

A.G&S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE

VUYYURU, KRISHNA Dt., A.P.(Autonomous)

Accredited by NAAC with “A” Grade

2020-2021

B.Sc.Aquaculture(Industrial Fisheries)



DEPARTMENT OF ZOOLOGY

MINUTES OF BOARD OF STUDIES

EVEN SEMESTER

29-03-2021

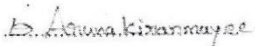
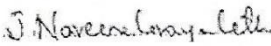
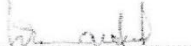

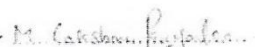
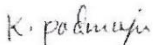

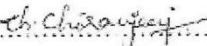


Minutes of the meeting of Board of studies in Zoology for the Autonomous courses of AG & SG Siddhartha Degree College of Arts & Science, Vuyyuru held at 3.00 PM on 29-03-2021 in the Department of Zoology.

Smt.D.A. Kiranmayee. ...

Presiding

Members Present:

- 1) 
(Smt. D.A.Kiranmayee) Chairperson Head, Dept.of Zoology,
AG & SG S Degree College, Vuyyuru.
- 2) 
(Dr.J.N.Lavanya Latha) University Nominee Professor, Dept. of Bio-Tech.,
Krishna University,
Machilipatnam.
- 3) 
(Dr. K.Daniel) Academic Council
Nominee Head, Dept.of Zoology,
JKC College, Guntur.
- 4) 
(Dr.B. Elia) Academic Council
Nominee Head, Dept.of Zoology,
Govt. Degree College,
Pitapuram.
- 5) 
(Ms.M.Lakshmi Priyanka) Member Lecturer, Dept.of Zoology,
AG & SG S Degree College, Vuyyuru.
- 6) 
(Smt. K.Padmaja) Member Lecturer, Dept.of Zoology,
AG & SG S Degree College, Vuyyuru.
- 7) 
(B.Appala Naidu) Industrialist Asst. Project Manager,
RGCA, Manikonda.
- 8) 
(Ch.Chiranjeevi) Student Represent Ph.D, Research Scholor,
Dept.of Botany & Microbiology,
Acharya Nagarjuna University, Guntur

Agenda for B.O.S Meeting.

1. To recommend the syllabi (Theory & Practical), Model question paper for II Semester of I B.Sc (A.B.C) for the academic year 2020-2021.
2. To recommend the syllabi (Theory & Practical), Model question paper for IV Semester of II B.Sc (A.B.C) for the academic year 2020-2021.
3. To recommend the syllabi (Theory & Practical), Model question paper and Blue print of II &IV semester of I, II B.Sc (A.B.C.) for the academic year 2020-2021.
4. To recommend the teaching and evolution methods to be followed under Autonomous status.
5. Any other matter.

RESOLUTIONS

1. It is resolved to continue the same syllabi (Theory & Practical), model question paper of II Semester of I B.Sc. (A.B.C) under Choice Based Credit System (CBCS) for the academic Year 2020 – 2021.

2. It is resolved to follow the newly framed syllabi (Theory & Practical), model question paper of IV Semester of II B.Sc. (A.B.C) under Choice Based Credit System (CBCS) for the academic Year 2020 – 2021.

3. It is resolved to follow the Model question paper and Blue print of II & IV semester of I, II B.Sc(A.B.C.) for the academic year 2020-2021.

4. It is resolved to continue the following teaching & evaluation methods for the Academic year 2020-21.

Teaching methods:

Besides the conventional methods of teaching, we use modern technology i.e. Using of OHP and LCD projector to display on U boards etc; for better understanding of concepts.

