

# ANDHRA KESARI UNIVERSITY



## B.Sc., Honours in AQUACULTURE: MAJOR

w.e.f AY 2023-24 onwards

### COURSE STRUCTURE

SEMESTER	Code	Title of the paper	Hr /week	Credits
<b>I</b>	1	Introduction to Classical Biology	5	4
	2	Introduction to Applied Biology	5	4
<b>II</b>	3	Taxonomy and Functional Anatomy of Fin Fish and Shellfish - (T)	3	3
		Taxonomy and Functional Anatomy of Fin Fish and Shellfish - (P)	2	1
	4	Biology of fin fish & shell fish - (T)	3	3
		Biology of fin fish & shell fish- (P)	2	1
<b>III</b>	5	Basic Principles of Aquaculture- (T)	3	3
		Basic Principles of Aquaculture - (P)	2	1
	6	Capture Fisheries- (T)	3	3
		Capture Fisheries- (P)	2	1
	7	Fresh water Aquaculture- (T)	3	3
		Fresh water Aquaculture- (P)	2	1
	8	Brackish water Aquaculture- (T)	3	3
		Brackish water Aquaculture- (P)	2	1
<b>IV</b>	9	Fish Health management- (T)	3	3
		Fish Health management- (P)	2	1
	10	Shrimp Health Management- (T)	3	3
		Shrimp Health Management- (P)	2	1
	11	Fish nutrition & Feed technology - (T)	3	3
	11	Fish nutrition & Feed technology - (P)	2	1

**III SEMESTER**  
**Course No.: 5 - Basic Principles of Aquaculture**  
credits :3

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**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 Pradhan Mantri Matsya Sampada Yojana (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  
Recirculating 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<sub>2</sub>, NH<sub>3</sub>, NO<sub>2</sub>

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BOS Chairman

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**III SEMESTER**  
**Course No.: 5 - Basic Principles of Aquaculture**  
credits :1

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1. Estimation of Carbonates, Bicarbonates in watersamples
2. Estimation of DissolvedOxygen
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 aquaticweeds, 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. Elsvier 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**  
**Course No.: 6 - Capture Fisheries**  
credits :3

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**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 .**

1.1 General account of the distribution

1.2 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) :-**

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

3.2 Kolleru Lake and its fishery.

3.3 Different reservoirs of River systems in India with special reference to Nagarjuna Sagar,

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**III SEMESTER**  
**Course No.: 6 - Capture Fisheries**  
credits :1

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**PRACTICALS SEMESTER – II**

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 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 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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**III SEMESTER**  
**Course No.: 7 - Fresh water Aquaculture**  
credits :3

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**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

**UNIT-V: Culture of Prawn**

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

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**III SEMESTER**  
**Course No.: 7 - Fresh water Aquaculture.**  
credits :1

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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.

**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
1972. Text book of fish culture.Oxford fishing news books.

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**III SEMESTER**  
**Course No.: 8 - Brackish water Aquaculture**  
credits :3

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**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 *Penaeus monodon*/ *P.vannamei*

2.2 Brackish water prawns of India – Commercial value.

2. Morphotypes and harvesting

**Unit – III Biology of Shrimp**

3.1 Biology of *Penaeus monodon*,

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**  
**Course No.: 8 - Brackish water Aquaculture**  
credits :1

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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 penaeus monodon.

**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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**IV SEMESTER**  
**Course No.: 9 - Fish Health Management**  
credits :3

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**Course outcomes:**

1. Provide students with knowledge about fish diseases and pathological aspects of diseases.
2. Learn about Fungal, Viral and Bacterial diseases of finfish.
3. Gain knowledge of Nutritional deficiency related diseases and antibiotic and chemotherapeutics.
4. Understand and learn the importance of diagnostic tools in identification of diseases and application and development of vaccines.

**UNIT I: Pathology and parasitology**

1-1 Introduction to fish diseases –Definition and categories of diseases – Disease and environment

1-2 Disturbance in cell structure – changes in cell metabolism, progressive and retrogressive tissue changes, types of degeneration, infiltration, necrosis, cell death and causes

1-3 Atrophy, hypertrophy, neoplasms, inflammation, healing and repair

**UNIT II: Fungal and viral Diseases of fin fish.**

2-1 Fungal diseases (both of shell and finfish) – Saprolegniosis, brachiomycosis, ichthyophorus

diseases – Lagenidium diseases – Fusarium disease, prevention and therapy

2-2 Viral diseases – Emerging viral diseases in fish, haemorrhagic septicemia, spring viremia of carps, infectious hematopoietic necrosis in trout, infectious pancreatic necrosis in

salmonids, swim-bladder inflammation in cyprinids, channel cat fish viral disease, prevention and therapy

**UNIT III: bacterial Diseases of fin fish.**

2-3 Bacterial diseases – Emerging bacterial diseases, aeromonas, pseudomonas and vibrio infections, columnaris, furunculosis, epizootic ulcerative syndrome, infectious abdominal dropsy, bacterial gill disease, enteric red mouth, bacterial kidney disease, proliferative kidney disease, prevention and therapy

**UNIT IV: Protozoan Diseases of fin fish.**

Protozoan diseases: Ichthyophthiriasis( White spot Disease), Costiasis, Whirling disease

**UNIT V: Nutritional diseases**

4-1 Nutritional pathology – lipid liver degeneration, Vitamin and mineral deficiency diseases. Aflatoxin and dinoflagellates.

