

I DEGREE
AQUA CULTURE
SEMESTER - I
2018 - 2019

**SRI Y.N.COLLEGE (AUTONOMOUS) NARSAPUR, W.G.DIST.,
AQUACULTURE TECHNOLOGY COURSE SYLLABUS**

**SEMESTER-I-PAPER-1
BASIC PRINCIPLES OF AQUACULTURE**

UNIT-I: INTRODUCTION

- 1-1 Concept of Blue Revolution – History and definition of Aquaculture
- 1-2 Scope of Aquaculture at global Level, India and Andhra Pradesh
- 1-3 Fresh water aquaculture, brackish water aquaculture and mariculture
- 1-4 Different Aquaculture systems – Pond, Cage, Pen, Running water, Extensive, Intensive and Semi-Intensive Systems and their significance. Monoculture, Polyculture and Monosex culture systems.

UNIT-II: POND ECOSYSTEM

- 2-1 General Concepts of Ecology, Food Chains
- 2-2 Lotic and lentic systems, streams and springs
- 2-3 Importance of Plankton and Benthos in culture ponds.
- 2-4 Concepts of Productivity, estimation and improvement of productivity.

UNIT-III: TYPES OF FISH PONDS

- 3-1 Classification of ponds based on water resources – spring, rain water, flood water, well water and water course ponds.
- 3-2 Functional classification of ponds – nursery, rearing, production, stocking and quarantine ponds.
- 3-3 Hatchery design – Fish hatchery.

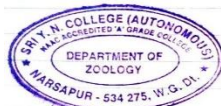
UNIT-IV: POND PREPARATION


- 4-1 Important factors in the construction of an ideal fish pond – site selection, topography, nature of the soil, water resources
- 4-2 Lay out and arrangements of ponds in a fish farm

UNIT-V: POND MANAGEMENT FACTORS

- 5-1 Need of fertilizer and manure application in culture ponds; Role of nutrients; NPK contents of different fertilizers and manures used in aquaculture; and precautions in their application.
- 5-2 Physico-chemical conditions of soil and water, (PH, temperature, depth, turbidity, light) to increase oxygen and reduce ammonia & hydrogen sulphide in culture ponds; correction of PH.
- 5-3 Eradication of predators and weed control – advantages and disadvantages of weed, weed plants in culture ponds, aquatic weeds, weed fish, toxins used for weed control and control of predators.

- 1. AROTS
- 2. T.V.V. S. J.
- 3. K. S.
- 4. R. S.
- 5. K. S.
- 6. S. K. S.
- 7. L. S.
- 8. S. S.



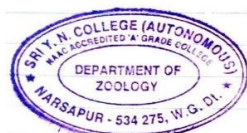

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AQUACULTURE TECHNOLOGY COURSE SYLLABUS
SEMESTER-I-PAPER-1
BASIC PRINCIPLES OF AQUACULTURE

BLUE PRINT (Guidelines to the paper setter)

| UNITS | ESSAY QUESTIONS | SHORT QUESTIONS |
|--------------|-----------------|-----------------|
| UNIT-I | 2 | 2 |
| UNIT-II | 2 | 1 |
| UNIT-III | 2 | 2 |
| UNIT-IV | 2 | 1 |
| UNIT-V | 2 | 2 |
| TOTAL | 10 | 8 |

1. *Notes*
2. *T.V.V. Sujin*
3. *Notes*
4. *Ramesh*
5. *K. Uma Devi*
6. *Even number*
7. *L. Red*
8. *Notes*




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AQUACULTURE TECHNOLOGY COURSE SYLLABUS

SEMESTER-I-PAPER-1
BASIC PRINCIPLES OF AQUACULTURE

Time: 3 Hrs.

Max.Marks: 75

PART – I

Answer any **Five** of the following.

5x5 = 25 M

1. Cage Culture – పెట్టెల యందు పెంపకము.
2. Food Chains – ఆహారపు గొలుసులు
3. Nursery Ponds – నర్సరీ కుంటలు
4. Soil Characters of Pond – చెరువు యొక్క మృత్తిక లక్షణాలు
5. Manure applications in Culture Ponds – చెరువులయందు ఎరువుల వాడకం
6. P^H – పి.హెచ్.
7. Aquatic Weeds – నీటికలుపు మొక్కలు
8. Weed Fishes – భక్షక చేపలు.

