concept of Blue Revolution and Pradhan Mantri Matsya Sampada Yojana (PMMSY) **2Hr s**

1.3 Present status of Aquaculture at global level, India and Andhra Pradesh. **3Hrs**

1.4 Aquaculture versus Agriculture; Present day needs with special reference to Andhra Pradesh **3Hrs**

Assignment 1: Collect the data of Concept of Blue Revolution

Assignment 2: Collect the data of present status of Aquaculture at global level, India and Andhra Pradesh.

Unit – II **9 Hours**

Types of Fish Ponds

2.1 Lotic and Lentic systems, streams and springs **2Hrs**

2.2 Classification of ponds based on water resources – spring, rain water, flood water, wellwater and water course ponds **2Hrs**

2.3Functional classification of ponds – head pond, hatchery (Jar hatchery, Chinese Hatchery, hatching hapa) nursery, rearing, production and stocking ponds; **3Hrs**

2.4. Quarantine ponds, isolation ponds and wintering ponds. **2Hrs**

Assignment 1: Classification of ponds

Exercises/Projects 1: Prepare charts / models of Functional classification of ponds**.**

Unit- III **9 Hours**

Design and Construction of Aqua Farms

3.1Important factors in the construction of an ideal fish pond – site selection, topography,nature of the soil, water resources **3Hrs**

3.2 Lay out and arrangement of ponds in a fish farm **3Hrs**

3.3 Design and construction of an ideal fish pond – space allocation, structure and components of Barrage pond and its importance **3Hrs**

Case Studies: Collect any 2 case studies regarding Design and Construction of Aqua Farms

Exercises/Projects: Prepare charts / models of construction of an ideal fish pond.

Unit – IV **9 Hours**

Aquaculture Systems and Practices

4.1Types of aquaculture_ Fresh water aquaculture- Brackish water aquaculture - Mari culture **1Hr**

4.2Aquaculture Systems – Pond, Raceways, Cage, Pen, Rafts, Running water **2Hrs**

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

4.4 Fin fish culture methods - Monoculture, Poly culture and Monosex culture and Integrated fish farming. **3Hrs**

Case Studies: Collect any 2 case studies regarding the usage of types of aquaculture **Exercises/Projects:** Prepare models/charts on Aquaculture Systems

Unit – V **9 Hours**

Management Factors of Culture Ponds,

5.1Pre-stocking Management**-** Dewatering, drying, ploughing/desilting

Control measures for 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; Algal blooms and their control **4 Hrs**

5.2Stocking Management – Stocking density and stocking **1Hr**

5.3 Post-stocking Management: Feeding: Role of nutrients **2Hrs**

5.4 Water quality management: 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 **2Hrs**

Assignment 1: Physico-Chemical Conditions of Water Optimum for culture

Assignment 2: Algal blooms and their control

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.

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III SEMESTER END EXAMINATIONS

PAPER – V **MODEL PAPER** **Course Code:**

Title of the paper: Basic Principles of Aquaculture

Time: 3 Hours **Max. Marks: 70**

SECTION-A

Answer all questions. **5X4= 20M**

Each question carries 4 marks

1. a) Explain Pradhan Mantri Matsya Sampada Yojana (PMMSY) K5

Or

b) Write a short note on History of Aquaculture K1

2 .a) Describe the difference between Lotic and Lentic systems K2

Or

b) Write a short note on quarantine ponds K1

3.a) Give an account of site selection in the construction of an ideal fish pond K3

Or

b) Draw diagram of barrage pond and its importance K3

4. a) Write short notes on Mari culture K1

Or

b)Explain Monosex culture in tilapia K2

5.a) Explain control measures for Predators, weeds and weed fish in culture ponds weeds K2

Or

b) Write about Algal blooms in culture ponds K1

SECTION-B

Answer all the Questions. **5X10=50M**

6.a) Describe the present status of Aquaculture at global, Indian and Andhra Pradesh level K2

