



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
B.Sc Fisheries Syllabus (w.e.f: 2020-21 A.Y)

UG PROGRAM (4 years Honors)

CBCS - 2020-21



B. Sc
FISHERIES



Syllabus and Model Question Papers



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Note: BOS is to provide final soft copy in PDF and word formats and four copies of hard copies in bounded form to the office of Dean Academic affairs.



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1. Resolutions of the Board of Studies

Meeting held on:21-1-21.....Time:10.30 am

At: Convention center, Adikavi Nannaya Univrsity :: Rajamahendravaram

Agenda:

Members present:

1.

Resolutions:



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DETAILS OF PAPER TITLES & CREDITS

I YEAR							
Sem	Course no	Course name	Course type (T/L/P)	Hrs/Week (Sciences 4+1)	Credits (Science 4+1)	Max.Marks Cont/Internal/Mid	Max. Marks Sem-end Exam
I	1	Biology of Fin Fish	T	4	4	25	75
	2	Biology of Fin Fish Practical-I	L	2	1	0	50
II	3	Biology of Shell Fish	T	4	4	25	75
	4	Biology of Shell Fish Practical-II	L	2	1	0	50
II Year							
III	5	Capture Fisheries -I	T	4	4	25	75
	6	Capture Fisheries -I Practical -III	L	2	1	0	50
IV	7	Capture Fisheries -II	T	4	4	25	75
	8	Capture Fisheries -II Practical -IV	L	2	1	0	50
	9	Fin Fish Culture	T	4	4	25	75
	10	Practical-V	L	2	1	0	50
Total				24	20		

Note; Course type code: T: Theory, L: Lab, P: Problem solving

a. Proposed combination subjects

Chemistry (M1), Zoology / Microbiology/Biotechnology/ Biochemistry (Choose any one as a M1)

b. Student eligibility for joining the course

Intermediated passed with combination of Bi.P.C and Diploma in Fisheries

c. Faculty eligibility for teaching the course

Fisheries – M.Sc., Ph.D. M.Sc- NET and SET Qualified, M.Sc, M.FSc., Ph.D. M.FSc - NET and SET, M.FSc,

Aquaculture – M.Sc., Ph.D. M.Sc- NET and SET Qualified, M.Sc, M.FSc., Ph.D. M.FSc - NET and SET, M.FSc,

Zoology - M.Sc., Ph.D. M.Sc- NET and SET Qualified, M.Sc,

d. List Proposed Skill enhancement courses with syllabus, if any

All Core papers are skill enhancement courses

e. Any newly proposed Skill development / Life skill courses with drafts syllabus and required resources

No



- f. Required instruments / software / computers for the course (Lab/ Practical course – wise required i.e ., for a batch of 15 students)

Sem No	Lab/Practical Name	Name of Instruments /software/computers required with specifications	Brand Name	Qty Required
1	Biology of Fishes	Virtual Dissection software+15 CPUs	Biolab HP	1 15
2	Fishing Methods	Traditional Crafts and Boats	Local Made	2+2

- g.List of suitable levels of positions eligible in the Govt/Pvt organization

S.No	Position	Company/Govt organization	Remarks	Additional skills required, if any
1	Fisheries Development officers	Govt- Fisheries Dept	Nil	Nil
2	Village fisheries officers	Govt- Fisheries Dept	Nil	Nil
3	Field assistants	Private Sector Fisheries Industries	Nil	Nil
4	Lab Technicians	Private Sector Fisheries Industries	Nil	Nil



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h. List of Govt. organizations/ Pvt companies for employment opportunities or internships or projects

S.No	Company/ Govt organization	Position type	Level of Position		
1	Govt- Fisheries Dept	Fisheries Development officers	Group -II	Technical	
2	Govt- Fisheries Dept	Village fisheries officers	Group -IV	Technical	
3	Private Sector Fisheries Industries	Field assistants	Marketing	Marketing	
4	Private Sector Fisheries Industries	Lab Technicians	Technician	Technical	

I. Any specific instructions to the teacher/ paper setters/ papers setters/Exam -Chief Superintendent

Nil



3. Program objectives, outcomes, co-curricular and assessment methods

B. Sc	FISHERIES
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Aim and objectives of UG program in Subject:

- Promote, facilitate and influence the best possible standards of fisheries management across the British Isles.
- Provide the technical and general knowledge necessary for competent fisheries management.
- Be the organization of choice for evidence-based advice and guidance for sustainable fisheries management.
- Be the membership body of choice for fisheries managers, and to provide good value fisheries management services to members and customers of the Institute.