PART – II

Answer any **Five** of the following choosing at least two questions from Section A and Section B. All questions carry equal marks.

5x10 = 50 M

SECTION – A

9. Write an essay on Mono culture and Poly culture.
ఏక సంవర్ధనము మరియు బహు సంవర్ధనము గూర్చి ఒక వ్యాసము వ్రాయుము.
10. Describe the differences between Lotic and Lentic waters.
లోటిక్ మరియు లెన్ టిక్ జలాల మధ్య వ్యత్యాసములను తెల్పుము.
11. Give an account of the design and construction of Culture Ponds.
సంవర్ధన చెరువుల యొక్క డిజైన్ మరియు నిర్మాణమును గూర్చి వివరింపుము.
12. Give an account on Nitrogen Cycle
నత్రజని వలయము గూర్చి వ్రాయుము.
13. Explain the Fish Hatchery design.
చేపల హీచరీ డిజైన్ గూర్చి తెల్పుము.

SECTION – B

14. Describe the organic and inorganic fertilizers used in fresh water culture ponds.
మంచినీటి చెరువులయందు సహజ ఎరువు, కృత్రిమ ఎరువుల వాడకమును గూర్చి వివరింపుము.
15. Write an essay on physico-chemical characters of fresh water culture ponds.
సంవర్ధన చెరువుల భౌతిక-రసాయనిక లక్షణాలపై ఒక వ్యాసము వ్రాయుము.
16. Describe the detailed account on Aquatic Weeds and their control in Aqua Culture ponds.
జలసంవర్ధన చెరువులయందు కలుపుమొక్కలను గూర్చి తెలిపి వాటి నివారణ పద్ధతులను వివరింపుము.
17. Write an essay on predatory and weed fishes.
పరభక్షక చేపలు మరియు వీడ్ చేపలను గూర్చి ఒక వ్యాసము వ్రాయుము.
18. Write an account on lay out of a fish farm.
చేపల చెరువు యొక్క లే-అవుట్ గూర్చి వ్రాయుము.

1. 

7. L. Venkatesh

2. V. V. S. S. S.

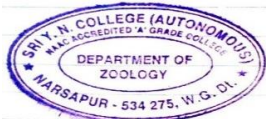
8. R. B. S.


3.

4. 

5. K. S. S.

6. B. K. R. M. S.




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AQUACULTURE TECHNOLOGY COURSE SYLLABUS

SEMESTER-I-PAPER-1

BASIC PRINCIPLES OF AQUACULTURE

PRACTICALS:

1. Estimation of Carbonates, Bicarbonates in water samples
2. Estimation of dissolved oxygen
3. Field visit to nursery, rearing and stocking ponds of aqua farms
4. Field visit to hatchery
5. Study of algal blooms and their control
6. Collection & identification of zooplankton and phytoplankton
7. Study of aeration devices.
8. Collection and study of aquatic weeds
9. Filed survey of nearby habitat for dietary dependency on and requirement of aqua products.

PRACTICAL MODEL QUESTION PAPER

Time: 3 Hrs.

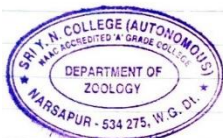
Max.Marks: 50

1. Estimation of DO₂ in the given sample of water and write the procedure adopted. 10 + 5 = 15 M
2. Identify draw and comment on the given spotters 5 x 4 = 20 M
A, B, C, D, & E
3. Record and Field Note Book 10 + 5 = 15 M

TOTAL:

50 M

1. *Crab*
2. *T.V.V. Spine*
3. *Water*
4. *Paramecium*
5. *K. White Law*
6. *Green water*
7. *L. Pond*
8. *Red Pond*



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SEMESTER - II
2018 - 2019



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I B.Sc., Aquaculture Technology - Under CBCS - Semester II
Paper II, Biology of Fin Fish & Shell Fish

UNIT-I: GENERAL CHARACTERS & CLASSIFICATION OF CULTIVABLE FIN & SHELL FISH.