(Or)

b) Explain the Concept of Blue Revolution K2

7. a) Explain the classification of ponds based on water resources K4

(Or)

b) Describe the types of hatcheries with diagrams K2

8.a) Describe the Design and construction of an ideal fish pond K2

(Or)

b) Write an essay on lay out and arrangement of ponds in a fish farm K6

9.a) Explain different Aquaculture Systems K2

(Or)

b) Write an essay on integrated fish farming. K1

10. a) Describe the Pre-stocking Management practices in fish culture K2

(Or)

b) Explain the Physico-chemical conditions of water optimum for fish culture K6

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AQUACULTURE PRACTICAL - III

w.e.f. 2024-2025.

PRACTICAL SYLLABUS Code:

(2hrs/week)
Credits: 01 MAX.MARKS: 50. **(CIA-15+ SEE-35)**

PRACTICALS: **CourseNo.5** – **Basic Principles of Aquaculture**

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.

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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Aquaculture Practical - III

w.e.f. 2024-2025.

Title: Basic Principles of Aquaculture

Model Practical Paper

Code: **Max Marks: 50 (CIA-15+ SEE-35)**

Time : 3 Hrs

A. Semester End Lab Exam

I Answer the following **Max Marks: 25**

Q1:

Q2:

Q3:

Q4:

Q5:

II. Viva

2M

III. Record

8M

Total

35M

_____

B. Continuous Internal Assessment **15M**

_____

Total (A+ B**)** **50M**

SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALA: VIJAYAWADA-10.
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Course Code							
Title of the Course				**Capture Fisheries**			
Offered to: (Programme/s)				**II B.Sc. Hons Aquaculture**			
L	**4**	**T**	**0**	**P**	**0**	**C**	**3**
Year of Introduction:	**2024-25**			**Semester:**			**III**
Course Category:	**MAJOR**			**Course Relates to:**	**GLOBAL**		
Year of Introduction:	**2024**			**Percentage:**	**45%**		
Type of the Course:				**SKILL DEVELOMENT**			
Crosscutting Issues of the Course :							
Pre-requisites, if any				Basic knowledge in Rivers in India.			

Course Description:

Capture fisheries explains the present day fish production of the world both Inland &marine water bodies
Gives the knowledge on contribution of Fisheries in different countries,
Helps in attaining knowledge in EEZ zones of India, position of India.
Gives knowledge in distribution of fishes in different regions of India.
Attain knowledge in Riverine Fishery resources like Ganga, Brahmaputra, East coast, & West Coast riverine systems with their tributaries & which Aquatic species are available in those riverine systems.
Helps in gaining knowledge in construction &usage of different types of traditional crafts &Modern crafts in India.
Helps in gaining knowledge in construction & usage of different types of traditional gears& modern gears in India.

Course Aims and Objectives:

S.NO	COURSE OBJECTIVES
1	Understand the EEZ concept & its implementation in fisheries
2	Knowledge on Fish Distribution
3	Acquire Knowledge on the River in systems of India
4	Discuss the mechanization of Indian fishing crafts and assess its impact on fishing efficiency, and resource utilization.
5	Interpret traditional and modern fishing gears used in India, including their design, materials, and fabrication techniques, and assess their suitability for different fishing environments and target species.

Course Outcomes: At the end of the course, the student will be able to…

CO NO	COURSE OUTCOME	BTL	PO	PSO
CO1	Students will gain background knowledge in the fish catch statistics.	**K2**	5	1
CO2	Student will analyze the distribution and biology of important fishes and other aquatic animals in India.	**K4**	5	1
CO3	Students will understand the riverine fisheries of Indian resources and their fishery	**K2**	5	1
CO4	Create knowledge in critical discussion regarding the impact of mechanization on Indian fishing crafts, assessing its effects on fishing efficiency, labour dynamics, and resource utilization.	**K6**	5	1
CO5	Evaluate traditional and modern fishing gear designs, materials, and fabrication techniques, determining their appropriateness for various fishing environments and species.	**K5**	5	1