4-2 Antibiotic and chemotherapeutics. Nutritional cataract. Genetically and environmentally induced diseases.

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**IV SEMESTER**  
**Course No.: 9 - Fish Health Management**  
credits :1

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1. Enumeration of Bacteria by TPC Method
2. Enumeration of total Coli forms
3. Observation of gross pathology and external lesions of fish with reference to the common diseases in aquaculture
4. Examination of pathological changes in gills and gut lumen, lymphoid organ, muscles and nerves of fish
5. Collection, processing and analysis of data for epidemiological investigations of viral diseases
6. Bacterial pathogens – isolation, culture and characterization
7. Identification of parasites in fishes: Protozoan, Helminths, Crustaceans
8. Estimation of dose, calculation of concentration, methods of administration of various chemotherapeutics to fish and shell fish
9. Estimation of antibiotics used in aquaculture practices

**PRESCRIBED BOOK(S):**

1. Shaperclaus W. 1991 Fish Diseases- Vol.I & II. Oxonian Press Pvt.ltd
2. Roberts RJ 1989. Fish pathology. Bailliere Tindall, New York
3. Lydia Brown 1993. Aquaculture for veterinarians- fish husbandry and medicine. Pergamon Press. Oxford

**REFERENCES:**

1. Shankar KM & Mohan CV. 2002. Fish and Shellfish Health Management. UNESCO Publ. Sindermann CJ. 1990
2. Walker P & Subasinghe RP. (Eds.). 2005 Principal Diseases of Marine Fish and Shellfish. Vols. I, II. 2nd Ed. Academic Press
3. DNA Based Molecular Diagnostic Techniques: Research Needs for Standardization and Validation of the Detection of Aquatic Animal Pathogens and Diseases. FAO Publ. Wedmeyer G, Meyer FP & Smith L. 1999.
4. Bullock G et.al., 1972 Bacterial diseases of fishes. TFH publications, New Jersey
5. Post G 1987. Text book of Fish Health. TFH publications, New Jersey
6. Johnson SK 1995. Handbook of shrimp diseases. Texas A & M University, Texas

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## IV SEMESTER

### Course No.:10 - Shrimp Health Management

credits :1

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#### **Course outcomes:**

1. Provide students with knowledge about shrimp diseases and pathological aspects of diseases.
2. Learn about Fungal, Viral and Bacterial diseases of shellfish.
3. Gain knowledge of Nutritional deficiency related diseases and antibiotic and chemotherapeutics.
4. Understand and learn the importance of diagnostic tools in identification of diseases and application and development of vaccines.
5. To know about production of disease free seeds and good feed management.

#### **Syllabus**

##### **UNIT I: Viral Diseases of shell fish (Symptoms, Treatment and Prophylaxis)**

- 1-1 Major shrimp viral diseases – Baculovirus penaei, Monodon Baculovirus,
- 1-2 Baculoviral midgut necrosis, Infectious hypodermal and haematopoietic necrosis virus, Hepatopancreatic parvo like virus,
- 1-3 Yellow head baculovirus, white spot baculovirus.

##### **UNIT II: Bacterial Diseases of shell fish (Symptoms, Treatment and Prophylaxis)**

- 2.1 Bacterial diseases of shell fish – aeromonas, pseudomonas and vibrio infections,
- 2.2 Luminous bacterial disease, filamentous bacterial disease. Prevention and therapy

##### **UNIT III: Protozoan Diseases of shell fish (Symptoms, Treatment and Prophylaxis)**

- 3-1 Protozoan diseases- Ichthyophthiriasis, Costiasis,
- 3-2 Whirling diseases, trypanosomiasis

##### **UNIT IV: Health management**

- 4-1 Diagnostic tools – immune detection- DNA/RNA techniques, General preventive methods and

prophylaxis. Application and development of vaccines.

- 4-2 Quarantine – Significance, methods and regulations for transplants.

