SRR & CVR GOVERNMENT DEGREE COLLEGE (AUTONOMOUS)

VIJAYAWADA

DEPARTMENT OF ZOOLOGY

BOARD OF STUDIES MEETING

(2017-18)

B.Sc., (B.Z.C)

ZOOLOGY

SEMESTER-I & II SYLLABUS

AND

MODEL QUESTION PAPERS

(AS *PER CBCS AND SEMESTER SYSTEM*)

(W.E.F.2017-18)

SRR & CVR GOVERNMENT DEGREE COLLEGE (AUTONOMOUS)

Vijayawada 520004

Minutes of the meeting of the Board of Studies in the subject of

ZOOLOGY

The meeting of the Board of Studies in the subject of **ZOOLOGY** was held on **18th April 2017** in **Room No: Zoology Department**, SRR & CVR Govt Degree College (Autonomous), Vijayawada 520004.

The following members attended the meeting:

1. **Dr. P.ANURADHA** **(In-charge of the Department & Chairman, BoS)**
   Lecturer in Zoology
   SRR & CVR GDC, VIJAYAWADA

2. **Prof .K.R.S.SAMBASIVA RAO** **(University Nominee)**
   Professor in Zoology
   Department of Zoology
   Acharya Nagarjuna University.
   Guntur.AP

3. **Dr.CH.TULASI MASTANAMMA** **(Subject Expert)**
   Lecturer in Zoology
   Govt. Degree College for Women (A)
   Guntur

4. **Dr.N.SREENIVAS** **(Subject Expert)**
   Lecturer in Zoology
   PR Govt.(A) College
   Kakinada.AP

5. **Sri.RAGHURAM REDDY** **(Special Member)**
   Neelagri foundation
   Atmakur,Guntur

6. **G.VANI** **(Faculty Member)**
   Lecturer in Zoology
   SRR & CVR GDC, VIJAYAWADA

7. **K. DURGA RAO** **(Faculty Member)**
   Lecturer in Zoology
   SRR & CVR GDC, VIJAYAWADA

SRR & CVR GOVERNMENT DEGREE COLLEGE
(AUTONOMOUS)Vijayawada 520004

Minutes of the meeting of the Board of Studies in the subject of
ZOOLOGY

The meeting of the Board of Studies in the subject of **ZOOLOGY** was held on **18 April 2017** in Room No Zoology Dept, SRR & CVR Govt Degree College (Autonomous), Vijayawada 520004.

The following members attended the meeting:

1. **Dr. P.ANURADHA** **(In-charge of the Department & Chairman, BoS)**
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7. **K. DURGA RAO** **(Faculty Member)**
   Lecturer in Zoology
   SRR & CVR GDC, VIJAYAWADA

(The number of faculty members variesdepending on the department)

Agenda:

Item 1: Approval of syllabus for Semester I and II for the academic year 2017-18

Item 2: Approval of Question paper blue print and model paper

Item 3: Approval of list of paper setters and examiners

Item 4: Any other item with the approval of the chair.

The Chairperson, Board of Studies welcomed the members and initiated discussion on the syllabus for I and II year semesters. He apprised the members of the guidelines of the UGC and the CCE regarding the framing of syllabus, and the recommended evaluation ratio for internal and external examinations. The members discussed in detail the various aspects presented before them and unanimously resolved the following:

Resolutions:

1. Resolved to adopt the present University CBCS syllabus for semester I and II.
2. Resolved to approve the division of marks for internal and external examination along with the suggested blue print and model paper.
3. Resolved to approve the list of paper setters and examiners submitted by the department.
4. Resolved to include Additional Inputs wherever necessary.

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

ZOOLOGY SYLLABUS (w.e.f -2017-18)

SEMESTER-I

PAPER – I

ANIMAL DIVERSITY OF INVERTEBRATES

Periods: 60 **Max.marks: 100**

UNIT – I

Brief history, Significance of Diversity of Non Chordates

Protozoa- General Characters, Classification of Protozoa up to classes with examples, Type study of *Elphidium*

Porifera- General characters, Classification of Porifera up to classes with examples, *Sycon* – External Characters, Types of cells, Skeleton in Sponges,Canal system in sponges

- **Additional Input:**

  Three Protozoans parasites of man: Trypanosoma, Leishmania and Giardia- pathogenicity and treatment.

