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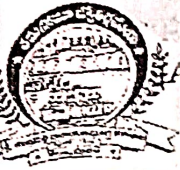
## BOARD OF STUDIES MEETING

2025-2026

DEPARTMENT OF ZOOLOGY & FISHERIES

SRI. Y. N. COLLEGE (AUTONOMOUS)

NARSAPUR



SRI Y.N.COLLEGE (Autonomous)  
Affiliated to Adikavi Nannaya University, Rajamahendravaram)  
Accredited by NAAC at 'A+' Grade (IV Cycle)  
NARSAPUR-534 275, W.G.Dt., A.P.,



Dr. Ch.Kanaka Rao, M.Sc.(Tech), B.Ed., M.Phil., Ph.D., M.I.E

Principal

Date: 23-09-2025

### **NOTICE**

All the Heads of the Departments are requested to go through the agenda for the Board of Studies meeting for the academic year 2025-2026 of your respective departments and see that they are discussed thoroughly and the respective resolutions are recorded in the minutes book of the respective departments.

### **AGENDA:**

1. To prepare the syllabi, course-outcomes, programme outcomes, programme specific outcomes and model question papers for the degree I, II, III and IV years for the academic year 2025-2026 by making appropriate modifications to the University syllabus if necessary.
2. To implement the ratio of CIA to SEE 40:60 and the division of marks among the sections in CIA and SEE for the third year degree also from the Academic year 2025-2026.
3. To prepare the syllabi and model question papers for Add-on courses, Certificate courses, and Bridge course for the newly admitted students for the Academic year 2025-2026.
4. To discuss about conducting Seminars, Workshops, FDPs, in the department for the Academic year 2025-2026.
5. To discuss about conducting guest lectures, Quiz Programmes, field trips, Community Service Projects, Internships and student study projects..
6. Any other item with permission of the chair.

Ch. R. V. Nataraj  
MEMBER SECRETARY



Ch. Kanaka Rao  
PRINCIPAL

PRINCIPAL  
Y.N. College (Autonomous)  
AAC Accredited 'A+' Grade College  
(4th Cycle)  
NARSAPUR-534275, W.G.Dt., (A.P.)





## DEPARTMENT OF ZOOLOGY AND FISHERIES

### SRI Y N COLLEGE (A): NARSAPUR (Affiliated to Adikavi Nannaya University)

#### LIST OF CHAIRMAN & MEMBERS

#### BOARD OF STUDIES: 2025-2026

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##### 1. LIST OF CHAIRMAN AND MEMBERS :

1. Dr. P. Y. V. Satyanarayana, HOD of Zoology & Fisheries, Chairman
2. Kum. K. S. S.V.N. Lakshmi, Lecturer in Zoology & Fisheries, Member
3. Smt.Sub.Lit. G.Sunitha, Lecturer in Zoology & Fisheries, Member

2. UNIVERSITY NOMINEE : Dr. K. Lakshmi Kanthamma  
HOD of Zoology & Aquaculture  
S.V. K. P & Dr. K. S. Raju Arts & Science collège(A)  
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Phone No- 8074650577  
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3. SUBJECT EXPERTS :
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  2. N. Suneetha  
Lecturer in Zoology  
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Vijayawada  
Phone No. 9703332851  
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4. INDUSTRIALIST :
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Mail. Id : mmramakrishna.katta@gmail.com

5. ALUMNUS :
- U. Prasad  
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Fortune Aqua Labs  
Palakollu- 534260  
Phone No : 9848099097  
Mail.Id : fortunelabspkl@gmail.com

**SRI Y N COLLEGE(A): NARSAPUR**  
(Affiliated to Adikavi Nannaya University)

Thrice Accredited by NAAC at 'A' Grade

**DEPARTMENT OF ZOOLOGY**

**Board of studies in Zoology & Fisheries for the Year 2025-2026**

**Resolutions:**

The members of the **Board of Studies** met in the Zoology Dept. under the Chairmanship of Dr. P. Y. V. Satyanarayana, Reader & HOD of Zoology in the Chair on ~~10.10.2025~~ at 10 A.M. and resolved the following.