- 1-1 General Characters and classification of fishes up to the classes.
- 1-2 Fish, Crustaceans and Molluscs of commercial importance.
- 1-3 Sense organs of fishes.
- 1-4 Specialized organs in fishes - electric organ, venom and toxins.
- 1-5 Buoyancy in fishes - swim bladder.

UNIT-II: FOOD, FEEDING AND GROWTH

- 2-1 Natural fish food, feeding habits, feeding intensity, stimuli for feeding, utilization of food, gut content analysis, structural modifications in relation to feeding habits.
- 2-2 Principles of Age and growth determination; growth regulation, Growth rate measurement - scale method, otolith method, skeletal parts as age indicators.
- 2-3 Genetic, biotic & ecological factors in determining the longevity of fishes.
- 2-4 Length-weight relationship, condition factor/Ponderal index, relative condition factor.

UNIT-III: REPRODUCTIVE BIOLOGY.

- 3-1 Breeding in fishes, breeding places, breeding habits & places, breeding in natural environment and in artificial ponds.
- 3-2 Induced breeding in fishes

UNIT-IV: DEVELOPMENT.

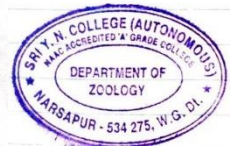
- 4-1 Parental care in fishes, ovo-viviparity, oviparity, viviparity, nest building and brooding.
- 4-2 Embryonic and larval development of fishes
- 4-3 Embryonic and larval development of shrimp.
- 4-4 Environmental factors affecting reproduction and development of cultivable fin fishes.

UNIT-V: HORMONES & GROWTH

- 5-1 Endocrine system in fishes.
- 5-2 Neurosecretary cells, ovary and chromatophores.
- 5-3 Molting, molting stages, metamorphosis in crustacean shell fish.

1. *ATP*
2. *F.v.v. S.J.*
- 3.
4. *Ramesh*
5. *L. Uma Devi*

6. *S.K.M. Mudda* 22/6
7. *L. Uma Devi*
8. *Ramesh*



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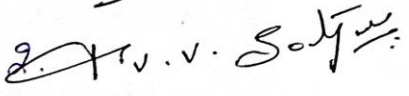
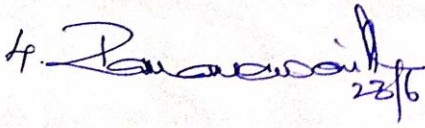

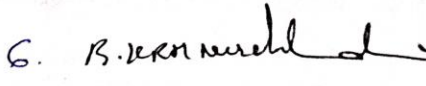
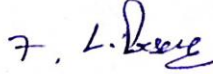

REFERENCES:

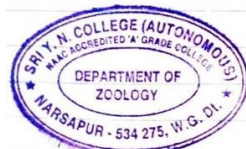
1. Tandon KK & Johal MS 1996. Age and Growth in Indian Fresh Water Fishes. Narendra Publishing House, New Delhi.
2. Raymond T et al., 1990. Crustacean Sexual Biology, Columbia University Press, New York.
3. Guiland J.A (ed) 1984. Penacid shrimps. Their Biology and Management.
4. Barrington FJW 1971. Invertebrates: Structure and Function. ELBS
5. Parker F & Haswell 1992. The text book of Zoology, Voll. Invertebrates (eds. Marshal AJ & Williams). ELBS & Mc Millan & Co.


BLUE PRINT FOR QUESTION PAPER SETTERS:

| UNITS | SHORT ANSWERS 5 MARKS | ESSAY QUESTIONS 10 MARKS | |
|---------------------------------|--------------------------|--------------------------|-------------|
| | | SECTION A | SECTION B |
| Unit I | 2 | 2 | |
| Unit II | 2 | 2 | |
| Unit III | 1 | 1 | 1 |
| Unit IV | 1 | | 2 |
| Unit V | 2 | | 2 |
| Total Marks Including Choice | 8 x 5 = 40 | 5 x 10 = 50 | 5 x 10 = 50 |

Note: The question paper setters are requested to kindly adhere to the format given in the above data.