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyze; K5: Evaluate; K6: Create

CO-PO MATRIX											
CO NO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO1	2							2			
CO2	2							2			
CO3	2							2			
CO4	2										2
CO5	2										2

Use the codes 3, 2, 1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

Unit – I **9 Hours**

Fish Catch Statistics

1.1 Fish production of the world both inland and marine, contribution of different countries,and position of India in the Fish Catches**. 5Hrs**

1.2 The EEZ concept & its implementation in fisheries. The Indian EEZ, Fishery survey inIndia **4Hrs**

Assignment 1:

Collect the data regarding the position of India for past 10 years

Assignment 2: Gather the information of present EEZ Zones in AP

Unit- II **9 Hours**

Fish Distribution.

2.1 General account of the fish distribution **2Hrs**

2.2 Biology and fishery of Catla catla and Labeo rohita **2Hrs**

2.3 Biology and fishery of shell fishes - Macrobrachium rosenbergi and Scylla serrata **3Hrs**

2.4. Economic importance of Fresh Water Fishes of Andhra Pradesh **2Hrs**

Activity 1:

Case study on comparative biology of Indian Major Carps

Exercises/Projects: Collect the data of area wise& season wise availability of fishes in Andhra Pradesh (which area is is famous for which kind of fishes)

Unit – III **9 Hours**

Riverine Fishery I:-

3.1 Important characters of Streams. **1Hr**

3.2 Different riverine systems in India, and their fishery: The Ganga River System, the Brahmaputra river system **3Hrs**

3.3The East Coast River System. **2Hrs**

3.4The West Coast River System, River Jhelum of the Indus River System **3Hrs**

Assignment 1: Ganga and Brahmaputra River systems in India

Exercises/Projects: Prepare charts / models of river systems with their tributaries

Unit – IV 9 Hours

Fishing Craft

4.1 Main types of the traditional crafts employed in Marine, fresh water fisheries of Andhra Pradesh- Coracle, Dhoni, Sangadam, Canoes, Catamaran, Masula type boats, Fiber Glass boats 4 Hrs

4.2Modern fishing crafts- trawlers, BLC. Mechanized Crafts **3Hrs**

4.3 Techniques for the maintenance of the craft **2Hrs**

Activity1: Prepare models/charts on crafts

Unit- V 9 Hours

Fishing Gears

5.1 Traditional gear - Dip & Lift nets, Cast nets, Gill nets, Shore seines, Boat Seines, Hand Lines, Long Lines, Conical Set nets, Drag nets, Trawl nets and Basket traps. **5hrs**

5.4 Modern gear- Techniques for the maintenance of the gear.**2Hrs**

5.3 Fish Finding Equipment (Echo sounder and sonar) **2Hrs**

Activity1: Exercises/Projects: Prepare models/charts on gears

Reference Books:-

1. Jhingram,V.G.FishandFisheriesofIndia.Secondedition1983,HindustanPub.Co.Picker,
2. W.E.MethodsforassessmentofFishProductioninFreshWaters.BlackwellScient.Publ. 1970
3. Bal, D.V. and VeerabhadraRao, K.MarineFisheries, TataMC GrawhillPublications,NewDelhi.
4. Srivastava,U.K.et.al.FreshwateraquacultureinIndia,OxfordandIBHPubl.Co.NewDelhi1980
5. C.B.L.Srivastava–AtextbookofFisheryScienceandIndianFisheries.KitabMahalAgencies,Patna.