Evaluation of a student is done by the following procedure:

- **Internal Assessment Examination:**
- Out of maximum 100 marks in each paper for I, II B.Sc (A.B.C) 30 marks shall be allocated for internal assessment.
- Out of these 30 marks, 20 marks are allocated for announced tests (i.e. IA-1& IA-2). Two announced tests will be conducted and average of these two tests shall be deemed as the marks obtained by the student, 5 marks are allocated on the basis of candidate's percentage of attendance and remaining 5 marks are allocated for the assignment for I, II B.Sc (A.B.C).
- **Semester – End Examination:**
- The maximum mark for II, IV (A.B.C) semester – End examination shall be 70 marks and duration of the examination shall be 3 hours. Even though the candidate is absent for two IA exams/ obtain Zero marks the external marks are considered (if the candidate gets 40/70) and the result shall be declared as "PASS".
- Semester – End examination shall be conducted in theory papers at the end of every semester, while in practical papers, these examinations are conducted at the end of II & IV semester for I, IV B.Sc. (A.B.C).

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Aquaculture

Class: I B.Sc.(ABC)

Credits : 3

Title of the paper: Biology of fin fish & shell fish

60 hrs.(4hrs/week)

Semester – II

PAPER-II

w.e.f. 2019-2020

(Code: Aqu-201C)

Max.Marks : 70

Objective of the course: To introduce the Biology of fin fish & shell fish. General characters, Classification, growth and Development crustacean shellfish

Course outcomes:

1. Understand the characters and classification of cultivable Fin and Shell fish and commercial importance of crustaceans and Fish .
2. Gain Knowledge of feeding habits, gut content analysis and growth factors in fishes.
3. Understand and learn breeding in fishes, method of induced breeding in fishes.
4. To create awareness on parental care of Fishes and embryonic and larval development and environmental factors affecting development of major aquaculture organisms.
5. Acquire knowledge about Endocrine system in fishes.

UNIT- I: General character & Classification of Cultivable finShellfish

- 1.1 General Characters and classification of fishes & crustaceans up to the level of Class
- 1.2 Fish and Crustaceans of commercial importance
- 1-3 Sense organs of fishes and crustaceans .
- 1.4 Specialized organs in fishes – electric organ, venom and toxins
- 1.5 Buoyancy in fishes- swim bladder and mechanism of gas secretion

UNIT- II: Food, Feeding and Growth

- 2.1 Natural fish food, feeding habits, feeding intensity, stimuli for feeding, utilization of food, gut content analysis, forageratio
- 2.2 Principles of Age and growth determination; growth regulation, Growth rate measurement – scale method, otolith method, skeletal parts as age indicators
- 2.3 Length-frequency method, age composition, age-length keys, absolute and specific growth, back calculation of length and growth, annual survival rate,
- 2.4 Length-weight relationship.

UNIT- III: Reproductive Biology

- 3.1 Breeding in fishes, breeding places, breeding habits & places, breeding in natural environment and in artificial ponds, courtship and reproductive cycles
- 3.2. Induced breeding in fishes
- 3-3 Breeding in shrimp, oysters, mussels, clams, pearl oyster, pila, and cephalopods.

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, crabs and molluscs of commercial importance
- 4.4 Environmental factors affecting reproduction and development of cultivable aquatic fin & shell fish

UNIT- V: Hormones & Growth.

- 1.1 Endocrine system in fishes.
- 1.2 Neurosecretory cells, androgenic gland, ovary, chromatophores,
- 1.3 Molting, molting stages, metamorphosis in crustacean shellfish

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Semester –II
Model Question Paper

w.e.f. 2019-2020

Title of the paper: Biology of fin fish & shell fish

Time: 3hrs.

Code – AQU-201C

Max.marks: 70

Section – A

4 x 5 = 20.

Answer any **four** questions. Each question carries **five** marks. Draw neat labeled diagrams wherever necessary.

1. Writethegeneralcharactersofthefishes?
2. Explaintheelectricorganinfishes?
3. writethedefinitionanddifferenttypesofnaturalfishfeeding?
4. Definethegrowthratemeasurementinfish?
5. Whatisthebreeding?writethebreedinginnaturalenvironment?
6. What is nestbuilding?
7. Explain the structure of fish ovary?
8. pearl oyster

Section – B

5 x 10 =50.