Learning outcomes of Subject

- To exchange and circulate information, ideas and practical experience on all matters relating to fisheries and their management.
- To admit students to the Institute and to increase the number of professionally qualified fisheries managers through the provision of training courses.
- To designate the categories of membership appropriate to the experience, qualifications and contribution of members to the profession and determine the letters that may be placed after the names of members indicating these designations.
- To establish and maintain an appropriate Branch and Specialist section structure to meet the local, specialist and overall needs of fisheries interests.
- To promote the interests of members.
- To co-operate with other institutions and associations in order to achieve common goals.

Recommended Skill enhancement courses:

Core subjects are all Skill enhancement courses

Recommended Co-curricular activities:

A. Measurable:

1. Assignments
2. Student seminar
3. Quiz Programmes
4. Individual Field Studies/ projects
5. Group discussion
6. Group/Team Projects

B. General:

1. Collection of news reports and maintaining a record of paper-cuttings relating to topics covered in syllabus
2. Group Discussions on new trends Aquaculture related industries
3. Watching TV discussions and preparing summary points record of paper – cuttings relating to topics covered in syllabus
4. Any similar activities with imaginative thinking.



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4. Details of course – wise Syllabus

B.Sc.	Semester - I	Credits: 4
Course: 1	Biology of Fishes	Hrs/Wk: 4

Objectives:

- To introduce the learner to general morphology and taxonomy of fin fishes.
- To study the Biological, Morphological and physiological characteristics of fin fishes
- To provide the knowledge on the taxonomic characteristics of the fin fishes

Learning Outcomes:

- By the end of the course the student will be equipped with the knowledge of taxonomy, morphology & physiology of fin fishes
- Knowledge on the basic taxonomic tools for the identification of fin fishes will be learnt by the student.

UNIT I: General Characters and Classification of Cultivable Fin Fish

- 1.1 General characters and classification of fishes up to the level of classes.
- 1.2 Morphology of a teleost. Variation in the form and structure, skin, colouration, scales, mouth, jaws & teeth, fins.
- 1.3 Anatomy of a teleost fish. Alimentary canal and associated structures like gills, swim bladder, accessory respiratory organs, heart and circulation of blood.
- 1.4 Osmotic regulation and ion regulation – mechanism and general account.

UNIT II: Food & Feeding and Growth

- 2.1 General account and functional morphology of digestive system, natural fish food, feeding habits, feeding adaptations, digestion and absorption of food.
- 2.2 Age and growth of fish – absolute and relative growth, isometric and allometric growth.
- 2.3 Methods for determination of growth – length frequency analysis. Estimation of growth by direct methods – known age methods. Mark and recapture method, marking and tagging.

UNIT III: Reproductive Biology

- 3.1 Breeding in fishes, breeding places, breeding habits.
- 3.2. Induced breeding technique, bandh breeding,
- 3.3 Sexual maturity, testicular cycle, ovarian cycle, estimation of fecundity, ova diameter, frequency.
- 3.4 Fecundity in relation to length, weight, age and food supply.



UNIT IV: Development

- 4.1 Parental care in fishes, oviparity, viviparity,
- 4.2 Embryonic and larval development of fishes.
- 4.3 Environmental factors affecting reproduction and development of cultivable aquatic fin fish.

UNIT V: Locomotion

- 5.1 Fish Migration -
- 5.2 Locomotion
- 5.3 Classification of fishes based on degree of movement, zones inhabited, manner of reproduction.

REFERENCE BOOKS:

1. Jhingran, V.G. Fish and Fisheries of India. Hindustan Publishing Co., 1975.
2. Howar, W.S. & D.S. Randal Fish Physiology, Vols.: 1 to 4.
3. Moyle Peterb, Fishes: An Introduction to Ichthyology. Prentice Hall, 1974.
4. Meyer & Ashlock. Principles of systematic zoology.
5. Turnor – Text book of endocrinology.