1. 
2. 
- 3.
4.  23/6
5. 
6. 
7. 
8. 




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I B.Sc., Aquaculture Technology – Semester II

Paper II, Biology of Fin Fish & Shell Fish

Time: 3 Hrs.

Max.Marks: 75

PART – I

Answer any **FIVE** of the following.

5 x 5 = 25 M

ఈ క్రింది ప్రశ్నలనుండి ఐదంటికి జవాబులు వ్రాయుము.

1. Chanos Chanos - చానాస్ చానాస్
2. Eye of Fish – చేప యొక్క కన్ను.
3. Feeding Habits of Fishes – చేపల యొక్క ఆహారపు అలవాట్లు.
4. Otolith Method – Growth Rate Measurement – ఆటోలిత్ – పెరుగుదల కొలత.
5. Breeding Habits in Fishes – చేపల ప్రత్యుత్పత్తి అలవాట్లు.
6. Parental Care in Fishes – చేపల యందు సంతానపాలన.
7. Ovary – ఓవరీ.
8. Moulting - కుబుస విసర్జన.

PART – II

Answer any **FIVE** questions choosing at least **Two** questions from each Section A & B. Draw a neat Labeled Diagram wherever necessary. All questions carry equal marks.

5 x 10 = 50 M

ఏదైనా ఐదు ప్రశ్నలకు సమాధానము వ్రాయుము. సెక్షన్ 'ఎ' మరియు సెక్షన్ 'బి' ల నుండి కనీసం రెండు ప్రశ్నలను ఎంచుకొని మొత్తం ఐదు ప్రశ్నలకు జవాబులు వ్రాయుము. అవసరమైనచోట భాగాలు గుర్తిస్తూ చిత్ర పటములను గీయవలెను. అన్ని ప్రశ్నలకు మార్కులు సమానము.

5 x 10 = 50 M

SECTION - A

9. Describe the General characters and Classification of Bony fishes up to classes.
అస్థి చేపలయొక్క సామాన్య లక్షణములను తెల్పి తరగతుల వరకు వర్గీకరింపుము.
10. Describe the important characters of any two commercially important fishes.
ఆర్థిక ప్రాముఖ్యము కల ఏవైనా రెండు చేపల యొక్క ముఖ్య లక్షణములను తెలుపుము.
11. Write an essay on feeding adaptations in fishes.
చేపల యందు ఆహారం తినడానికి చూపు అనుకూలనాలను గూర్చి ఒక వ్యాసము వ్రాయుము.
12. Write a detailed account on length - weight relationship of fishes.
చేపల యొక్క పొడవు-బరువు సంబంధమును గూర్చి విపులముగా వివరింపుము.
13. Describe the different breeding habits of fishes.
చేపల యొక్క వివిధ ప్రత్యుత్పత్తి అలవాట్లను గూర్చి వివరింపుము.

SECTION - B

14. Write an essay on induced breeding technique in fishes.
చేపల యందు ప్రేరేపిత ప్రజననము గూర్చి ఒక వ్యాసము వ్రాయుము.
15. Describe the larval development in fishes.
చేపల యొక్క లార్వాల అభివృద్ధిని గూర్చి వివరింపుము.
16. Write an essay on endocrine glands in fishes.
చేపల యొక్క వినాళ గ్రంథులను గూర్చి ఒక వ్యాసము వ్రాయుము.
17. Describe the Neurosecretary cells in fishes.
చేపల యొక్క నాడీ శ్రావక కణాలను గూర్చి వివరింపుము.
18. Describe the Chromatophores in fishes .
చేపల యొక్క క్రొమోటోఫోరులను గూర్చి వివరింపుము.

1. *A.H.K.*

2. *T.V.V. Gokul*

3.