##### **UNIT V: Production of disease free seeds**

- 5-1 Production of disease-free seeds. Evaluation criteria of healthy seeds.
- 5-2 Good Feed management for healthy organisms, Zero water exchange, Probiotics in

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**IV SEMESTER**  
**Course No.:10 - Shrimp Health Management**  
credits :1

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1. Enumeration of Bacteria by TPC Method
2. Observation of gross pathology and external lesions of fish and prawn with reference to the common diseases in aquaculture
3. Examination of pathological changes in gut lumen, hepatopncreas, lymphoid organ, muscles and nerves of prawn and shrimp
4. Collection, processing and analysis of data for epidemiological investigations of viral diseases
5. Bacterial pathogens – isolation, culture and characterization
6. AntibioGrams – preparation and evaluation
7. Molecular and immunological techniques; Biochemical tests; PCR; ELISA; Agglutination test; Challenge tests; Purification of virus for development of vaccines (Demonstration at institutes/labs)
8. Estimation of dose, calculation of concentration, methods of administration of various chemotherapeutics to fish and shell fish
9. Estimation of antibiotics used in aquaculture practices
10. Estimation of probiotics used in aquaculture

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**IV SEMESTER**  
**Course No.: 11 - Fish nutrition & Feed technology**  
credits :3

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**Course outcomes:**

1. Understand Nutritional requirements of cultivable fishes and factors affecting energy partitioning and feeding.
2. Know different types of feed and FCR and different types of feeders
3. Gain Knowledge of Feed manufacture and storage methods of feeds
4. Understand the value of Feed additives and Non-Nutrient ingredients.
5. To create awareness of different nutritional deficiency and importance of natural and supplementary feeds and balanced diet.

**UNIT-I: Nutritional requirements of cultivable fish**

- 1.1 Requirements for energy, proteins, carbohydrates, lipids, fiber, micronutrients for different stages of cultivable fish and prawns
- 1-2 Essential amino acids and fatty acids, protein to energy ratio, nutrient interactions and protein sparing effect
- 1.3 Dietary sources of energy, effect of ration on growth, determination of feeding rate, check tray

**UNIT-II: Forms of feeds & Feeding methods**

- 2-1 Feed conversion efficiency, feed conversion ratio and protein efficiency ratio
- 2-2 Wet feeds, moist feeds, dry feeds, mashes, pelleted feeds, floating and sinking pellets, advantages of pelletization
- 2-3 Manual feeding, demand feeders, automatic feeders, surface spraying, bag feeding and tray feeding

**UNIT-III: Feed manufacture & Storage**

- 3-1 Feed ingredients and their selection, nutrient composition and nutrient availability of feed ingredients
- 3-2 Feed formulation – extrusion processing and steam pelleting, grinding, mixing and drying, pelletization, and packing
- 3-3 Water stability of feeds, farm made aqua feeds, micro-coated feeds, micro-encapsulated feeds and micro-bound diets
- 3-4 Microbial, insect and rodent damage of feed, chemical spoilage during storage period and proper storage methods.

**UNIT-IV: Feed additives & Non-nutrient ingredients**

- 4-1 Binders, anti-oxidants, probiotics
- 4-2 Feed attractants and feed stimulants
- 4-3 Enzymes, hormones, growth promoters and pigments
- 4-4 Anti-metabolites, aflatoxins and fiber.

**UNIT-V: Nutritional Deficiency in Cultivable fish**

- 5-1 Protein deficiency, vitamin and mineral deficiency symptoms
- 5-2 Nutritional pathology and ant-nutrients
- 5-3 Importance of natural and supplementary feeds, balanced diet.

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**IV SEMESTER**  
**Course No.:11 - Fish nutrition & Feed technology**  
credits :1

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1. Estimation of protein content in aquaculture feeds
2. Estimation of carbohydrate content in aquaculture feeds
- 3 Estimation of lipid content in aquaculture feeds
4. Estimation of ash in aquaculture feed
5. Study of water stability of pellet feeds
6. Feed formulation and preparation in the lab
7. Study of binders used in aquaculture feeds
8. Study of feed packing materials
9. Study of physical and chemical change during storage
10. Study on physical characteristics of floating and sinking feeds
11. Visit to a aqua-feed production

unit PRESCRIBED BOOK(S):

1. HALVER JE 1989. Fish nutrition. Academic press, San

diego REFERENCES:

- 1.1 Lovell rt 1998. Nutrition and feeding of fishes, Chapman & Hall, New York
- 1.2 Sena de silva, trevor a anderson 1995. Fish nutrition in aquaculture. Chapman & Hall, New York.

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ANDHRA KESARI UNIVERSITY-ONGOLE, PRAKASAM DISTRICT  
Single Major Programme from the Year 2023-24 Onwards  
Programme-B.Sc. Honours Aquaculture - Question Paper model,  
Second Year-Semester-III & IV

Time: 3 Hours

Total Marks: 75

PART –A

Answer any Five of the following  
(Draw label diagrams wherever necessary)

5X5=25 Marks

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10

PART –B

Answer the following  
(Draw label diagrams wherever necessary)

5x10=50 Marks

- 11.
- 12.
- 13.
- 14.
- 15.
- 16.
- 17.
- 18.
- 19.
- 20.

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