1. It is resolved to approve the **Syllabus for I,II,III,IV and V Semesters** for the academic year **2025-2026** as appended here with.
2. It is resolved to approve "**Bridge course**" in I Sem and **Certificate Course "Ornamental Fishes"** in III Sem for the academic year **2025-2026**.
3. Resolved to approve **Model papers, scheme & Blue prints**.
4. Resolved to prepare **Course outcomes, Programme outcomes**, and **PSO's** for degree I,II, & III years for the academic year **2025-2026**.
5. Resolved to conduct social **immersion programme** (community service project) at the end of I/II year degree and **Internship (Project)** during V semester or VI Semester for III year degree students.
6. Resolved to conduct –**Seminars, Workshops, ICT enabled teaching** (Digital classes) **practices, field trips, and student projects**.
7. Resolved to extend extension activity like "**Consultancy activity**" to the Aquaculture farmers.
8. Resolved to encourage **Staff publications** in UGC recognized journals.
9. Resolved to get functional **MOU'S & Collaborations** with other colleges/ Industry.

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**SRI Y.N. COLLEGE (AUTONOMOUS), NARSAPUR**

(Affiliated to Adikavi Nannayya University)

Accredited by NAAC with 'A+' Grade (Fourth Cycle)

**II B.Sc Theory syllabus for batch 2025-2029 on words (w.e.f. 2024-2025)**

**SEMESTER-III- ZOOLOGY: MINOR**

**COURSE-2-ANIMAL DIVERSITY-II BIOLOGY OF CHORDATES**

Theory

Credits: 3

3hrs/week

**LEARNING OBJECTIVES**

- To understand the animal kingdom.
- To understand the taxonomic position of Protochordata to Mammalia.
- To understand the general characteristics of animals belonging to Fishes to Reptilians.
- To understand the body organization of Chordata.
- To understand the taxonomic position of Protherian mammals.

**LEARNING OUTCOMES:** By the completion of the course the graduate should be able to –

- Describe general taxonomic rules on animal classification of chordates
- Classify Protochordata to Mammalia with taxonomic keys
- Understand Mammals with specific structural adaptations
- Understand the significance of dentition and evolutionary significance
- Understand the origin and evolutionary relationship of different phyla from Prochordata to Mammalia.

**SYLLABUS:**

**UNIT - I**

1.1 General characters and classification of Chordata up to classes

1.2 Structure and life history of *Herdmania*, Retrogressive metamorphosis –Process and Significance

1.3 Cyclostomata, General characters, Comparison of Petromyzon and Myxine

**Activity:** Model preparation /Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above

**Evaluation:** Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity



## UNIT - II

- 2.1 General characters of Fishes, Salient features Dipnoi
- 2.2 *Scoliodon*: External features, Digestive system, Structure and function of Heart.
- 2.3 Migration in Fishes, Types of Scales

*Activity: Model preparation /Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above*  
*Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity.*

## UNIT - III

- 3.1 General characters of Amphibia, General characters of Reptilia
- 3.2 *Rana hexadactyla*: External features, , Structure and function of Heart.
- 3.3 *Calotes*: External features, Digestive system, Identification of Poisonous snakes

*Activity: Model preparation /Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above*  
*Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity*

## UNIT - IV

- 4.1 General characters of Aves
- 4.2 *Columba livia*: External features, Digestive system, Respiratory system
- 4.3 Migration in Birds, Flight adaptation in birds

*Activity: Model preparation/Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above*  
*Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity*

## UNIT - V

- 5.1 General characters of Mammalia
- 5.2 Comparison of Prototherians, Metatherians and Eutherians
- 5.3 Dentition in mammals, Aquatic mammals Adaptations

*Activity: Model preparation/Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above*  
*Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity*



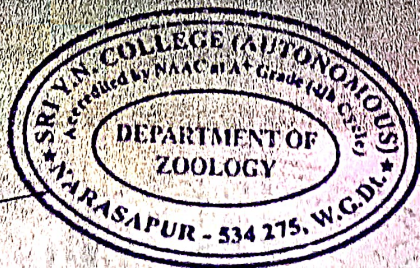
- Co-curricular activities (suggested)
- Preparation of charts on Chordate classification (with representative animal photos) and progressive metamorphosis
- Clay models of Herdmania and Amphioxus
- Visit to local fish market and identification of local cartilaginous and bony fishes
- Maintaining of aquarium by students
- Model of fish heart and brain
- Preparation of slides of scales of fishes
- Visit to local/nearby river to identify migratory fishes and prepare study notes
- Preparation of Charts on above topics by students (Eg: comparative account of vertebrate heart/brain/lungs, identification of snakes etc.)
- Collecting and preparation of Museum specimens with dead frogs/snakes/lizards etc., and/or their skeletons
- Additional input on types of snake poisons and their antidotes (student activity).
- Collection of bird feathers and submission of report on Plumology
- Taxidermic preparation of dead birds for Zoology Museum
- Map pointing of prototherian and metatherian mammals
- Chart preparation for dentition in mammals