UNIT - II

Coelenterata- General characters, Classification of Coelenterata up to classes with examples, *Obelia* - External Characters, Structure of Polyp and Medusa, Polymorphism in coelenterates, Corals and coral reef formation

Platyhelminthes-General characters,Classification of Platyhelminthes upto classes with examples, *Fasciola hepatica* - External Characters, Excretory system, Reproductive System,

Life History and pathogenicity

UNIT - III

Nemathelminthes-General characters, Classification of Nemathelminthes up to classes with examples,

Annelida-General characters, Classification of Annelida up to classes with examples, *Hirudinaria granulosa* - External Characters, Digestive System, Excretory System

and Reproductive System, Coelomoducts, Vermiculture - Scope, significance, earthworm species, processing, Vermicompost, economic importance of vermicompost

UNIT - IV

Arthropoda-General characters, Classification of Arthropoda up to classes with examples, Prawn - External Characters, Appendages, Respiratory system and Circulatory System,

Peripatus - Structure and affinities

Mollusca-General characters, Classification of Mollusca up to classes with examples, Pearl formation in Pelecypoda, Torsion in gastropods

UNIT - V

Echinodermata: General characters, Classification of Echinodermata up to classes with examples, Water vascular system in star fish

Hemichordata-General characters, Classification of Hemichordata up to classes with examples, *Balanoglossus* - Structure and affinities.

Non-Chordata larval forms: Amphiblastula, Ephyra, Trochophore, Nauplius, Glochidium, Bipinnaria, Tornaria

References:

- Modern Text Book of Zoology Invertebrates – R.L.Kothpal
- Economic Zoology ---- Saras Publication
- Invertebrate Zoology ---E.L.Jordan & P.S.Verma
- General Parasitology (Academic Press) – Cheng T.C.
- Telugu Academy –Invertebrates

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

ZOOLOGY PRACTICAL SYLLABUS (w.e.f -2017-18)

SEMESTER-I

PAPER – I

ANIMAL DIVERSITY OF INVERTEBRATES

Periods: 24 **Max. Marks: 50**

Observation of the following slides / spotters / models

Protozoa : *Elphidium, Paramecium* - Binary fission and conjugation

Porifera : *Spongilla , Euspongia, Sycon, Sycon* - T.S and L.S

Coelenterata : *Obelia* - colony and medusa, *Physalia, Velella, Corallium, Gorgonia, Pennatula*

Platyhelminthes : *Planaria, Fasciola hepatica, Fasciola* larval forms - Miracidium, Redia, Cercaria, *Echinococcus granulosus*

Nemathelminthes : *Ascaris* - Male and female, *Ancylostoma duodenale*

Annelida : *Neries, Heteroneries, Aphrodite, Hirudo,* Trochophore larva

Arthropoda : Mouth parts of male and female *Anopheles* and *Culex,* Mouth parts of housefly, Mouth parts of Scorpion, Nauplius, Mysis, Zoea larvae, crab, prawn, *Scolopendra, Sacculina, Limulus, Peripatus*

Mollusca : *Chiton, Murex, Sepia, Loligo, Octopus, Nautilus,* Glochidium larva

Echinodermata : *Ophiothrix, Echinus, Clypeaster, Cucumaria, Antedon, Asterias,* Bipinnaria larva

Hemichordata : *Balanoglossus,* Tornaria larva

Demonstration of dissection / dissected / virtual dissection :

1. Leech / Prawn / Scorpion / Crab - Digestive system
2. Prawn - Appendages
3. Prawn / Scorpion / Crab - Nervous system
4. *Pila / Unio* - Digestive system
5. Mounting of Statocyst
6. Mounting of Radula

Laboratory record work shall be submitted at the time of practical examination

Compulsory one species to be adopted for demonstration only by the faculty

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Sc (B.Z.C) ZOOLOGY THEORY (w.e.f -2017-18)

INTERNAL MARKS ALLOTMENT

SEMESTER-I

PAPER – I

ANIMAL DIVERSITY OF INVERTEBRATES

Zoology Theory- Internal **Total Marks: 40**

1. Project	:	10 marks
2. Assignments (2)	:	5x2=10 marks
3. Internals (2) Best of Two	:	10 marks
4. Seminar	:	5 marks
5. Viva voce	:	5 marks

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Sc (B.Z.C) ZOOLOGY THEORY (w.e.f -2017-18)

EXTERNAL MARKS ALLOTMENT

SEMESTER-I

PAPER – I

ANIMAL DIVERSITY OF INVERTEBRATES

Zoology Theory- External **Total Marks: 60**

Section –A

I. Short Answer questions (Any 5 from given 10) 5x4=20
1 to 10

Section –B

II. Essay Questions (With internal choice) 5x8=40

11 to 15

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Sc (B.Z.C) ZOOLOGY (w.e.f -2017-18)

PRACTICAL MARKS ALLOTMENT

SEMESTER-I

PAPER – I

ANIMAL DIVERSITY OF INVERTEBRATES

Zoology Practical's - External

Time: 3 hrs. **Total Marks: 25**

1.Major dissection demonstration only	:	8 marks
(Identification-2M; Diagram-3M; Labelling-3M)		
2.Mounting (2)/Minor dissection (1)	:	4 marks (2+2)
3.Identification (2)	:	5 marks (2x2 1/2)
4.Record	:	5 marks
5.Viva voce	:	3 marks