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B.Sc.	Semester - I	Credits: 1
Course: 1(L)	Biology of Fishes Lab	Hrs/Wk: 2

List of the Practical Experiments:

1. Identification of commercially important fishes.
2. Identification of fish scales.
3. Study of mouth parts of herbivorous and carnivorous fishes.
4. Comparative study of digestive system of herbivorous and carnivorous fishes.
5. Gut content analysis.
6. Embryonic larval development of fishes.
7. Study of gonadal maturity and fertility.
8. Study of nest building and brooding of fishes.
9. Induced breeding technique.
10. Morphometric and meristic characters.
11. Study of Weberian Ossicles in cat fish.
12. Lateral line nerve of Trichiurus



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B.Sc.	Semester - II	Credits: 4
Course: 2	Biology of Shell Fish	Hrs/Wk: 4

OBJECTIVES:

- To introduce the learner to general morphology and taxonomy of Shell fishes.
- To study the Biological, Morphological and physiological characteristics of shell fishes
- To provide the knowledge on the taxonomic characteristics of the Shell fishes

LEARNING OUTCOMES:

- By the end of the course the student will be equipped with the knowledge of taxonomy, morphology & physiology of Shell fishes.
- Knowledge on the basic taxonomic tools for the identification of shell fishes will be learnt by the student.

UNIT I: General Characters and Classification of Cultivable Shell Fish

- 1.1 General characters and classification of crustaceans and molluscs up to the level of class.
- 1.2 Commercial importance of crustaceans and molluscs.
- 1.3 Prawn external parts and appendages, exoskeleton and integument.
- 1.4 Respiration and circulatory systems of prawn. Structure of gills, mechanism of respiration.
- 1.5 Nervous and excretory system of crustacean molluscs.
- 1.6 Sense organs in crustaceans and molluscs.

UNIT II: Food, Feeding and Growth

- 2.1 Natural food, feeding habits, feeding intensity utilization of food, gut content analysis.
- 2.2 Digestive system of shrimp, crab and molluscs.
- 2.3 Integument and exoskeleton of crustaceans, their structure and functions.

UNIT III: Reproductive Biology

- 3.1 Induced maturation in shrimp –induced maturation technology physiological changes after induced maturation.
- 3.2 Breeding in Oysters, Mussel, Clams, Pearl Oyster, Pila, Fresh water Mussel and Cephalopods.
- 3.3 Reproductive organs in Shrimp.
- 3.4 Life cycle of Shrimp.

UNIT IV: Development

- 4.1 Embryonic and larval development of Shrimp, Crab and Molluscs.
- 4.2 Environmental factors affecting reproduction and development of cultivable shell fish.



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UNIT V: Hormones & Growth

- 5.1 Endocrine system of Prawn and Crab, Oyster.
- 5.2 Neurosecretory cells Androgenic gland, ovary, cuticle.
- 5.3 Moulting, Moulting stages, Metamorphosis in Crustaceans.

REFERENCE BOOKS:

1. Borradile & R.A. Potts. The Invertebrates. Asia Publishing House, 1962.
2. Kaestner, A. Invertebrate Zoology. Vol. I – III, John Wiley & Sons, 1967.
3. Barrington, F.J.W. Invertebrates : Structure and Functions. EIBS, 1971.
4. Kurian, C.V. & V.O. Sabastian. Prawns and Prawn Fisheries of India. Hindustan Pub. Co., 1976.
5. Parker, J. & W.A. Haswell. The Textbook of Zoology. Vol. I. Invertebrates (eds. A.J. Marshall & W.D. Williams), ELBS & McMillan & Co., 1992.