### REFERENCE BOOKS

- J.Z. Young, 2006. The life of vertebrates. (The Oxford University Press, New Delhi). 646 pages. Reprinted
- Arumugam, N. Chordate Zoology, Vol. 2. Saras Publication. 278 pages. 200 figs.
- A.J. Marshall, 1995. Textbook of zoology, Vertebrates. (The McMillan Press Ltd., UK). 852 pages. (Revised edition of Parker & Haswell, 1961).
- M. Ekambaranatha Ayyar, 1973. A manual of zoology. Part II. (S. Viswanathan Pvt. Ltd., Madras).
- P.S. Dhami & J.K. Dhami, 1981. Chordate zoology. (R. Chand & Co.). 550 pages.
- Gurdarshan Singh & H. Bhaskar, 2002. Advanced Chordate Zoology. Campus Books, 6 Vols., 1573 pp., tables, figs.
- A.K. Sinha, S. Adhikari & B.B. Ganguly, 1978. Biology of animals. Vol. II. Chordates. (New Central Book Agency, Calcutta). 560 pages.
- R.L. Kotpal, 2022. Modern textbook of zoology, Vertebrates. (Rastogi Publ., Meerut). 632 pages.
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- G.S. Sandhu, 2005. Objective Chordate Zoology. Campus Books, vii, 169 pp.
- Sandhu, G.S. & H. Bhaskar, H. 2004. Textbook of Chordate Zoology. Campus Books, 2 vols., xx, 964 p., figs.
- Veena, 2008. Lower Chordata. (Sonali Publ.), 374 p., tables, 117 figs.

**APPROVED**

*I. K. K.*



*M. Raju*  
CHAIRMAN

BOARD OF STUDIES  
DEPARTMENT OF ZOOLOGY  
Sri Y.N. College (Autonomous)  
Accredited by NAAC at A+ Grade (4th Cycle)  
NARSAPUR - 534 275





Batch 2024-2025

**SRI Y.N. COLLEGE (AUTONOMOUS), NARSAPUR**

(Affiliated to Adikavi Nannayya University)

Accredited by NAAC with 'A+' Grade (Fourth Cycle)

**II: B.Sc., HONOURS IN ZOOLOGY: MINOR**

**SEMESTER-III-COURSE 2.**

**ANIMAL DIVERSITY -II- BIOLOGY OF CHORDATES**

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**Note:** The question paper setters are requested to adhere to the format given below.

| S.No. | UNIT | ESSAYS | SHORTS |
|-------|------|--------|--------|
| 1.    | I    | 2      | 1      |
| 2.    | II   | 2      | 1      |
| 3.    | III  | 2      | 2      |
| 4.    | IV   | 2      | 2      |
| 5.    | V    | 2      | 2      |

**8. Syrinx of Pigeon**

**PART-II**

II. Answer any FIVE of the following questions. Draw a neat labelled diagram wherever necessary.

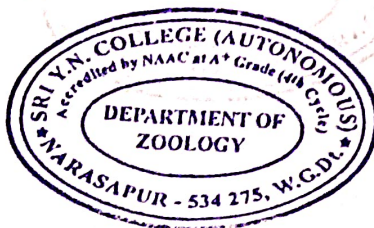
5 x 8 = 40 M

**Section-A**

9. Explain the general characters of Chordates.
10. Describe the Life history of Herdmania.
11. Describe the structure and functioning of heart of Scoliodon.
12. Write an essay on migration in fishes.
13. Explain the general characters of Amphibia with examples.