Zoology Practical's - Internal

Total Marks: 25

1.Assessment including viva voce	:	6 marks
2.Record	:	6 marks
3.Field note book	:	5 marks
4.Project	:	8 marks

Question Paper Blue Print

SRR&CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Sc (B.Z.C) ZOOLOGY THEORY (w.e.f -2017-18)

SEMESTER-I

PAPER – I

ANIMAL DIVERSITY OF INVERTEBRATES

BLUE PRINT MODEL FOR EXTERNAL EXAMINATIONS

	Section A **Short Questions**			**Section B** **Essay Questions**		
	NO OF QUESTIONS	**MARKS ALLOTED FOR EACH QUESTION**	**TOTAL MARKS**	**NO OF QUESTIONS**	**MARKS ALLOTED FOR EACH QUESTION**	**TOTAL MARKS**
UNIT -I	02	4	8	02	8	16
UNIT-II	02	4	8	02	8	16
UNIT-III	02	4	8	02	8	16
UNIT-IV	02	4	8	02	8	16
UNIT-V	02	4	8	02	8	16

Section-A: Questions numbers 1 to 10,

Out of 10 Questions 5 has to be answered.

Section-B: Questions numbers 11 to 15,

Internal Choice (either / or) and 5 Questions has to be answered.

1. Short Questions : 5 x 4 = 20
2. Essay Questions : 5 x 8 = 40

Total : 60 Marks

Model Question Paper

SRR&CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.
I B.Sc (B.Z.C) ZOOLOGY (w.e.f -2017-18)
SEMESTER-I
PAPER – I
ANIMAL DIVERSITY OF INVERTEBRATES

Time: 2½ hrs **Max Marks: 60**

SECTION-A

I. Answer any FIVE of the following
Draw labeled diagram wherever necessary **5x4=20**
ఈ క్రింది ప్రశ్నలలో నుండి ఐదు ప్రశ్నలుకు సమాధానలు వ్రాయండి అవసరమగు చోట పటము సహాయంతో వివరింపుము.

1. General characters of Protozoa ప్రోటోజోవా యొక్క సాధారణ లక్షణాలు
2. Skeleton in sponges స్పాంజికలలోఅస్థిపంజరం
3. Coral reefs ప్రవాళబిత్తలు
4. Structure of obelia ఒబెలియా నిర్మాణం
5. Polycheta పాలికిటే
6. Nematoda నెమటోడ
7. External characters of prawn రొయ్య యొక్క బాహ్య లక్షణాలు
8. Torsion మెలిక
9. Trochophore ట్రోకోఫోర్
10. Bipinnaria బైపిన్నిరియా

SECTION-B

II. Answer any FIVE of the following
Draw labeled diagram wherever necessary **5x8=40**
ఈ క్రింది ప్రశ్నలలో నుండి ఐదు ప్రశ్నలుకు సమాధానలు వ్రాయండి అవసరమగు చోట పటము సహాయంతో వివరింపుము.

11. a. Write the life history of elphidium.
ఎల్ఫిడియమ్ యొక్క జీవిత చరిత్రను రాయండి.

(OR)

b. Describe the Canal system in sponges
స్పంజికలో కుల్య వ్యవస్థను వివరించండి.

12. a. Explain polymorphism in coelenterates.
సీలంటరేటా జీవులలో బహురూపకతను వివరించండి.

(OR)

b. Describe the life cycle of Fasciola hepatica.
ఫాసియోలా హెపాటిటా యొక్క జీవితచరిత్రను వివరించండి.

13 a. Describe the digestive system in Hirudunaria.

హీరడినేరియాలో జీర్ణ వ్యవస్థను వివరించండి.

(OR)

b. What is vermi culture? Explain the process of vermiculture.

వెర్మికల్చర్ అంటే ఏమిటి? వెర్మికల్చర్ ప్రక్రియను వివరించండి.

14 a. Write the affinities of peripatus.

పెరిపేటస్ యొక్క సంబంధ బాంధవ్యాలను వ్రాయండి

(OR)

b. Explain pearl formation in mollusca.

మొలస్కా జీవులలో ముత్యం ఏర్పడే విదానం వివరించండి.

15. a. Write in detail about water vascular system in Asterias.

ఏస్టీరియాస్ లో జలప్రసరణ వ్యవస్థ నిర్మాణం గురించి వివరంగా వ్రాయండి

(OR)

b. Write Balanoglossus structure and affinities.

బెలానోగ్లోసస్ నిర్మాణం మరియు సంబంధ బాంధవ్యాలను వ్రాయండి.