4. *Ramachand*
23/6

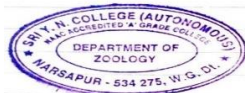
/

5. *K. Uthappa*

6. *B. Ramachand*

7. *L. Balaji*

8. *Ramachand*



A.H.K.
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DEPARTMENT OF ZOOLOGY & FISHERIES

AQUACULTURE TECHNOLOGY COURSE

Semester - II

Biology ~~BASE~~ OF FIN FISH & SHELL FISH - Paper - II

PRACTICALS :

1. Study of mouth parts in herbivorous and carnivorous fishes.
2. Comparative study of digestive system of herbivorous and Carnivorous fishes.
3. Length - Weight relationship of fishes.
4. Gut content analysis in fishes.
5. Mouth parts and appendages of cultivable prawns.
6. Study of eggs of fishes, shrimps, prawns.
7. Embryonic and larval development of fish.
8. Study of gonads maturity and fecundity in fishes.
9. Observation of Crustacean larvae.
10. Observation of Molluscan larvae.

PRACTICAL MODEL QUESTION PAPER

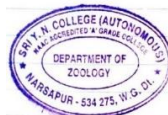
Time : 3 Hrs.

Max. Marks : 50

- | | |
|--|-------------------|
| 1. Identify the gut contents of given specimen and analyse & note down the gut contents and draw the diagrams. | 10 + 5 = 15M |
| 2. Identify, draw and comment on the given spotters A, B, C, D & E | 5 x 3 = 15M |
| 3. Length - Weight relationship of given specimens | 1 x 10 = 10M |
| 4. Record and Viva | 5 + 5 = 10M |
| TOTAL : | <u>50M</u> |

1. *AMH*
2. *H.V.V. Soff*
- 3.
4. *Prasanna*
5. *L. Usha Devi*

6. *B. Venkatesh*
7. *L. Prasad*
8. *R. Prasad*



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II DEGREE
AQUA CULTURE
SEMESTER - III
2018 - 2019

SEMESTER III – PAPER-III
FISH NUTRITION & FEED TECHNOLOGY

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 aminoacids 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
- 1-4 Factors affecting energy partitioning and feeding

UNIT-II: FORMS OF FEEDS & FEEDING METHODS

- 2-1 Fed 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
- 2-4 Frequency of 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

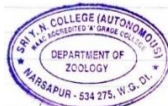
UNIT-V: NUTRITIONAL DEFICIENCY IN CULTIVABLE FISH

- 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

385

- 1. *AMR*
- 2. *T.V.V. S.V.P.*
- 3.
- 4. *P. Anand*
- 5. *L. Uma Devi*

- 6. *S.K.M. Mulla*
- 7. *L. Bose*
- 8. *R. Srinivasan*



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DEPARTMENT OF ZOOLOGY & FISHERIES

AQUACULTURE TECHNOLOGY COURSE

Semester - III

FISH NUTRITION & FEED TECHNOLOGY - Paper - III

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| Unit No | Essay Questions | Short Questions | Marks allotted to the unit | Remarks |
|------------|-----------------|-----------------|----------------------------|--|
| UNIT - I | 02 | 01 | 25 | <u>SECTION - A</u> 2 Essays and 1 Short |
| UNIT - II | 02 | 02 | 30 | <u>SECTION - A</u> 2 Essays and 2 Shorts |
| UNIT - III | 02 | 01 | 25 | <u>SECTION - A - 1Essay</u> <u>SECTION - B - 1Essay</u> 2 Essays and 1 Short |
| UNIT - IV | 02 | 02 | 30 | <u>SECTION - B</u> 2 Essay and 2 Shorts |
| UNIT - V | 02 | 02 | 30 | <u>SECTION - B</u> 2 Essays and 2 Shorts |
| TOTAL | 10 | 08 | 140 | |

1. *ATP*

2. *T.V.V. S.P.S.*

3.