**APPROVED**

*K. H. D.*



*M. T. G.*

**CHAIRMAN  
BOARD OF STUDIES  
DEPARTMENT OF ZOOLOGY  
Sri Y.N. College (Autonomous)  
Accredited by NAAC at A+ Grade (4th Cycle)  
NARSAPUR - 534 27**



**SRI Y.N. COLLEGE (AUTONOMOUS), NARSAPUR**

(Affiliated to Adikavi Nannayya University)

Accredited by NAAC with 'A' Grade (Fourth Cycle)

**ZOOLOGY: MINOR- SEMESTER -III**

**Course-2-Animal Diversity -II Biology of Chordates**

**Model question Paper**

Time: 3 hrs.

Max. Marks: 60

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PART- A

- I. Answer any FIVE of the following questions. Draw a neat labelled diagram wherever necessary. 5 x 4 = 20 M

1. Ascidian Tadpole
2. Cycloid scales
3. Dipnoi
4. Draco
5. Buccopharyngeal respiration
6. Air sacs in Pigeon
7. Archaeopteryx
8. Syrinx of Pigeon

PART-II

- II. Answer any FIVE of the following questions. Draw a neat labelled diagram wherever necessary. 5 x 8 = 40 M

Section-A

9. Explain the general characters of Chordates.
10. Describe the Life history of Herdmania.
11. Describe the structure and functioning of heart of Scoliodon.
12. Write an essay on migration in fishes.
13. Explain the general characters of Amphibia with examples.

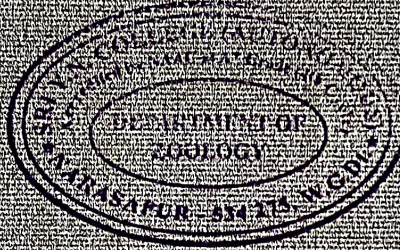


Section-B

14. Give an account of Identification of poisonous snakes from nonpoisonous snakes.
15. Give an account on digestive system of Pigeon.
16. Write an essay on flight adaptations in birds.
17. Compare the differences between Prototheria and Metatheria .
18. Write an essay on dentition in mammals.

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APPROVED



DR. ANAND K. ANAND  
HEAD OF STUDIES  
DEPARTMENT OF ZOOLOGY  
N.Y.N. College (Autonomous)  
Approved by NAAC at A+ Grade (1st Cycle)  
NAKSAPUR - 534 275



3157  
**SRI Y.N. COLLEGE (AUTONOMOUS), NARSAPUR**

(Affiliated to Adikavi Nannayya University)

Accredited by NAAC with 'A+' Grade (Fourth Cycle)

**II B.Sc Theory syllabus for batch 2025-2029 on words (w.e.f. 2024-2025)**

**SEMESTER-III- ZOOLOGY: MAJOR**

**COURSE-5-ANIMAL DIVERSITY-II BIOLOGY OF CHORDATES**

Theory

Credits: 3

3hrs/week

**LEARNING OBJECTIVES**

- To understand the animal kingdom.
- To understand the taxonomic position of Protochordata to Mammalia.
- To understand the general characteristics of animals belonging to Fishes to Reptilians.
- To understand the body organization of Chordata.
- To understand the taxonomic position of Protherian mammals.

**LEARNING OUTCOMES:** By the completion of the course the graduate should able to –

- Describe general taxonomic rules on animal classification of chordates
- Classify Protochordata to Mammalia with taxonomic keys
- Understand Mammals with specific structural adaptations
- Understand the significance of dentition and evolutionary significance
- Understand the origin and evolutionary relationship of different phyla from Prochordata to Mammalia.

**SYLLABUS:**

**UNIT - I**

1.1 General characters and classification of Chordata up to classes

1.2 Structure and life history of *Herdmania*, Retrogressive metamorphosis –Process and Significance

1.3 Cyclostomata, General characters, Comparison of Petromyzon and Myxine

*Activity: Model preparation /Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above*

*Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity*



## **UNIT - II**

2.1 General characters of Fishes, Salient features Dipnoi

2.2 *Scoliodon*: External features, Digestive system, Structure and function of Heart.

2.3 Migration in Fishes, Types of Scales

*Activity: Model preparation /Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above*

*Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity.*

## **UNIT - III**

3.1 General characters of Amphibia, General characters of Reptilia

3.2 *Rana hexadactyla*: External features, , Structure and function of Heart.