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SRR&CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.
ZOOLOGY SYLLABUS (w.e.f -2017-18)
SEMESTER-II
PAPER – II
ANIMAL DIVERSITY OF VERTEBRATES

Periods: 60 **Max. marks: 100**

UNIT- I

General characters of Chordata

Prochordata: Salient features of Cephalochordata, Structure of *Branchiostoma,* Affinities of Cephalochordata, Salient features of Urochordata, Structure and life history of *Herdmania,*Significance of Retrogressive metamorphosis.

UNIT - II

Cyclostomata: General characters of Cyclostomata, Comparision of the *Petromyzon* and *Myxine*

Pisces:General characters of Fishes, Classification of fishes up to sub - class level with examples, *Scoliodon* - External features, Digestive system, Respiratory system,Heart, Brain, Migration in Fishes, Types of Scales, Dipnoi

UNIT - III

Amphibia: General characters of Amphibian, Classification of Amphibia upto orders with examples, *Rana hexadactyla* - External features, Digestive system, Respiratory system, Heart, Brain.

Reptilia: General characters of Reptilia, Classification of Reptilia upto orders with examples, Calotes - External features, Digestive system, Respiratory system, Heart, Brain, Identification of Poisonous snakes and Skull in reptiles

- **Additional Input:** Parental care in amphibia

UNIT - IV

Aves: General characters of Aves, Classification of Aves upto subclasses with examples. *Columba livia* - External features, Digestive system, Respiratory system,Heart, Brain, Migration in Birds, Flight adaptation in birds

UNIT-V

Mammalia: General characters of Mammalia, Classification of Mammalia upto sub - classes with examples, Comparision of Prototherians, Metatherians and Eutherians, Dentition in mammals

References:

- Modern text book of VERTEBRATES- R.L. Kothpal
- Vertebrate Zoology -E.L.Jordan & P.S.Verma
- Telugu Academy: Vertebrates

SRR&CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.
ZOOLOGY PRACTICAL SYLLABUS (w.e.f -2017-18)
SEMESTER-II
PAPER – II
ANIMAL DIVERSITYOF VERTEBRATES

Periods: 24 **Max. Marks: 50**

Observation of the following slides / spotters / models

Protochordata : *Herdmania, Amphioxus, Amphioxus* T.S. through pharynx

Cyclostomata : *Petromyzon, Myxine*

Pisces : *Pristis, Torpedo, Channapleuronectes, Hippocampus, Exocoetus,*

Eheneis, Labeo, Catla, Clarius, Auguilla,Protopterus

Placoid scale, Cycloid scale, Ctenoid scale

Amphibia : *Ichthyophis, Amblystoma, Siren, Hyla, Rachophous*

Axolotl larva

Reptilia : *Draco, Chemaeleon, Uromastix, Vipera russeli, Naja, Bungarus,*

Enhydrina, Testudo, Trionyx, Crocodilus

Aves : *Passer, Psittacula, Bubo, Alcedo, Columba, Corvus, Pavo,* Study of

different types of feathers : Quill, Contour, Filoplume down

Mammalia : *Ornithorthynchus, Tachyglossus, Pteropus, Funambulus, Manis, Loris,*

Hedgehog

Osteology : Appenducular skeletons of Varanus, Pigeon

Rabbit - Skull, fore limbs, hind limbs and girdles

Demonstration of dissection / dissected / virtual dissection:

1. V, VII, IX, X cranial nerves of shark / locally available fishes
2. Arterial system, venous system of Shark / Calotes / Fowl / Rat
3. Digestive system of fish

Laboratory record work shall be submitted at the time of practical examination

Compulsory one species to be adopted for demonstration only be the faculty

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Sc (B.Z.C) ZOOLOGY THEORY (w.e.f -2017-18)

INTERNAL MARKS ALLOTMENT

SEMESTER-I

PAPER – I

ANIMAL DIVERSITY OF INVERTEBRATES

Zoology Theory- Internal	**Total Marks: 40**	
1. Project	:	10 marks
2. Assignments (2)	:	5x2=10 marks
3. Internals (2) Best of Two	:	10 marks
4. Seminar	:	5 marks
5. Viva voce	:	5 marks

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Sc (B.Z.C) ZOOLOGY THEORY (w.e.f -2017-18)

EXTERNAL MARKS ALLOTMENT

SEMESTER-I

PAPER – I

ANIMAL DIVERSITY OF INVERTEBRATES

Zoology Theory- External **Total Marks: 60**

Section –A

I. Short Answer questions (Any 5 from given 10) 5x4=20
1 to 10

Section –B

II. Essay Questions (With internal choice) 5x8=40

11 to 15

SRR&CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Sc (B.Z.C) ZOOLOGY (w.e.f -2017-18)