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III SEMESTER END EXAMINATIONS

PAPER – VI **MODEL PAPER** **Course Code:**

Title of the paper: Capture Fisheries

Time: 3 Hours **Max. Marks: 70**

SECTION-A

Answer all questions. **5X4= 20M**

Each question carries 4 marks

1. a) Explain Fish catch statistic contribution of different countries. K6

Or

b) Write a short note on Indian EEZ K1

2 .a) Explain the biology of Catla catla K2

Or

b) Give an account on Economic importance of Fresh Water Fishes of Andhra Pradesh K3

3. a) Explain about Important characters of Streams K2

Or

b) Write short notes on Ganga River System K1

4. a) Discuss about Catamaran & Masula type boats K6

Or

b) Explain techniques for the maintenance of the craft K2

5.a) Explain about Dip & Lift nets K2

Or

b) Write about Fish Finding Equipment K1

SECTION-B

Answer all the Questions. **5X10=50M**

6. a) Describe the Fish production of the world both inland and marine? K2

(Or)

b) Explain the EEZ concept & its implementation in fisheries? K2

7. a) Explain the Biology and fishery of Labeo rohita ? K2

(Or)

b) Describe the biology and fishery of shell fish Macrobrachium rosenbergi K2

8. a) Give an account of East Coast River System. K3

(Or)

b) Write an essay on Indus River System K1

9. a) Describe the main types of traditional crafts employed in Marine fisheries of Andhra Pradesh K2

(Or)

b) Discuss about Modern fishing crafts K6

10. a) Discuss any five traditional gear in fish culture K6

(Or)

b) Explain the techniques for the maintenance of the gear. K2

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AQUACULTURE PRACTICAL – III Paper -VI

w.e.f. 2022-2023.

PRACTICAL SYLLABUS Code:

(2hrs/week)

Credits: 01 MAX.MARKS: 50.

PRACTICALS: Course No.6 **–Capture Fisheries**

1. Identification of Freshwater fishes based on colour, Pigmentation, Morph metric and Meristic characters and other characters relevant 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 ofview of ecology and fishery.

4. Knowledge of common types of Freshwater craft and gear on models provided in the department.

5. Demonstration of fish collection and operation of nets, observing different instruments used in Fisheries

6. 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 Veerabhadra Rao, K. Marine Fisheries, Tata MC Grawhill Publications,New Delhi.

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

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

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Aquaculture Practical - VI

w.e.f. 2024-2025.

Title: Capture Fisheries

Model Practical Paper

Code: **Max Marks: 50 (CIA-15+ SEE-35)**

Time : 3 Hrs

A. Semester End Lab Exam

I Answer the following **Max Marks: 25**

Q1:

Q2:

Q3:

Q4:

Q5:

II. Viva

2M

III. Record

8M

Total

35M

_____

B. Continuous Internal Assessment **15M**

_____

Total (A+ B**)** **50M**

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Course Code							
Title of the Course				**Fresh Water Aquaculture**			
Offered to: (Programme/s)				**I B.Sc. Hons Aquaculture**			
L	**4**	**T**	**0**	**P**	**0**	**C**	**3**
Year of Introduction:	**2024-25**			**Semester:**			**III**
Course Category:	**MAJOR**			**Course Relates to:**	**GLOBAL**		
Year of Introduction:	**2024**			**Percentage:**	**NA**		
Type of the Course:				**SKILL DEVELOMENT**			
Crosscutting Issues of the Course :							
Pre-requisites, if any				Basic knowledge in fresh water aquaculture			

Course Description:

Fresh water aquaculture gives an idea about the status scope & prospects of fresh water aquaculture in global national & state wide.

It makes the students to choose the fishes suitable for culture.

It gives knowledge in different modern culture technologies use in aquaculture apart from traditional methods.

It helps in gaining knowledge in culturing of major carps, minor carps, & exotic carps.

It gives an idea about composite fish culture of exotic carps their compatibility & competition with Indian carps and culturing of genetically modified carps through composite culture.

It helps in gaining knowledge in Culture of Carp air-breathing and cold water fishes.