4. *P. Sankar*

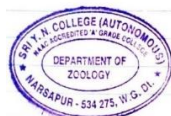
5. *K. Usha Devi*

6. *S.K.M. Muthu*

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7. *L. Sankar*

8. *R. Sankar*



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MODEL PAPER FOR III SEMESTER
II B. SC., AQUACULTURE TECHNOLOGY - PAPER - III
FISH NUTRITION & FEED TECHNOLOGY

Time: 3 hrs

Max. Marks: 75

PART - I

- I. Write short note on any FIVE of the following 5 x 5 = 25
1. Proteins – మాంసకృత్తులు
 2. F.C.R. – ఎఫ్. సి. ఆర్.
 3. Natural Feed – సహజ ఆహారము
 4. Storage methods of Feed – ఆహారపు నిల్వ పద్ధతులు
 5. Probiotics – ప్రోబయోటిక్స్
 6. Anti metabolites – యాంటి మెటబోలైట్స్
 7. Supplementary Feed – అనుబంధ ఆహారము
 8. Anti Nutrients – వ్యతిరేక పోషకాలు

PART - I

- II. Answer any FIVE questions choosing at least TWO questions from each section.
Draw labeled diagrams wherever necessary. 5 x 10 = 50

SECTION - A

9. Describe various requirements for energy of different stages of cultivable fishes.
పంపకపు చేపల వివిధ దశలకు అవసరమగు వివిధ శక్తులను గూర్చి వర్ణింపుము.
10. Write an essay on factors effecting energy partitioning and feeding.
ఆహారము మరియు శక్తి వినియోగాములను ప్రభావితం చేయు ప్రభావకాలను గూర్చి ఒక వ్యాసమును వ్రాయుము.

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11. Differentiate feed conversion ratio and protein efficiency ratio.
ఆహారపు మార్పు నిష్పత్తి మరియు మాంసకృత్తుల సామర్థ్యపు నిష్పత్తుల మధ్య
బేధములను గూర్చి చర్చించుము.
12. Give an account on different types of feedings.
వివిధ రకముల ఆహారములను గూర్చి వ్రాయుము.
13. Write an essay on Feed formulation.
ఆహారపు నిష్పత్తులను గూర్చి ఒక వ్యాసము వ్రాయుము.

SECTION - B

14. Give an account on feed spoilage methods.
ఆహారము నిల్వచేయుటలో పాడగుటకు గల వివిధ పద్ధతులను గూర్చి వ్రాయుము.
15. What are the differences between Feed attractants and Feed stimulants?
ఆహారపు ఆకర్షకాలు మరియు ఆహారపు ప్రేరేపకాల మధ్య గల తేడాలు ఏమి.
16. Write an essay on growth promoters and pigments.
పెరుగుదల ప్రోత్సాహకాలను గూర్చి ఒక వ్యాసము వ్రాయుము.
17. Give an account on different deficiency symptoms.
వివిధ క్షీణతా లక్షణములను గూర్చి వ్రాయుము.
18. Describe the importance of natural and supplementary feeds.
సహజ మరియు అనుబంధ ఆహారముల యొక్క ప్రాముఖ్యతను గూర్చి వర్ణించుము.

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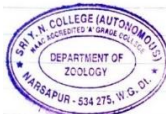
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PRACTICALS:

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
12. Visit to a farm for studying feeding practices

PRESCRIBED BOOK(S):

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

REFERENCES:

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

1. Arif

2. T.V.V. S. Jayaraj

3.

4. P. Anand

5. K. Uthappa

6. B. K. M. Mudda
23/6

7. L. B. Reddy

8. R. S. Kumar



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DEPARTMENT OF ZOOLOGY & FISHERIES

AQUACULTURE TECHNOLOGY COURSE

Semester – III

FISH NUTRITION & FEED TECHNOLOGY - Paper - III

PRACTICAL MODEL QUESTION PAPER

Time : 3 Hrs.


Max. Marks : 50

- | | |
|--|--------------------|
| 1. Estimate the amount of carbohydrates present in Aquaculture feed and write the procedure adopted. | 10 + 5 = 15M |
| 2. Describe the binders used in Aquaculture feed. | 1 x 10 = 10M |
| 3. Write the physical and chemical changes of feed during storage near Aqua farms. | 1 x 10 = 10M |
| 4. Record + Field Visit Note book | 8 + 7 = <u>15M</u> |
| TOTAL : | <u><u>50M</u></u> |

1. ADP
 2. T.V.V. Sulfur
 3.
 4. Bacterial
 5. L. Ure Linn

6. exam well
 7. L. Bred
 8. Refiner




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II DEGREE
AQUA CULTURE
SEMESTER - IV
2018 - 2019



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AQUACULTURE TECHNOLOGY COURSE SYLLABUS

Semester – IV

Paper - IV

FRESH WATER & BRACKISH WATER AQUA CULTURE

UNIT – I : INTRODUCTION TO FRESH WATER AQUACULTURE

- 1-1.1 Status, scope and prospects of fresh water aquaculture in the world, India and A.P.
- 1-1.2 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 Indian – Tilapia, Pangassius and clarius sp.
- 2-3 Composite fish culture (fish) system of Indian and exotic carps.