PRACTICAL MARKS ALLOTMENT

SEMESTER-II

PAPER – II

ANIMAL DIVERSITYOF VERTEBRATES

Zoology Practical's - External

Time: 3 hrs. **Total Marks : 25**

1.Major dissection demonstration only	:	8 marks
(Identification-2M; Diagram-3M; Labelling-3M)		
2.Mounting (2)/Minor dissection (1)	:	4 marks(2+2)
3.Identification (2)	:	5 marks(2x21/2)
4.Record	:	5 marks
5.Viva voce	:	3 marks

Zoology Practical's - Internal

Total Marks: 25

1.Assessment including viva voce	:	6 marks
2.Record	:	6 marks
3.Field note book	:	5 marks
4.Project	:	8 marks

Question Paper Blue Print

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Sc (B.Z.C) ZOOLOGY THEORY (w.e.f -2017-18)

SEMESTER-II

PAPER – I

ANIMAL DIVERSITY OF VERTEBRATES

BLUE PRINT MODEL FOR EXTERNAL EXAMINATIONS

	Section A **Short Questions**			**Section B** **Essay Questions**		
	NO OF QUESTIONS	**MARKS ALLOTED**	**TOTAL MARKS**	**NO OF QUESTIONS**	**MARKS ALLOTED**	**TOTAL MARKS**
UNIT –I	02	4	8	02	8	16
UNIT-II	02	4	8	02	8	16
UNIT-III	02	4	8	02	8	16
UNIT-IV	02	4	8	02	8	16
UNIT-V	02	4	8	02	8	16

Section-A: Questions numbers 1 to 10,

Out of 10 Questions 5 has to be answered.

Section-B: Questions numbers 11 to 15,

Internal Choice (either / or) and 5 Questions has to be answered.

1. Short Questions : 5 x 4 = 20
2. Essay Questions : 5 x 8 = 40

Total : 60 Marks

Model Question Paper

SRR&CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.
I B.Sc (B.Z.C) ZOOLOGY (w.e.f. 2017-18)
SEMESTER-II
PAPER – II
ANIMAL DIVERSITY OF VERTEBRATES

Time: 2½ hrs **Max Marks: 60**

SECTION-A

I. Answer any FIVE of the following
Draw labeled diagrams wherever necessary **5x4=20**
ఈ క్రింది ప్రశ్నలలో నుండి ఐదు ప్రశ్నలుకు సమాధానలు వ్రాయండి అవసరమగు చోట పటము సహాయంతో వివరింపుము.

1. Structure of *Amphioxus* అంఫియోక్సస్ యొక్క నిర్మాణం
2. General charters of prochordata ప్రోటోకార్డేటా
3. Placoid scale ప్లాకాయిడ్ పొలుసులు
4. Dipnoi డిప్నోయి
5. Apoda ఎపోడా
6. Anapsida అనాప్సిడా
7. Quill feather క్విల్ ఈక
8. Ratitae రాటిటే
9. Prototheria ప్రోటోదీరియ
10. General characters of mammals క్షీరదాల సాధారణ లక్షణాలు

II. Answer any FIVE of the following: **5x8=40**
Draw labeled diagrams wherever necessary
ఈ క్రింది ప్రశ్నలలో నుండి ఐదు ప్రశ్నలుకు సమాధానలు వ్రాయండి అవసరమగు చోట పటము సహాయంతో వివరింపుము.

1. a. Explain the life history of Herdmania
హెర్డ్మానియా జీవిత చరిత్రను వివరించండి

OR

b. Explain the general characters of chordata
కార్డేటా యొక్క సాధారణ లక్షణాలనూ వివరించండి

12. a. Compare the characters of *Petromyzon* and *Myxine*
పెట్రోమైజాన్ మరియు మిక్సిన్ యొక్క లక్షణాలను సరిపోల్చండి

OR

b. Describe the structure of heart of *Scoliodon*
స్కోలియోడాన్ యొక్క గుండె నిర్మాణం వివరించండి

13. a. Describe the digestive system of *Rana hexadactyla*
రానా హెక్సా డాక్టైల్ జీర్ణ వ్యవస్థ వివరించండి

OR

b. Describe the identifications of poisonous snakes
విషపూరిత పాముల గుర్తింపు లక్షణాలను వివరించండి

14. a. Write an essay on flight adaptations in birds
పక్షులలో ఉడ్డయన అనుకూలనాల మీద ఒక వ్యాసం రాయండి

OR

b. Explain the respiratory system of *Columba livia*
కోలంబా లివియ యొక్క శ్వాసకోశ వ్యవస్థను వివరించండి

15. a. Compare the characters of Metatheria and Eutheria
మెటాదీరియా మరియు యుథేరియా యొక్క లక్షణాలు పోల్చండి

OR

b. Write an essay on dentition in mammals
క్షీరదాలలో దంత విన్యాసము గూర్చి ఒక వ్యాసాన్ని వ్రాయండి

*****

Signature of the members of the BoS:

NAME	POSITION	SIGNATURE
1. **Dr. P.ANURADHA** Lecturer in Zoology SRR & CVR GDC, VIJAYAWADA	**(In-charge of the Department & Chairman, BoS)**	P. Anuradha 18/7/2017
2. **Prof. K.R.S.SAMBASIVA RAO** Professor in Zoology Department of Zoology Acharya Nagarjuna University. Guntur.AP.	**(University Nominee)**	
3. **Dr.CH.TULASI MASTANAMMA** Lecturer in Zoology Govt. Degree College for Women(A) Guntur.	**(Subject Expert)**	Tulsi
4. **Dr.N.SREENIVAS** Lecturer in Zoology PR Govt.(A) College Kakinada.AP.	**(Subject Expert)**	
5. **Sri. .RAGHURAM REDDY** Neelagiri foundation Atmakur, Guntur	**(Special Member)**	
6. **G.VANI** Lecturer in Zoology SRR & CVR GDC, VIJAYAWADA.	**(Faculty Member)**	Gvani
7. **K. DURGA RAO** Lecturer in Zoology SRR & CVR GDC, VIJAYAWADA	**(Faculty Member)**	K. Durga Rao

SRR & CVR GOVERNMENT DEGREE COLLEGE (AUTONOMOUS)

VIJAYAWADA

DEPARTMENT OF ZOOLOGY

(2017-18)

NEW COURSE- AQUACULTURE TECHNOLOGY

(AS PER APSCHE w.e.f 2017-18)

B.Sc., (AT.Z.C)

SEMESTER-I & II SYLLABUS

AND

MODEL QUESTION PAPERS

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

AQUACULTURE TECHNOLOGY SYLLABUS (w.e.f -2017-18)
SEMESTER-I
PAPER – I
BASIC PRINCIPLES OF AQUACULTURE

Periods: 60 **Max.marks: 100**

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
1-5 Aquaculture versus Agriculture; Present day needs with special reference to Andhra Pradesh

UNIT-II: POND ECOSYSTEM

2-1 General Concepts of Ecology, Carrying Capacity and Food Chains
2-2 Lotic and lentic systems, streams and springs
2-2 Nutrient Cycles in Culture Ponds – Phosphorus, Carbon and Nitrogen
2-3 Importance of Plankton and Benthos in culture ponds, nutrient dynamics and algal blooms
2-4 Concepts of Productivity, estimation and improvement

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 – head pond, hatchery, nursery, rearing, production, stocking and quarantine ponds
3-3 Hatchery design

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
4-3 Construction of an ideal fish pond – space allocation, structure and components of barrage pond

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 optimum for culture –temperature, depth, turbidity, light, water and shore currents, PH, DOD, CO2 and nutrients; measures 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

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

AQUACULTURE TECHNOLOGY PRACTICAL SYLLABUS (w.e.f -2017-18)

SEMESTER-I

PAPER – I

BASIC PRINCIPLES OF AQUACULTURE

Periods: 24 **Max. Marks: 50**

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

Laboratory record work shall be submitted at the time of practical examination

PRESCRIBED BOOK(S):

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 Books Ltd., London
2. Stickney RR 1979. Principles of Warm Water Aquaculture. John Wiley & Sons Inc. 1981
3. Boyd CE 1982. Water Quality Management for Pond Fish Culture. Elsivier Scientific Publishing Company.
4. Bose AN et.al., 1991. Costal Aquaculture Engineering. Oxford & IBH Publishing Company Pvt.Ltd.

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Sc (AT.Z.C) AQUACULTURE TECHNOLOGY THEORY (w.e.f -2017-18)

INTERNAL MARKS ALLOTMENT

SEMESTER-I

PAPER – I

BASIC PRINCIPLES OF AQUACULTURE

Theory- Internal **Total Marks: 40**

1. Project	:	10 marks
2. Assignments (2)	:	5x2=10 marks
3. Internals (2) Best of Two	:	10 marks
4. Seminar	:	5 marks
5. Viva voce	:	5 marks

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Sc (AT.Z.C) AQUACULTURE TECHNOLOGY THEORY (w.e.f -2017-18)

EXTERNAL MARKS ALLOTMENT

SEMESTER-I

PAPER – I

BASIC PRINCIPLES OF AQUACULTURE

Aquaculture :Theory- External **Total Marks: 60**

Section –A

I. Short Answer questions (Any 5 from given 10) 5x4=20
1 to 10

Section –B

II. Essay Questions (With internal choice) 5x8=40

11 to 15

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Sc (AT.Z.C) AQUACULTURE TECHNOLOGY (w.e.f -2017-18)