It gives knowledge in culturing of fresh water prawns Macrobrachium rosenbergii & M. malcomsonii.

Course Aims and Objectives:

S.NO	COURSE OBJECTIVES
1	To know the present status of freshwater and brackish water aquaculture and their role in world economy and food production
2	To gain knowledge on Indian major, minor carp culture and exotic carp culture
3	To improve the technical knowledge on Composite fish culture system
4	To gain knowledge on recent developments in the culture of air-breathing and cold water fish
5	To improve the knowledge on commercial value Fresh water prawns of India

Course Outcomes: At the end of the course, the student will be able to…

CO NO	COURSE OUTCOME	BTL	PO	PSO
CO1	Learn the Status, Scope and Prospects of fresh water aquaculture in the world, India andAP.	**K2**	5	1
CO2	Learn about Major Cultivable Indian Carps and Exotic fish Species introduced in India	**K2**	5	1
CO3	Understand the Composite fish culture system of Indian and exotic carps	**K2**	5	1
CO4	Analyse about recent developments in the culture of of clarius, anabas and murrels and specialsystems in of aquaculture.	**K4**	5	1
CO5	Gain knowledge of commercially valuable Fresh water prawns of India and their culturingmethods	**K2**	5	1

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyze; K5: Evaluate; K6: Create

Use the codes 3, 2, 1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

CO-PO MATRIX											
CO NO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO 1**	**PSO2**	**PSO3**	**PSO 4**
CO1	2							2			
CO2	2							2			
CO3	2							2			
CO4	2										2
CO5	2							3			

Unit – I 9 Hours

Introduction to Freshwater Aquaculture

1.1Status, scope and prospects of fresh water aquaculture in the world, India and AP **2Hrs**

1.2Criteria for the selection of species for culture **2Hrs**

1.3 Natural seed resources and procurement of seed for stocking **2Hrs**

1.4Special systems of Aquaculture- brief study of culture in Recirculatory aquaculture systems (RAS) Biofloc Technology, Integrated multi –trophic aquaculture (IMTA) and 3-C System **3Hrs**

Assignment1 : Criteria for the selection of species for culture

Unit – II 9 Hours

Carp Culture

2.1 Culture of cultivable Major Indian carps – Labeo, Catla and Cirrhinus **2Hrs**

2.2 Culture of cultivable Minor Indian carps – Labeo bata, Labeo fimbriatus, Labeo calbasu **2Hrs**

2.3 Culture of Exotic fish species introduced to India – Tilapia, Pangassius and Clarius sp.**2Hrs**

2.4 Induced breeding of Indian Major carp by Hypophysation technique **3Hrs**

Activity1: Collection of photos of Indian Major and Minor carps and Exotic carps

Unit- III 9 Hours

Composite fish culture system

3.1Composite fish culture system of Indian and exotic carps **3Hrs**

3.2 1Composite fish culture system of genetically modified carps (Amur - Common carp(Cyprinus carpio haematopterus) , Jayanthi Rohu) **3Hrs**

3.3Impact of exotic fish, Compatibility of Indian and exotic carps and competition among them **3Hrs**

Assignment1: Composite fish culture system of genetically modified carps

Unit – IV 9 Hours

Culture of Carp air-breathing and cold water fish

4.1Recent developments in the culture of Clarius, Anabas, Murrels **3Hrs**

4.2Advantages and constraints in the culture of air-breathing and cold water fishes- seedresources, feeding, management and production **4Hrs**

4.3Adaptations of air-breathing and cold water fish **3Hrs**

Assignment 1: Special systems of Aquaculture

Unit – V 9 Hours

Culture of Prawn

5.1 Fresh water prawns of India - commercial value **1Hr**

5.2 Macrobrachium rosenbergii – biology, seed production, pond preparation, stocking, management of nursery and grow-out ponds, feeding, morphotypes and harvesting **4Hrs**