UNIT – III : CULTURE OF AIR-BREATHING AND COLD WATER FISH

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

UNIT – IV : CULTURE OF PRAWN

- 4-1 Fresh Water prawns of India – Commercial value.
- 4-2 Macrobrachium rosenbergii and M. Malcomsoni- biology, seed production, pond preparation, stocking management of Nursery and grow out ponds, feeding harvesting.

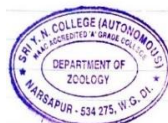
UNIT - V : CULTURE OF BRACKISH WATER SPECIES.


- 5-1 Culture of P.Mondon – Hatchery technology and culture practices including feed and disease management.
- 5-2 Culture of L-vannamei – hatchery technology and culture practices including feed and disease management.
- 5-3 Mixed culture of fish and prawns.

PRACTICALS

1. Identification of important cultivable carps.
2. Identification of important cultivable air-breathing fishes.
3. Identification of important cultivable fresh water prawns
4. Identification of different life history stages of fish.
5. Identification of different life history stage of fresh water prawn.
6. Collection and study of weed fish.
7. Identification of commercially viable crabs – scylla serrata, portunus pelagicus p.sanguinolentus. Neptules pelagicus, N.Sanguinolentus.
8. Identification of lobsters – panularius polyphagus, P.ornatus, p.homarus, p.sewelli, p.penicillatus.
9. Identification of oysters of Nutritional significance crossostrea Madrasensis, c.gryphoides, c.cucullata, c.rivularis, pienodanta.
10. Identification of Mussels and clams.
11. Identification of developmental stages of oysters
12. Field visit to aqua farm and study of different components like dykes etc.

1. ASST
 2. F.V.V. S.J.S.
 - 3.
 4. Bannam
 5. L. Ura
6. exam
 7. L. Ura
 8. Refer




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DEPARTMENT OF ZOOLOGY & FISHERIES

AQUACULTURE TECHNOLOGY COURSE

Semester - IV

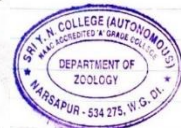
FRESH WATER & BRACKISH WATER AQUA CULTURE - Paper - IV

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| Unit No | Essay Questions | Short Questions | Marks allotted to the unit | Remarks |
|------------|-----------------|-----------------|----------------------------|---|
| UNIT - I | 02 | 02 | 30 | <u>SECTION - A</u> 2 Essays and 2 Shorts |
| UNIT - II | 02 | 02 | 30 | <u>SECTION - A</u> 2 Essays and 2 Shorts |
| UNIT - III | 02 | 02 | 30 | <u>SECTION - A</u> - 1Essay <u>SECTION - B</u> - 1Essay 2 Essays and 2 Shorts |
| UNIT - IV | 02 | 01 | 25 | <u>SECTION - B</u> 2 Essay and 1 Short |
| UNIT - V | 02 | 01 | 25 | <u>SECTION - B</u> 2 Essays and 1 Short |
| TOTAL | 10 | 08 | 140 | |

1. *ADP*
2. *V. V. S. S. S.*
- 3.
4. *P. S. S.*
5. *L. U. S. S.*

6. *S. S. S. S.*
7. *L. S. S.*
8. *P. S. S.*



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MODEL PAPER FOR IV SEMESTER
II B. SC., AQUACULTURE TECHNOLOGY - PAPER - IV
FRESH WATER & BRACKISH WATER AQUACULTURE