PRACTICAL MARKS ALLOTMENT

SEMESTER-I

PAPER – I

BASIC PRINCIPLES OF AQUACULTURE

Practical's - External

Time: 3 hrs. **Total Marks: 25**

1. Identification of given sample	:	6 marks
2. Identification of given sample	:	6 marks
3.Identification (2)	:	5 marks (2x2 1/2)
4.Record	:	5 marks
5.Viva voce	:	3 marks

Practical's – Internal **Total Marks: 25**

1.Assessment including viva voce	:	6 marks
2.Record	:	6 marks
3.Field note book	:	5 marks
4.Project	:	8 marks

Question Paper Blue Print

SRR&CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Sc (AT.Z.C) AQUACULTURE TECHNOLOGY THEORY (w.e.f -2017-18)

SEMESTER-I
PAPER – I
BASIC PRINCIPLES OF AQUACULTURE

BLUE PRINT MODEL FOR EXTERNAL EXAMINATIONS

	Section A **Short Questions**			**Section B** **Essay Questions**		
	NO OF QUESTIONS	**MARKS ALLOTED FOR EACH QUESTION**	**TOTAL MARKS**	**NO OF QUESTIONS**	**MARKS ALLOTED FOR EACH QUESTION**	**TOTAL MARKS**
UNIT -I	02	4	8	02	8	16
UNIT-II	02	4	8	02	8	16
UNIT-III	02	4	8	02	8	16
UNIT-IV	02	4	8	02	8	16
UNIT-V	02	4	8	02	8	16

Section-A: Questions numbers 1 to 10,

Out of 10 Questions 5 has to be answered.

Section-B: Questions numbers 11 to 15,

Internal Choice (either / or) and 5 Questions has to be answered.

1. Short Questions : 5 x 4 = 20
2. Essay Questions : 5 x 8 = 40

Total : 60 Marks

Model Question Paper

SRR&CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.
I B.Sc (AT.Z.C) AQUACULTURE TECHNOLOGY (w.e.f -2017-18)
SEMESTER-I
PAPER – I
BASIC PRINCIPLES OF AQUACULTURE

Time: 2½ hrs **Max Marks: 60**

SECTION-A

I. Answer any FIVE of the following
Draw labeled diagram wherever necessary **5x4=20**

1. Monoculture
2. Brackish water culture
3. Lotic system
4. Phosphorus cycle
5. Nursery pond
6. Flood water
7. Barrage pond
8. Topography
9. Weed fish
10. B.O.D.

SECTION-B

II. Answer any FIVE of the following
Draw labeled diagram wherever necessary **5x8=40**

11. a. Explain Fresh water aquaculture

(or)

b. Explain Intensive and Semi-Intensive aquaculture.

12. a. Explain Carbon cycle

(or)

b. Describe the importance of plankton and Benthos in culture ponds .

13 a. Explain different types of ponds in aquaculture.

(or)

b. Describe how to design Hatchery .

14. a. Which important factors are involved to construct an ideal fish pond.

(or)

b. Explain the components of barrage pond.

15. a. Explain chemical factors effect in aquaculture.

(or)

b. write about weed control in aquaculture.

SRR&CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

AQUACULTURE TECHNOLOGY SYLLABUS (w.e.f -2017-18)
SEMESTER-II
PAPER – II
BIOLOGY OF FIN FISH & SHELL FISH

Periods: 60 **Max. marks: 100**

UNIT- I

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

1-1 General Characters and classification of fishes, crustaceans and molluscs up to the level of Class.
1-2 Fish, Crustaceans and Molluscs of commercial importance
1-3 Sense organs of fishes, crustaceans and molluscs
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, structural modifications in relation to feeding habits, forage ratio and food selectivity index
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, lengthfrequency method, age composition, age-length keys, absolute and specific growth, back calculation of length and growth, annual survival rate, asymptomatic length, fitting of growth curve
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, courtship and reproductive cycles
3-2 Induced breeding in fishes
3-4 Breeding in shrimp, oysters, mussels, clams, pearl oyster, pila, freshwater mussel 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

5-1 Endocrine system in fishes

5-2 Neurosecretary cells, androgenic gland, ovary, Y-organ, chromatophores, pericardial glands and cuticle.
5-3 Molting, molting stages, metamorphosis in crustacean shell fish

SRR&CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.
AQUACULTURE TECHNOLOGY PRACTICAL SYLLABUS (w.e.f -2017-18)
SEMESTER-II
PAPER – II
BIOLOGY OF FIN FISH & SHELL FISH

Periods: 24 **Max. Marks: 50**

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 and shrimp
5. Mouth parts and appendages of cultivable prawns, shrimps and other crustaceans
6. Study of eggs of fishes, shrimps, prawns and other crustaceans
7. Study of oyster eggs
8. Embryonic and larval development of fish
9. Study of gonadal maturity and fecundity in fishes and shellfish
10. Observation of crustacean larvae
11. Observation of molluscan larvae
12. Study of nest building and brooding of fishes

Laboratory record work shall be submitted at the time of practical examination

PRESCRIBED BOOK(S):

1.Bone Q et al., 1995. Biology of fishes, Blackie academic & professional, LONDON

2. Saxena AB 1996. Life of Crustaceans. Anmol Publications Pvt.Ltd., New Delhi

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. Penaeid shrimps- Their Biology and Management.