3.3 *Calotes*: External features, Digestive system, Identification of Poisonous snakes

*Activity: Model preparation /Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above*

*Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity*

## **UNIT - IV**

4.1 General characters of Aves

4.2 *Columba livia*: External features, Digestive system, Respiratory system

4.3 Migration in Birds, Flight adaptation in birds

*Activity: Model preparation/Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above*

*Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity*

## **UNIT - V**

5.1 General characters of Mammalia

5.2 Comparison of Prototherians, Metatherians and Eutherians

5.3 Dentition in mammals, Aquatic mammals Adaptations

*Activity: Model preparation/Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above*

*Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity*



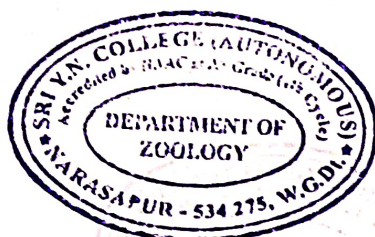
- Co-curricular activities (suggested)
- Preparation of charts on Chordate classification (with representative animal photos) and retrogressive metamorphosis
  - Clay models of Herdmania and Amphioxus
  - Visit to local fish market and identification of local cartilaginous and bony fishes
  - Maintaining of aquarium by students
  - Model of fish heart and brain
  - Preparation of slides of scales of fishes
  - Visit to local/nearby river to identify migratory fishes and prepare study notes
  - Preparation of Charts on above topics by students (Eg: comparative account of vertebrate heart/brain/lungs, identification of snakes etc.)
  - Collecting and preparation of Museum specimens with dead frogs/snakes/lizards etc., and/or their skeletons
  - Additional input on types of snake poisons and their antidotes (student activity).
  - Collection of bird feathers and submission of report on Plumology
  - Taxidermic preparation of dead birds for Zoology Museum
  - Map pointing of prototherian and metatherian mammals
  - Chart preparation for dentition in mammals

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- Veena, 2008. Lower Chordata. (Sonali Publ.), 374 p., tables, 117 figs.

**APPROVED**

*I. Kunt*



*M. T. G. S.*  
CHAIRMAN

**BOARD OF STUDIES**  
**DEPARTMENT OF ZOOLOGY**  
Sri Y.N. College (Autonomous)  
Accredited by NAAC at A+ Grade (4th Cycle)  
NARSAPUR - 534 275





Batch 2024-2025

**SRI Y.N. COLLEGE (AUTONOMOUS), NARSAPUR**

(Affiliated to Adikavi Nannayya University)

Accredited by NAAC with 'A+' Grade (Fourth Cycle)

**II: B.Sc., HONOURS IN ZOOLOGY: MAJOR**

**SEMESTER-III-COURSE-5**

**ANIMAL DIVERSITY -II- BIOLOGY OF CHORDATES**

**BLUE PRINT**

**Note:** The question paper setters are requested to adhere to the format given below.

| S.No. | UNIT | ESSAYS | SHORTS |
|-------|------|--------|--------|
| 1.    | I    | 2      | 1      |
| 2.    | II   | 2      | 1      |
| 3.    | III  | 2      | 2      |
| 4.    | IV   | 2      | 2      |
| 5.    | V    | 2      | 2      |

**PART-II**

- II. Answer any FIVE of the following questions. Draw a neat labelled diagram wherever necessary.

5 x 8 = 40 M

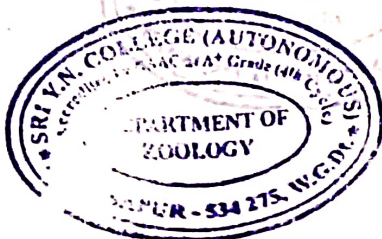
**Section-A**

9. Explain the general characters of Chordates.
10. Describe the Life history of Herdmania.
11. Describe the structure and functioning of heart of Scoliodon.
12. Write an essay on migration in fishes.
13. Explain the general characters of Amphibia with examples.