Time: 3 hrs

Max. Marks: 75

PART - I

I. Write short note on any FIVE of the following

5 x 5 = 25

1. Status of aquaculture in India - భారత దేశము నందలి ఆకాశ్రుకరణం స్థితి
2. Pond culture - కుంట సంవర్ధనము
3. Minor carps - మైనర్ కార్ప్ చేపలు
4. Tilapia - టిలాపియా
5. Air-breathing fishes. - శ్వాసించే చేపలు
6. Cage culture - పంజరపు సంవర్ధనము
7. M. malcomsoni - మా. మాల్కంసోని
8. Hatchery - హాచరీ

PART - I

II. Answer any FIVE questions choosing at least TWO questions from each section.

5 x 10 = 50

Draw labeled diagrams wherever necessary.

SECTION - A

9. Describe the scope and prospects of fresh water aquaculture in Andhra Pradesh.
ఆంధ్రప్రదేశ్ నందలి మంచినీటి ఆకాశ్రు సంవర్ధనము యొక్క పరిధి మరియు అవకాశములను
గూర్చి వర్ణింపుము.
10. Write an essay on different fresh water aquaculture systems.
వివిధ రకముల మంచినీటి సంవర్ధనపు వ్యవస్థలను గూర్చి ఒక వ్యాసము వ్రాయుము.

11. Give an account on cultivable species of Indian Major Carps.

భారత దేశపు పెద్ద కార్ప్ పెంపకపు చేపలను గూర్చి వ్రాయుము.

12. Write an essay on composite fish culture system in India.

భారత దేశము నందలి సమగ్ర చేపల పెంపకను గూర్చి ఒక వ్యాసము వ్రాయుము.

13. Give an account on recent developments in the culture of murels.

మరెల్ చేపల సంవర్ధనము నందలి ఆధునిక అభివృద్ధిని గూర్చి వ్రాయుము.

SECTION - B

14. Give an account on sewage-fed fish culture.

వ్యర్ధపు నీటి చేపల సంవర్ధనము గూర్చి వ్రాయుము.

15. Describe the commercial value of fresh water prawns of India.

భారత దేశము నందు వాణిజ్యపు విలువలు కలిగిన రొయ్యలను గూర్చి వర్ణింపుము.

16. Write an essay on biology of *Macrobrachium rosenbergii*.

మాక్రోబ్రాఖియం రోజ్ బెర్గె యొక్క జీవశాస్త్రంను గూర్చి ఒక వ్యాసము వ్రాయుము.

17. Give an account on cultural practices of *Penaeus monodon*.

పినయస్ మోనోడాన్ యొక్క పెంపకపు పద్ధతులను గూర్చి వ్రాయుము.

19. Write an essay on mixed culture of fish and prawns.

చేపలు మరియు రొయ్యల మిశ్రమ సంవర్ధనమును గూర్చి ఒక వ్యాసము వ్రాయుము.

1. Asst
2. T.V.V. S.P.
3.
4. Prasanna
5. L. M. Sain

6. exam well
7. L. Sain
8. Prasanna

Asst
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DEPARTMENT OF ZOOLOGY & FISHERIES

AQUACULTURE TECHNOLOGY COURSE

Semester - IV

FRESH WATER & BRACKISH WATER AQUA CULTURE - Paper - IV

PRACTICAL MODEL QUESTION PAPER

Time : 3 Hrs.

Max. Marks : 50

- | | |
|--|-------------------|
| 1. Give a detailed account on the life history stages of given specimen and draw the life stages | 15 + 5 = 20M |
| 2. Identify, Draw and comment on the given spotters A, B, C, D and E | 4 x 2 ½ = 10M |
| 3. Identify, Draw and Comment on the given spotters. A, B, C and D | 4 x 2 ½ = 10M |
| 4. Record and Viva | 7 + 3 = 10M |
| TOTAL : | <u>50M</u> |

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|-------------------------|-----------------------|
| 1. <i>Asst</i> | 6. <i>S.K.M. mull</i> |
| 2. <i>T.V.V. S.J.S.</i> | 7. <i>L. B...</i> |
| 3. | 8. <i>R...</i> |
| 4. <i>B...</i> | |
| 5. <i>L. U...</i> | |

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