4. Barrington FJW 1971. Invertebrates: Structure and Function.ELBS

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

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I B.Sc (AT.Z.C) AQUACULTURE TECHNOLOGY THEORY (w.e.f -2017-18)

INTERNAL MARKS ALLOTMENT

SEMESTER-II

PAPER – II

BIOLOGY OF FIN FISH & SHELL FISH

Theory- Internal **Total Marks: 40**

1. Project	:	10 marks
2. Assignments (2)	:	5x2=10 marks
3. Internals (2) Best of Two	:	10 marks
4. Seminar	:	5 marks
5. Viva voce	:	5 marks

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Sc (AT.Z.C) AQUACULTURE TECHNOLOGY THEORY (w.e.f -2017-18)

EXTERNAL MARKS ALLOTMENT

SEMESTER-II

PAPER – II

BIOLOGY OF FIN FISH & SHELL FISH

Theory- External **Total Marks: 60**

Section –A

I. Short Answer questions (Any 5 from given 10) 5x4=20
1 to 10

Section –B

II. Essay Questions (With internal choice) 5x8=40

11 to 15

SRR&CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Sc (AT.Z.C) AQUACULTURE TECHNOLOGY (w.e.f -2017-18)

PRACTICAL MARKS ALLOTMENT

SEMESTER-II

PAPER – II

BIOLOGY OF FIN FISH & SHELL FISH

Practical's - External

Time: 3 hrs. **Total Marks : 25**

1. Identification of mouth/appendages parts :		6 marks
2. Gut analysis/length-weight relationship/ Study of eggs	:	6 marks
3.Identification/observation (2)	:	5 marks(2x21/2)
4.Record	:	5 marks
5.Viva voce	:	3 marks

Practical's - Internal

Total Marks: 25

1.Assessment including viva voce	:	6 marks
2.Record	:	6 marks
3.Field note book	:	5 marks
4.Project	:	8 marks

Question Paper Blue Print

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Sc (AT.Z.C) AQUACULTURE TECHNOLOGY THEORY (w.e.f -2017-18)

SEMESTER-II

PAPER – II

BIOLOGY OF FIN FISH & SHELL FISH

BLUE PRINT MODEL FOR EXTERNAL EXAMINATIONS

	Section A **Short Questions**			**Section B** **Essay Questions**		
	NO OF QUESTIONS	**MARKS ALLOTED**	**TOTAL MARKS**	**NO OF QUESTIONS**	**MARKS ALLOTED**	**TOTAL MARKS**
UNIT -I	02	4	8	02	8	16
UNIT-II	02	4	8	02	8	16
UNIT-III	02	4	8	02	8	16
UNIT-IV	02	4	8	02	8	16
UNIT-V	02	4	8	02	8	16

Section-A: Questions numbers 1 to 10,

Out of 10 Questions 5 has to be answered.

Section-B: Questions numbers 11 to 15,

Internal Choice (either / or) and 5 Questions has to be answered.

1. Short Questions : 5 x 4 = 20
2. Essay Questions : 5 x 8 = 40

Total : 60 Marks

Model Question Paper

SRR&CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.
I B.Sc (AT.Z.C) AQUACULTURE TECHNOLOGY (w.e.f. 2017-18)
SEMESTER-II
PAPER – II
BIOLOGY OF FIN FISH & SHELL FISH

Time: 2½ hrs **Max Marks: 60**

SECTION-A

I. Answer any FIVE of the following
Draw labeled diagrams wherever necessary **5x4=20**

1. Electric organs.
2. Swim bladder in fishes
3. Natural fish food
4. Length-weight relationship
5. Breeding places
6. Induced breeding
7. Nest building
8. Ovo-viviparity
9. Neurosecretary cells
10. Moulting stages.

II. Answer any FIVE of the following: **5x8=40**
Draw labeled diagrams wherever necessary

11. a. Describe general characters of fishes and classify up to class level.
(or)
b. Explain fin fish and shell fish commercial importance.

12. a. Explain different methods to estimate fish age and growth
(or)
b. Explain different factors in fish longevity

13. a. Write an essay on different breeding habitats.
(**or)**
b. Explain Breeding in shrimp

14. a. Describe embryonic and larval development in fishes.
(or)
b. Explain environmental factors effecting on fin fish in reproduction and development.

15. a. Role of Endocrine hormones in fishes.
(or)
b. Describe metamorphosis in crustecean.