5.3 M. Malcomsonii - biology, seed production, pondpreparation, stocking, management of nursery and grow-out ponds, feeding, morphotypes and harvesting **4Hrs**

Activity1: Compare the seed production and feeding habits of M. rosenbergii and M. Malcomsonii

PRESCRIBED BOOK(S):

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

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 H1972. Text book of fish culture.Oxford fishing news book

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III SEMESTER END EXAMINATIONS

PAPER – VII **MODEL PAPER** **Course Code:**

Title of the paper: Fresh Water Aquaculture

Time: 3 Hours **Max. Marks: 70**

SECTION-A

Answer all questions. **5X4= 20M**

Each question carries 4 marks

1. a) Explain the scope and prospects of fresh water aquaculture in AP K2

Or

b) Write a short note on Recirculatory aquaculture systems (RAS) K1

2 .a) Discuss the culture of Cirrhinus K6

Or

b) Write short notes on culture of Minor carp K1

3. a) Explain the Composite fish culture system of Jayanthi Rohu K2

Or

b) Explain composite fish culture system of Indian carps K5

4. a) What are the recent developments in the culture of Murrels K1

Or

b) Discuss about the seed resources of air-breathing fishes K6

5.a) Explain the morphotypes of Macrobrachium rosenbergii K2

Or

b) Write about pond preparation of M. Malcomsonii K1

SECTION-B

Answer all the Questions. **5X10=50M**

6.a) Explain the criteria for the selection of species for culture K2

(Or)

b) Give an account of Natural seed resources and procurement of seed for stocking K3

7. a) Explain the culture of Exotic fish species Tilapia introduced into India K2

(Or)

b) Describe the process of Induced breeding in Indian Major Carp K2

8.a) Give an account of Composite fish culture system of Exotic carps K3

(Or)

b) Write an essay on compatibility of Indian and exotic carps and competition among them K1

9.a) What are the advantages and constraints in the culture of cold water fishes K1

(Or)

b) Discuss about adaptations of air-breathing and cold water fish K6

10. a) Discuss the commercial value of Fresh water prawns of India K6

(Or)

b) Compare the biology of Macrobrachium rosenbergii and M. malcomsonii K5

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(An autonomous college in the jurisdiction of Krishna University)

AQUACULTURE PRACTICAL - III

w.e.f. 2024-2025.

PRACTICAL SYLLABUS Code:

(2hrs/week)

Credits: 01 MAX.MARKS: 50. **(CIA-15+ SEE-35)**

PRACTICALS: Course No.7 – Fresh Water Aquaculture

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, Portunus pelagicus, P.sanguinolentus, Neptunus pelagicus, N. Sanguinolentus .
7. Identification of lobsters – Panulirus polyphagus, P.ornatus, P.homarus, P.sewelli,P.penicillatus.
8. Identification of oysters of nutritional significance – Crossostrea madrasensis,C.gryphoides, C.cucullata, C.rivularis , Picnodanta .
9. Identification of mussels and clams.
10. Identification of developmental stages of oysters.

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Aquaculture Practical - III

w.e.f. 2024-2025.

Title: **Fresh Water Aquaculture**

Model Practical Paper

Code:
Max Marks: 50 (CIA-15+ SEE-35)
Time : 3 Hrs

A. Semester End Lab Exam

I Answer the following **Max Marks: 25**

Q1:

Q2:

Q3:

Q4:

Q5:

II. Viva

2M

III. Record

8M

Total

35M

B. Continuous Internal Assessment **15M**

Total (A+ B**)** **50M**

SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALA, VIJAYAWADA.