Answer any **five** questions. Each question carries **Ten** marks. Draw neat labeled diagrams wherever necessary.

9. Definethe“fishgutcontentanalysis”?
10. Explaintheinducedbreedinginfishesanddrawthediagram?
11. Explain about the Breeding in shrimps
12. Explain about parental care of fishes?
13. Explain the environmental factors affecting reproduction of fin fishes?
- 14 Explain the fish endocrinesystem?
- 15 Explain about Molting stages of crustaceans

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Semester - II

Guide lines to the Paper Setter.

W.e.f. 2019-2020

Title of the paper: Biology of fin fish & shell fish.

Code – AQU-201C

Time: 3hrs.

Max. Marks: 70.

1. Answer any **four** questions out of eight in Section – A. Each question carries **five** marks.
4x5 = 20M.

2. Answer any **five** questions out of eight in Section – B. Each question carries **Ten** marks.
5x10= 50M.

	Section	UNIT-I	UNIT-II	UNIT-III	UNIT-IV	UNIT-V
5 Marks Questions	A	2	2	1	2	1
10 Marks Questions	B	1	1	2	2	2
Weightage		20	20	25	30	25

- Note:**
1. please provide the scheme of valuation for the paper.
 2. Question paper should be in English medium.

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AQUACULTURE
PRACTICAL - II

w.e.f. 2019-2020

.Code :AQU- 201P

MAX.MARKS : 50.

(2hrs/week)

SYLLABUS]

1. Study of mouth parts in herbivorous and carnivorousfishes
- 2.Comparative study of digestive system of herbivorous and carnivorousfishes
3. Length-weight relationship offishes
4. Gut content analysis in fishes andshrimp
5. Mouth parts and appendages of cultivable prawns, shrimps and othercrustaceans
6. Study of eggs of fishes, shrimps, prawns and othercrustaceans
7. Study of oyster eggs
8. Embryonic and larval development offish
9. Study of gonadal maturity and fecundity in fishes and shellfish
- 10.Observation of crustaceanlarvae
- 11.Study of nest building and brooding offishes

PRESCRIBED BOOK(S)

Bone Q et al., 1995. Biology of fishes, Blackie academic & professional, LONDON
1.14SaxenaAB1996.LifeofCrustaceans.AnmolPublicationsPvt.Ltd.,NewDelh

REFERENCES:

Tandon KK & Johal MS 1996. Age and Growth in Indian Fresh Water Fishes.
Narendra Publishing House, New Delhi.
Raymond T et al., 1990. Crustacean Sexual Biology, Columbia University Press, New York

Guiland J.A (ed) 1984. Penaeid shrimps- Their Biology and Management. 1.18Barrington
FJW 1971. Invertebrates: Structure andFunction.ELBS

1.19Parker F & Haswell 1992. The text book of Zoology, Voll. Invertebrates (eds. Marshal
AJ & Williams). ELBS & Mc Millan &Co.

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EXTERNAL PRACTICAL- II

MODEL QUESTION PAPER –II

Code: AQU-201P

Time: 3 hrs.

Max.marks: 25m.

I.Length-Weight relationship of fishes	5M.
II. Gut content analysis in fishes	5M.
III.Draw labeled diagram appendages of cultivable prawns.	2M
IV. Identify, draw labeled diagram & write notes on A, B, C, D	4X2=10M
V. Viva.	3M
TOTAL: -----	25M.

Guide lines for the practical Examiners

I:Length-Weight relationship of fishes(4marks notes &1 mark calculation .)

II :Gut content analysis in fishes (5 marks notes)

III :1Mark for identification, 1 Mark for labeled diagram .

IV. ½ Mark for identification, ½Mark for labeled diagram &1Mark for notes for each question.

4 specimens / slides / models.