**APPROVED**

1. Khit

2



*H. T. Jagan*  
**CHAIRMAN**  
**BOARD OF STUDIES**  
**DEPARTMENT OF ZOOLOGY**  
Sri Y.N. College (Autonomous)  
Accredited by NAAC at A+ Grade (4th Cycle)  
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**SRI Y.N. COLLEGE (AUTONOMOUS), NARSAPUR**

(Affiliated to Adikavi Nannayya University)

Accredited by NAAC with 'A'' Grade (Fourth Cycle)

**ZOOLOGY: MAJOR- SEMESTER -III**

**Course-5-Animal Diversity -II Biology of Chordates**

**Model question Paper**

Time: 3 hrs.

Max. Marks: 60

PART- A

- I. Answer any FIVE of the following questions. Draw a neat labelled diagram wherever necessary. 5 x 4 = 20 M

1. Ascidian Tadpole ✓
2. Cycloid scales ✓
3. Dipnoi ✓
4. Draco ✓
5. Buccopharyngeal respiration
6. Air sacs in Pigeon
7. Archaeopteryx ✓
8. Syrinx of Pigeon ✓

PART-II

- II. Answer any FIVE of the following questions. Draw a neat labelled diagram wherever necessary. 5 x 8 = 40 M

Section-A

9. Explain the general characters of Chordates.
10. Describe the Life history of Herdmania.
11. Describe the structure and functioning of heart of Scoliodon.
12. Write an essay on migration in fishes.
13. Explain the general characters of Amphibia with examples.



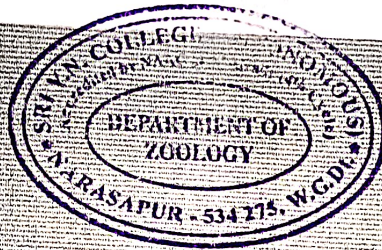
Section-B

14. Give an account of Identification of poisonous snakes from nonpoisonous snakes.
15. Give an account on digestive system of Pigeon.
16. Write an essay on flight adaptations in birds.
17. Compare the differences between Prototheria and Metatheria .
18. Write an essay on dentition in mammals.

\*\*\*\*\*

**APPROVED**

*[Signature]*



*[Signature]*  
**CHAIRMAN**  
**BOARD OF STUDIES**  
**DEPARTMENT OF ZOOLOGY**  
Sri Y.N. College (Autonomous)  
Accredited by NAAC at A+ Grade (4th Cycle)  
NARSAPUR - 534 275



# SRI Y.N. COLLEGE (AUTONOMOUS), NARSAPUR

(Affiliated to Adikavi Nannayya University)

Accredited by NAAC with 'A+' Grade (Fourth Cycle)

II B.Sc. syllabus for batch 2025-2029 on words (w.e.f. 2024-2025)

SEMESTER-III- ZOOLOGY: MAJOR

COURSE-5-ANIMAL DIVERSITY-II BIOLOGY OF CHORDATES

Practical

Credits: 1

2 hrs/week

## LEARNING OBJECTIVES

- To understand the importance of preservation of museum specimens
- To identify animals based on special identifying characters
- To understand different organ systems through demo or virtual dissections
- To maintain a neat, labeled record of identified museum specimens

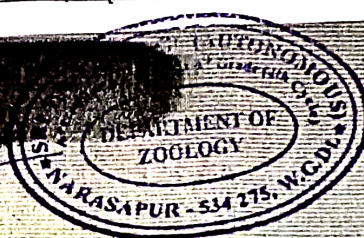
## SYLLABUS:

1. Protochordata: *Herdmania*, *Amphioxus*, *Amphioxus* T.S through pharynx.
2. Cyclostomes: *Petromyzon* and *Myxine*.
3. Pisces: *Pristis*, *Torpedo*, *Hippocampus*, *Exocoetus*, *Echeneis*, *Labeo*, *Catla*, *Clarius*, *Channa*, *Anguilla*.
4. Amphibia: *Ichthyophis*, *Amblystoma*, *Axolotl* larva, *Hyla*,
5. Reptilia: *Draco*, *Chamaeleon*, *Uromastix*, *Testudo*, *Trionyx*, *Russels viper*, *Naja*, *Krait*, *Hydrophis*, *Crocodile*.
6. Aves: *Psittacula*, *Eudynamis*, *Bubo*, *Alcedo*.
7. Mammalia: *Ornithorhynchus*, *Pteropus*, *Funambulus*.
8. Dissections-As per UGC guidelines  
*Scoliodon* IX and X, Cranial nerves  
*Scoliodon* Brain  
Mounting of fish scales

Note: 1. Dissections are to be demonstrated only by the faculty or virtual.  
2. Laboratory Record work shall be submitted at the time of practical examination.