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B.Sc.	Semester - II	Credits: 1
Course: 2(L)	Biology of Shell Fish Lab	Hrs/Wk: 2

List of the Practical Experiments:

1. Identification of commercially important shell fishes.
2. Study of different larval stages of shrimp.
3. Mouth parts and appendages of cultivable prawns, shrimp and other crustaceans.
4. Study of eggs of shrimps, prawns and other crustaceans.
5. Observations of Molluscan larva.
6. Study of visceral organs of fresh water mussels.
7. Dissections
 - A. Mounting of the shrimp/prawn appendages
 - B. Digestive system of shrimp/prawn
 - C. Nervous system of shrimp/prawn
 - D. Eye stalk ablation in shrimp/Prawn
 - E. Pituitary gland extract in fishes



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B.Sc.	Semester - III	Credits: 4
Course: 3	Capture Fisheries - I	Hrs/Wk: 4

OBJECTIVES:

- To study the Fish Distribution, Riverine and Reservoir fisheries.
- To understand pelagic fishery resources and demersal resources

LEARNING OUT COME

- Student learns the knowledge on the inland fishery resources
- Student learns the knowledge on the pelagic and demersal fishery resources

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

- 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

- 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 Nagarjuna Sagar,



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REFERENCE BOOKS :-

1. Jhingram, V.G. Fish and Fisheries of India. Second edition 1983, Hindustan Pub.Co.
2. Picker, 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. New Delhi 1980.
5. C.B.L. Srivastava – A text book of Fishery Science and Indian Fisheries. Kitab Mahal Agencies, Patna.



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B.Sc.	Semester - III	Credits: 1
Course: 3(L)	Capture Fisheries - I Lab	Hrs/Wk: 2

List of the Practical Experiments:

1. Identification of Freshwater fishes based on colour, Pigmentation, morphometric and meristic characters and other characters relevant to the group.
2. Identification of fry and fingerlings of Indian Major Crops.
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.
5. **Field Work:** Visit to fish landing centers of rivers, lakes and reservoirs.



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B.Sc.	Semester - IV	Credits: 4
Course: 4	Capture Fisheries II	Hrs/Wk: 4

OBJECTIVES:

- To develop basic knowledge about Estuarine and Marine Fishery resources and various crafts and gears used in fisheries
- To understand operation of various fishing gears
- To create awareness about fish finding devices.
- To develop basic knowledge on fishery management

LEARNING OUT COME:

- Student will learn the knowledge on Estuarine and Marine Fishery and various crafts and gears used in fisheries.
- Mechanism involved in the operation of the fishing gear will be learnt by the student.
- Tools for the identification of fishery resources and management of fisheries in different aspects will be learnt by the student

UNIT I: Estuarine Fishery

- 1.1 Definition of an estuary, Origin and Classification
- 1.2 Divergent estuaries in India, their location and species composition
- 1.3 Hooghly – Matlah Estuary, Mahanadi estuary, Godavari Estuary, Krishna Estuary

UNIT II: Marine Fishery

- 2.1 Marine Environment. Marine Fishery resources in India, Pelagic fishery resources.
- 2.2 Taxonomy, general description, distribution, food and feeding habits, reproduction, craft and gear, fish utilization of the following Sardines, Bombay Duck, Mackerel, Hilsa, Mulletts, Sharks and Rays, Pomfrets, Tuna, Seer Fish and Prawns,

UNIT III: Craft

- 3.1 Main types of the traditional crafts employed in Marine, fresh water fisheries of Andhra Pradesh.
- 3.2 Coracle, Dhoni, Sangadam, Canoes, Catamaran, Masula type boats, Fiber Glass boats
- 3.3 Techniques for the maintenance of the craft
- 3.4 Modern fishing crafts- trawlers, BLC. Mechanized Crafts

UNIT IV: Gear

- 4.1 Traditional gear
- 4.2 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.
- 4.3 Fish Finding Equipment (Echo sounder and sonar)
- 4.4 Modern gear- Techniques for the maintenance of the gear



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UNIT V: Fishery Management

- 5.1 Principles of conservation, and management.
- 5.2 Population dynamics – Overfishing, Maximum Sustainable yield (MSY), Maximum Economic Yield (MEY), Optimum Sustainable Yield (OSY).

REFERENCE BOOKS :

1. Jhingram, V.G. Fish and Fisheries of India. Second edition 1983, Hindustan Pub.Co. Picker, W.E. Methods for assessment of Fish Production in Fresh Waters. Blackwell Scient. Publ. 1970
2. Bal, D.V. and Veerabhadra Rao, K. Marine Fisheries, Tata MC Grawhill Publications, New Delhi
3. Srivastava, U.K. et.al. Freshwater aquaculture in India, Oxford and IBH Publ. Co. New Delhi 1980.
4. C.B.L. Srivastava – A text book of Fishery Science and Indian Fisheries. Kitab Mahal Agencies, Patna.