(An autonomous college in the jurisdiction of Krishna University, Machilipatnam)

Course Code							
Title of the Course				**Brackish Water Aquaculture**			
Offered to: (Programme/s)				**II B.Sc. Hons Aquaculture**			
L	**4**	**T**	**0**	**P**	**0**	**C**	**3**
Year of Introduction:	**2024-25**			**Semester:**			**III**
Course Category:	**MAJOR**			**Course Relates to:**	**GLOBAL**		
Year of Introduction:	**2024**			**Percentage:**	**NA**		
Type of the Course:				**SKILL DEVELOMENT**			
Crosscutting Issues of the Course :							
Pre-requisites, if any				Basic knowledge in brackish water aquaculture			

Course Description:

Brackish Water Aquaculture deals with the history development and present status of brackish water farming in India.

Explains traditional and modern culture systems for shrimp culture.

It also gives an idea in management & economics of shrimp culture.

It gives knowledge in biology & culture of brackish water fishes.

It explains the nutritional requirements, importance of natural & artificial food in shrimp culture.

Explains the culture techniques of brackish water species like crabs & edible oysters.

Course Aims and Objectives:

S.NO	COURSE OBJECTIVES
1	To know the present status of brackish water farming in India
2	To gain knowledge on culture practices of brackish water prawns
3	To improve the technical knowledge on culture of important fishes
4	To gain knowledge on recent developments of Management practices of cultivable shrimps
5	To learn about culture of brackish water crabs and edible oysters

Course Outcomes: At the end of the course, the student will be able to…

CO NO	COURSE OUTCOME	BTL	PO	PSO
CO1	Knowledge on development and present status of brackish water farming in India	**K2**	5	1
CO2	Learn about the types of culture practices of shrimp commercial value of prawns in India	**K2**	5	1
CO3	Gain knowledge on biology and culture of important fishes	**K2**	5	1
CO4	Apply knowledge of Management practices for sustainable development	**K3**	5	1
CO5	Understand about the of culture of brackish water crabs and edible oysters	**K2**	5	1

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyze; K5: Evaluate; K6: Create

Use the codes 3, 2, 1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

CO-PO MATRIX									
CO NO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**
CO1	2							2	
CO2	2							2	
CO3	2							3	

CO4	2							3	
CO5	2							2	

Unit – I 9 Hours

Introduction

1.1Introduction, History, Development and present status of brackish water farming in India. **3Hrs**

1.2 Brackish water as a medium for aquaculture, ecological factors – Abiotic and biotic factors. **3Hrs**

1.3Types of culture systems – Traditional, extensive, semi-intensive and intensive culture systems of shrimp, their management and economics. **3Hrs**

Assignment1: Compare the extensive and intensive culture systems of shrimp

Unit – II 9 Hours

Culture of brackish water prawns

2.1Culture practices of Penaeus monodon- hatchery technology and culture practices including feed and disease management **3Hrs**

2.2 Culture practices of P. vannamei - hatchery technology and culture practices including feed and disease management **3Hrs**

2.3 Brackish water prawns of India – Commercial value, Morphotypes and harvesting **2Hrs**

2.4 Mixed culture of fish and prawn **1Hr**

Assignment1 : Mixed culture of fish and prawn

Assignment2 : Culture practices of Penaeus monodon

Unit – III 9 Hours

Culture of brackish water Fishes

3.1 Biology and culture of Lates calcarifer **2Hrs**

3.2 Biology and culture of Chanos chanos **2Hrs**

3.3 Biology and culture of Mugil cephalus **2Hrs**

3.4 Biology and culture of Etroplus suratensis**2Hrs**

Assignment1: Culture of Lates calcarifer

Assignment2 : Case study of Biology of Etroplus suratensis and Mugil cephalus

Unit – IV 9 Hours

Management practices

4.1Nutritional requirements of cultivable prawns. **2Hrs**

4.2 Natural food and artificial feeds and their importance in shrimp culture **3Hrs**

4.3 Pond preparation, stocking of Hatchery, Nursery, Grow out ponds and harvesting of shrimp. **4Hrs**

Assignment1: Pond preparation of shrimp

Unit – V **9 Hours**

Culture of Brackish water species

5.1Species of crabs cultured, biology and culture technique, prospects in India. **3Hrs**