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INTERNAL PRACTICAL- II

Code: AQU-201P.

MODEL QUESTION PAPER -II

Max.marks:25M.

Time: 3hrs.

1. Attendance	-----	05M.
2. Record	-----	10M.
3. Collection of nests pictures	-----	05M
4. Assignment	-----	05M.
Total	-----	25M.

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Aquaculture

Semester – IV

Class: II B.Sc .(ABC)

PAPER-IV

w.e.f. 2020-2021

Credits : 3

(Code: Aqu-301C)

Title of the paper: **Fish nutrition & Feed technology**

60 hrs.(4hrs/week)

Max.Marks : 70

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
- 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.

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Semester –IV

w.e.f. 2020-2021

Title of the paper: Fish nutrition & Feed technology

Time: 3hrs.

Code – AQU-301C

Max.marks: 70

Section – A

4 x 5= 20.

Answer any **four** questions. Each question carries **five** marks. Draw neat labeled diagrams wherever necessary.

1. writethe about protein to energy ratio?
2. Dry feeds.
3. Surface spraying
4. Insect and rodent damage of feed.
5. Nutrient composition
6. What is probiotics .
7. Growth pigments.
8. Vitamin deficiency symptoms.

Section – B

5 x 10 =50.

Answer any **five** questions. Each question carries **Ten** marks. Draw neat labeled diagrams wherever necessary.

9. Write an essay on any two Nutritional Requirements for cultivable fish ?
10. Explaintheeffect of ration on growth?
11. Explain about Frequency of feeding?
12. Describe the Feed formulation?
13. Explain the Feed attractants and feed stimulants?
14. Write anessay onFeed additive hormones?
15. Explain about Nutritional pathology?
16. Importance of natural and supplementary feeds

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Semester -IV**

Guide lines to the Paper Setter

Title of the paper Fish nutrition & Feed technology

Code – AQU-301C

Time: 3hrs.

Max. Marks: 70

1. Answer any **four** questions out of eight in Section – A. Each question carries **five** marks.
4x5 = 20M.
2. Answer any **five** questions out of eight in Section – B. Each question carries **Ten** marks.
5x10= 50M.

	Section	UNIT-I	UNIT-II	UNIT-III	UNIT-IV	UNIT-V
5 Marks Questions	A	1	2	2	2	1
10 Marks Questions	B	2	1	1	2	2
Weightage		25	20	20	30	25

- Note:**
1. please provide the scheme of valuation for the paper.
 2. Question paper should be in English medium.

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AQUACULTURE
PRACTICAL - IV

w.e.f. 2020-2021.
MAX.MARKS : 50.
(2hrs/week)

Code :AQU- 401P

PRACTICAL SYLLABUS

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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EXTERNAL PRACTICAL- IV

MODEL QUESTION PAPER –IV

**w.e.f. 2020-2021.
Code: AQU- 401P**

Time: 3 hrs.

Max.marks: 25m.

I. Estimation of carbohydrate content in aquaculture feeds	7M.
II. Estimation of ash in aquaculture feed	5M
III. Study of feed packing materials	5M
IV. Study of physical and chemical change during storage	5M
V. Viva	3M
TOTAL: -----	25M.

Guide lines for the practical Examiners

I: Estimation of carbohydrate content in aquaculture feeds (5 marks notes & Result 2 mark)

II : Estimation of ash in aquaculture feed (5 marks notes)

III :Study of feed packing materials (5 marks notes)

IV. Study of physical and chemical change during storage(5 marks notes)

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INTERNAL PRACTICAL- IV

**w.e.f. 2020-2021.
(2 hrs/week).**

(Practical -III)Code: AQU-401P.

MODEL QUESTION PAPER -IV

Max.marks:25M.

Time: 3hrs.

1. Attendance	-----	05M.
2. Record	-----	10M.
3. Field trip	-----	05M
4. Assignment	-----	05M.

Total ----- 25M.