Maintenance of field work note book to be evaluated at the time of examination.



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B.Sc.	Semester - IV	Credits: 1
Course: 4(L)	Capture Fisheries II Lab	Hrs/Wk: 2

List of the Practical Experiments:

1. Identification of Marine and Estuarine water fishes based on colour, Pigmentation, morphometric and meristic characters and other characters relevant to the group.
2. Examination of Commercially Important Marine and Estuarine fishes and prawns, from the point of view of ecology and fishery.
3. Knowledge of common types of Marine and Estuarine craft and gear on models provided in the department.

Field Work:

Visit to Coastal region to observe marine fish landing centers, different types of traditional boats, mechanized boats and various types of traditional and modern nets used in the fish capture.

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

Maintenance of field work note book to be evaluated at the time of examination.



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B.Sc.	Semester - IV	Credits: 4
Course: 5	Fin Fish Culture	Hrs/Wk: 4

OBJECTIVES:

- To provide basic idea about the basics of aquaculture and fin fish culture
- To provide basic technical knowledge about pond preparations, pond managements and carp culture practices in ponds
- To provide basic idea about the Design, construction and management of hatchery

LEARNING OUT COME:

- Student will learn the basics of aquaculture and fin fish culture
- Technical knowledge about pond preparations, pond managements and carp culture practices in ponds
- will be learnt.
- The Design, construction and management of hatchery will be learnt

UNIT I: Introduction

- 1.1 Basics of aquaculture – Scope and definition, history of aquaculture origin and growth, General principles underlying the practices of aquaculture.
- 1.2. Major cultivable Indian Carps, Chinese carps and Air Breathing fishes.
- 1.3. Different fresh water Aquaculture systems – Monoculture, Polyculture, Integrated culture, Cage culture, Pen culture, Monosex culture system.

UNIT II: Types of fish ponds

- 2.1. Classification of ponds based upon water resources – Spring, Rain water, Flood water, Well water and Water course ponds.
- 2.2. Classification of ponds based upon functions – Hatchery, Nursery, Rearing, Production, Stocking and Quarantine ponds.
- 2.3. Criteria for the selection of species for culture.

UNIT III: Pond Preparation

- 3.1. Important factors in construction of ideal fish pond – site selection, topography, nature of soil, water resources – quantity and quality of water, sources of pollution.
- 3.2. Design and construction of pond – layout of farm, size of farm, shape and depth of pond, dike design, pond bottom preparation, inlet, outlet, aerators and method of construction.



UNIT IV: Pond Management

- 4.1. Liming – properties of liming material, lime requirement and application to ponds, effect of liming on pond ecosystem.
- 4.2. Need of fertilizers and manures in culture ponds, role of nutrients, precautions in their application.
- 4.3. Physics – Chemical conditions of soil and water optimum culture – Temperature, depth, turbidity light water currents, pH, Dissolved oxygen, Co₂, Hardness, Nutrients.
- 4.4. Eradication of predator, and weed control – advantages and disadvantages of weed, types of weeds in culture pond, weed fish, toxins used for weed control and control of predators.

UNIT V: Hatchery Technology

- 5.1 Hatchery – Design and construction of hatchery;
- 5.2 water quality monitoring and management
- 5.3 Selection of brood stock and brood stock management
- 5.4 Different types of hatcheries.

REFERENCES 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.
3. Pillay TVR & Dill, WMA, 1979. Advances in Aquaculture. Fishing news books ltd., England.
4. Pillay TVR & Kutty MN 2005. Aquaculture – Principles and practices, Blackwell.
5. Boyd CE 1982. Water Quality Management for Pond Fish Culture. Elsevier Scientific Publishing Company.
6. Pillay TVR, 1996. Aquaculture Principles and Practices, Fishing News Books Ltd., London



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B.Sc.	Semester - IV	Credits: 1
Course: 5(L)	Fin Fish Culture Lab	Hrs/Wk: 2

List of the Practical Experiments:

I. Experiments

1. Estimation of dissolved oxygen.
2. Estimation of chlorides
3. Estimation of carbonates and bicarbonates

II. Breeding Techniques

Induced breeding techniques in carps – Dissection of pituitary gland preparation of hormone extract, dosage fixation, breeders selection. Study of Gonadial maturity and fecundity in carps.