5.2 Species of edible oysters, **1Hr**

5.3 Culture techniques used for edible oysters (Bottom culture, Rock and bag culture, Floating culture, Nursery culture) **3Hrs**

5.4. Important species of pearl oysters and method of artificial pearl production. **2Hrs**

Exercises/Projects:

Prepare charts on Culture techniques used for edible oysters

References:

1.Pillay, TVR. Aquaculture principles and practices, Fishery News (Books) Ltd., London1990.
Prawn and prawn fisheries by Kurain and Sebestain.

2.Shankar KM & Mohan CV 2002. Fish and Shell Fish Health Management UNESCO.Publ.

3. Sundermann CJ 1990.Johnson SK 1995. Hand book of shrimp diseases Texas A & M university, Texas.

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

5.Raymond T et al., 1990. Crustacean Sexual Biology, Columbia University Press, NewYork

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III SEMESTER END EXAMINATIONS

PAPER – VIII **MODEL PAPER** **Course Code:**

Title of the paper: Brackish Water Aquaculture

Time: 3 Hours **Max. Marks: 70**

SECTION-A

Answer all questions. **5X4= 20M**

Each question carries 4 marks

1. a) Explain the present status of brackish water farming in India. K2

Or

b) Write a short note on economics in shrimp culture. K1

2 .a) Discuss the hatchery technology in Penaeus monodon K6

Or

b) Write short notes on harvesting of brackish water prawns of India K1

3. a) Explain the biology of Lates calcarifer K2

Or

b) Explain culture of Etroplus suratensis K2

4. a) Write short notes on Natural food in shrimp K1

Or

b) Discuss about the stocking of shrimp in grow out ponds K6

5.a) Explain the species of edible oysters K2

Or

b) Write about biology of Scylla serrata K1

SECTION-B

Answer all the Questions. **5X10=50M**

6.a) Explain the ecological factors in brackish water aquaculture K2

(Or)

b) Give an account of types of culture systems of shrimp K3

7. a) Explain the feed and disease management in the culture practices of L. Vannamei K5

(Or)

b) Write an essay on mixed culture of fish and prawn K1

8.a) Give an account on biology and culture of Chanos chanos K3

(Or)

b) Write an essay on biology and culture of Mugil cephalus K1

9.a) What are the nutritional requirements of cultivable prawns K1

(Or)

b) Discuss about artificial feeds and their importance in shrimp culture K6

10. a) Discuss any two Culture techniques used for edible oysters K6

(Or)

b) Explain the method of artificial pearl production K2

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AQUACULTURE PRACTICAL - III

w.e.f. 2024-2025.

PRACTICAL SYLLABUS Course Code:

(2hrs/week)

Credits: 01 MAX.MARKS: 50. **(CIA-15+ SEE-35)**

PRACTICALS: CourseNo.8 – Brackish Water Aquaculture

1. Identification of cultivable fresh water and marine water prawns (any 3 each)
2. 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 stalks ablation in Penaeusmonodon
6. Identification and mounting of appendages of prawn / shrimp.
7. Field visit to prawn / shrimp hatchery
8. Field visit to prawn / shrimp culture ponds.

References:

1.Pillay, TVR. Aquaculture principles and practices, Fishery News (Books) Ltd., London1990.
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, NewYork.

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Aquaculture Practical - III

w.e.f. 2024-2025.

Title: Brackish Water Aquaculture

Model Practical Paper

Code: **Max Marks: 50 (CIA-15+ SEE-35)**

Time : 3 Hrs

A. Semester End Lab Exam

I Answer the following **Max Marks: 25**

Q1:

Q2:

Q3:

Q4:

Q5:

II. Viva

2M

III. Record

8M

Total

35M

_____

B. Continuous Internal Assessment **15M**

_____

Total (A+ B**)** **50M**