## REFERENCE WEB LINKS:

- <https://nt7-mhe-complex-assets.mheducation.com/nt7-mhe-complex-assets/20190715/InspireScience6-8CA/LS15/index.html>
- <https://themammallab.com/>
- <http://abacus.bates.edu/acad/depts/biobook/LabConCh.htm>
- <https://virtualzoology.wordpress.com/scoliodon/>
- <http://www.zoologyresources.com/uploadfiles/books/dc64b77d8769325515d17c945e461b45.pdf>



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**II B.Sc Theory syllabus for batch 2024-2025 on words (w.e.f. 2024-2025)**

**SEMESTER-III- ZOOLOGY: MAJOR**

**COURSE 6: PRINCIPLES OF GENETICS**

Theory

Credits: 3

3 hrs/week

**LEARNING OBJECTIVES**

- To provide the background knowledge on the history of genetics and the importance of Mendelian principles.
- To provide the required knowledge on the gene interactions
- To acquaint the students, distinguish between polygenic, sex-linked, and multiple allelic modes of inheritance and extrachromosomal inheritance.
- To understand the principles of sex determination in animals with a reference to human being, and sex-linked inheritance
- To understand the human karyotyping and the concept of pedigree analysis basics.

**LEARNING OUTCOMES:** By the completion of the course the graduate should able to –

- To understand the history of genetics, gain knowledge basic terminology of genetics
- To acquire knowledge on interaction of genes, various types of inheritance patterns existing in animals with reference to non-Mendelian inheritance.
- To acquire knowledge on chromosomal inheritance
- Acquiring in-depth knowledge on various of aspects of genetics involved in sex determination,
- Acquiring in-depth knowledge on human karyotyping, pedigree analysis and chromosomal disorders concepts of proteomics and genomics

**SYLLABUS:**

**UNIT-I:**

1.1 History of Genetics- Concepts of Phenotype, Genotype, Heredity&Variations.

1.2 Mendelian Principles on Monohybrid cross, back cross and Test cross

1.3 Mendelian Principles on Dihybrid cross

*Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above/Problem solving on Mendelian principles*

*Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity*



## UNIT-II:

2.1 Linkage - Definition, Types of linkage-complete linkage and incomplete linkage, Significance of linkage.

2.2 Crossing over - definition; Mechanism of crossing over:

2.3 Gene Interactions: Incomplete dominance, codominance, Pléiotropie

*Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above/Model preparation of linkage/crossing over Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity*

## UNIT-III:

3.1 Polygenes (General Characteristics & examples)

3.2 Multiple Alleles (General Characteristics and Blood group inheritance)

3.3 Rh inheritance erythroblastosis foetalis

*Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above/Case study on Rh/Erythroblastosis foetalis Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity*

## UNIT-IV:

4.1 Sex determination- Chromosomal theory and Genic Balance theory

4.2. Sex linked inheritance: X-linked inheritance

4.3 Sex linked inheritance: Y-linked & XY-linked inheritance

*Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above/ Preparation of animated model /chart on sex determination methods Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity*

## UNIT-V:

5.1 Human karyotyping, Pedigree Analysis(basics)

5.2 Autosomal Recessive disorder-Sickle cell anemia – causes, treatment, inheritance pattern, modes of testing and prevention

5.3 Autosomal Dominant disorder- Huntington disease

*Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above/ Case study of a family for pedigree analysis Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity*



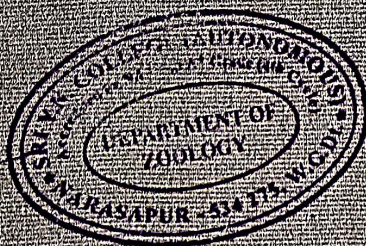
### Co-curricular activities (Suggested)

- Observation of Mendelian / Non-Mendelian inheritance in the plants of college botanical garden or local village as a student study project activity
- Observation of blood group inheritance in students, from their parents and grandparents
- Karyotyping and preparation of pedigree charts for identifying diseases in family history
- Charts on chromosomal disorders