Identification of life history stages of fish.

III. Hatchery

Study of water treatment and management in fish hatchery. Application of different chemicals and drugs used in hatchery.

IV. Field Trips

Field visit to fish hatchery.

Field visit to different fish ponds.



5. Model Question Paper (Sem-end, Exam)

MODEL QUESTION COURSE

B. Sc DEGREE EXAMINATION

SEMESTER: I

Course 1: Biology of Fishes

Time: 3Hrs.

Max. Marks: 75

SECTION – A

Write short notes on any FIVE of the following.

5X5=25M

1. Types of fins.
2. Placoid scale.
3. Feeding habits.
4. Breeding habits.
5. Viviparous.
6. Manner of reproduction.
7. Hilsa ilisha
8. Marking.

SECTION – B

Write any FIVE of the following question.

Draw diagrams wherever necessary.

5X10=50

9. (a) Write an essay on accessory respiratory organs in fishes.
(OR)
(b) Give an account on colouration in fishes
10. (a) Give an account of feeding adaptations in fishes.
(OR)
(b) Write about methods for determination of growth in fishes.
11. (a) Write an essay on induced breeding technique.
(OR)
(b) Explain Testicular cycle in male fishes.
12. (a) Describe parental care in fishes.
(OR)
(b) Give an account on factors affecting reproduction.
13. (a) Classification of fishes based on zones inhabited.
(OR)
(b) Write an essay on Migration.



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MODEL QUESTION COURSE
Semester End Examination - Practical
BIOLOGY OF FISHES LAB

Time: 3hrs

Max. Marks: 50M

I.	Identification of Spotters	5x05 = 25 Marks
II.	Dissection (Major)	1x10 = 10 M
III.	Dissection/ Analysis (Minor)	1x 05 = 05 M
IV.	Record+ Viva Voce	10 M



MODEL QUESTION COURSE

B. Sc DEGREE EXAMINATION

SEMESTER: II

Course 2: Biology of Shell fish

Time: 3Hrs.

Max. Marks: 75

SECTION-A

Answer any FIVE of the following. Draw diagrams wherever necessary.

5x5=25 M

1. Sense organs in crustaceans.
2. Gastropoda
3. Feeding intensity.
4. Radula
5. Pearl Oyster
6. Megalopa
7. Neuro secretory cells
8. Androgenic glands

SECTION-B

Answer any FIVE of the following. Draw diagrams wherever necessary. 5x10=50 M

- 9 (a) Describe respiratory system in Prawn.
(OR)
(b) Give a detailed account on Cephalic appendages of Prawn.
- 10 (a) Write an essay on integument in Crustaceans.
(OR)
(b) Explain digestive system of Crab.
- 11 (a) Give a detailed account on induced maturation in Shrimp.
(OR)
(b) Write an essay on breeding in Oysters.
- 12.(a) Write an essay on different larval stages of Shrimp.
(OR)
(b) Give an account on development of molluscs.
- 13.(a) Describe endocrine glands in Prawn.
(OR)
(b) Describe the moulting stages in Crustaceans.



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B.Sc Fisheries Syllabus (w.e.f: 2020-21 A.Y)

MODEL QUESTION COURSE
Semester End Examination - Practical
BIOLOGY OF SHELL FISH LAB

Time: 3hrs

Max. Marks: 50M

I.	Identification of Spotters	5x5=	25 Marks
II.	Dissection/ Analysis (Major)	1x10=	10M
III.	Dissection/ Analysis (Minor)	1x5=	05 M
IV.	Record+ Viva Voce		10 M



SECTION-A

Answer any **FIVE** of the following. Draw diagrams wherever necessary.

5x5=25 M

1. EEZ
2. Reservoir fisheries
3. Coastal fishery
4. Pelagic resources
5. Kolleru
6. Sanctuaries
7. Lakesterine fisheries
8. Capture fisheries

SECTION-B

Answer any **FIVE** of the following. Draw diagrams wherever necessary.

5x10=50 M

9. a) Write an essay on world inland and marine fish production ?
OR
b) Write an essay on EEZ concept and its implementation in fisheries?
10. a) Write the notes on Biology and fishery of important fishes in India
OR
b) Write an essay on Economically Important Fresh Water Fishes of Andhra Pradesh?
11. a) Write about the important characters of Streams?
OR
b) Write an essay on Major river systems in India?
12. a) Write an essay on East Coast river systems in India?
OR
b) Write an essay on East Coast river systems in India?
13. a) Define Reservoir? Major reservoirs in India?
OR
b) Write an essay on Types of lakes and based on circulation?



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MODEL QUESTION COURSE
Semester End Examination - Practical
CAPTURE FISHERIES -I LAB

Time: 3hrs

Max. Marks: 50M

I. Identification of Spotters	5x5= 25 Marks
II. Experiment (Major)	1x10= 10M
III. Field Report	1x5= 05 M
IV. Record+ Viva Voce	10 M



MODEL QUESTION COURSE

B. Sc DEGREE EXAMINATION
SEMESTER: IV
Course 4: CAPTURE FISHERIES -II

Time: 3Hrs.

Max. Marks: 75

SECTION-A

Answer any FIVE of the following. Draw diagrams wherever necessary. 5x5=25 M

1. Estuary
2. Sardines
3. Pelagic resources
4. Dhoni
5. Catamaran
6. Hand Lines
7. Trawl Net
8. Sanctuaries

SECTION-B

Answer any FIVE of the following. Draw diagrams wherever necessary.

5x10=50 M

9. a) Define Estuary? Explain about the Ecological significance of estuary?
OR
b) Write an essay on Major river systems in India?
10. a) Define Reservoir? Major reservoirs in India
OR
b) Write an essay on Types of lakes and based on circulation?
11. a) Write Different types of fishing crafts in India??
OR
b) Write Techniques for the maintenance of the craft?
12. a) Write Different types of traditional gears in India
OR
b) Write in detail about fish finding equipment?
13. a) Write the Principles and management of Fish conservation?
OR
b) Write a note on Population dynamics?



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MODEL QUESTION COURSE
Semester End Examination - Practical
CAPTURE FISHERIES -II LAB

Time: 3hrs

Max. Marks: 50M

I.	Identification of Spotters	5x5= 25 Marks
II.	Experiment (Major)	1x10= 10M
III.	Field Report	1x5= 05 M
IV.	Record+ Viva Voce	10 M



MODEL QUESTION COURSE

B. Sc DEGREE EXAMINATION

SEMESTER: IV

Course 5: FIN FISH CULTURE

Time: 3Hrs.

Max. Marks: 75

SECTION A

Answer any FIVE of the following. Draw diagrams wherever necessary.

5x5=25 M

1. Polyculture
2. Cage culture
3. Nursery pond
4. Topography
5. Liming
6. Aquatic weeds
7. Bundh breeding
8. Chinese circular trough

SECTION-B

Answer any FIVE of the following. Draw diagrams wherever necessary.

5x10=50 M

9. (a) Give an account on two Indian major carps identification and breeding habits.
(or)
(b) Explain about any three fresh water aquaculture systems.
10. (a) Classify ponds based upon water resources availability.
(or)
(b) Based upon functional aspect what are the different types of fish ponds?
11. (a) Describe about important factors to be considered while constructing Fish pond.
(or)
(b) Write an essay on design and construction of a Fish pond.
12. (a) Describe physical factors present in water required for fish culture.
(or)
(b) Write briefly about aquatic weeds. Mention the methods employed to control Aquatic weeds.
13. (a) Define Hypophysation. Explain how this technique is employed in carps for breeding.
(or)
(b) Discuss about construction and management of any one type of fish hatchery in detail.



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MODEL QUESTION COURSE
Semester End Examination - Practical
FIN FISH CULTURE II LAB

Time: 3hrs

Max. Marks: 50M

I.	Identification of life stages of Fish	2x5= 10Marks
II.	Dissection (Major)	1x15= 15M
III.	Experiment (Major)	1x10=10 M
IV.	Field Visit Report	1x5= 05 M
V.	Record+ Viva Voce	10 M