### REFERENCE BOOKS:

- Harper, P. (2010). Practical genetic counselling. CRC Press.
- Kessler, S. (Ed.). (2013). Genetic counselling: psychological dimensions. Academic Press. 3.
- Stevenson, A. C., & Davison, B. C. (2016). Genetic counselling. Elsevier.
- Evans, C. (2006). Genetic counselling: a psychological approach. Cambridge University Press.
- References:
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- Mendelian Inheritance in Man: A Catalog of Human Genes and Genetic Disorders, Victor A. McKusick, 2 Vol I & II
- Stacy L Blachford (Editor) 2001. The Gale Encyclopedia of Genetic Disorders. Gale Group Publishers, Vol. I (A-L), Vol. II (M-Z).
- Limoine, W.R. and Cooper, D.NB. 1996: Gene Trophy, Bios Scientific Pub. Oxford.
- REFERENCES:
- Gardner, E.J., Simmons, M.J., Snustad, D.P. (2008). Principles of Genetics. VIII Edition. Wiley India
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- Klug, W.S., Cummings, M.R., Spencer, C.A. (2012). Concepts of Genetics. X Edition. Benjamin Cummings.
- Russell, P. J. (2009). Genetics- A Molecular Approach. III Edition. Benjamin Cummings.
- Griffiths, A.J.F., Wessler, S.R., Lewontin, R.C. and Carroll, S.B. Introduction to Genetic Analysis. IX Edition. W. H. Freeman and Co.
- James D. Watson, Nancy H. Hopkins 'Molecular Biology of the Gene'
- Gupta P.K., 'Genetics'

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1. K. K. J.

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**II: B.Sc., HONOURS IN ZOOLOGY: MAJOR**

**SEMESTER-III**

**COURSE-6-PRINCIPLES OF GENETICS**

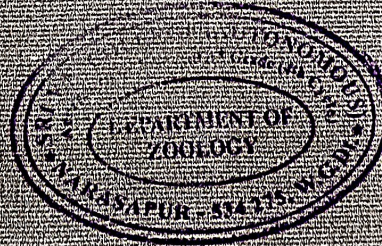
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**Note:** The question paper setters are requested to adhere to the format given below.

| S.No. | UNIT | ESSAYS | SHORTS |
|-------|------|--------|--------|
| 1.    | I    | 2      | 1      |
| 2.    | II   | 2      | 1      |
| 3.    | III  | 2      | 2      |
| 4.    | IV   | 2      | 2      |
| 5.    | V    | 2      | 2      |

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**ZOOLOGY: MAJOR- SEMESTER -III**

**Course-6-Principles of Genetics**

**Model question Paper**

Time: 3 hrs.

Max. Marks: 60

PART- A

- I. Answer any FIVE of the following questions. Draw a neat labelled diagram wherever necessary.  $5 \times 4 = 20$

1. Genotype
2. Pleiotropy
3. Multiple alleles
4. Erythroblastosis
5. ZW, ZZ type of Sex determination
6. Genic balance theory
7. Karyogram
8. Pedigree analysis

PART-II

- II. Answer any FIVE of the following questions. Draw a neat labelled diagram wherever necessary.  $5 \times 8 = 40$

Section-A

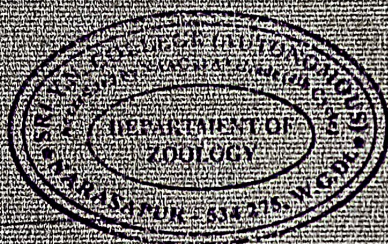
9. Explain the history genetics and concepts of phenotype.
10. Describe the mendelian principles on Monohybrid cross.
11. Explain the complete linkage and incomplete linkage.
12. Describe the incomplete dominance.
13. Describe the general characters and examples of polygenes.



Section-B

14. Write the general characters and blood group inheritance.
15. Explain the chromosomal theory of Sex- determination.
16. Write an essay on X-linked inheritance.
17. Write an essay on Human karyotyping
18. Write an essay on Sickle cell anemia causes and treatment.

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II B.Sc Theory syllabus for batch 2025-2029 on words (w.e.f. 2024-2025)

SEMESTER-III- ZOOLOGY: MAJOR

COURSE 7: ANIMAL BIOTECHNOLOGY

Theory

Credits: 3

3 hrs/week

**LEARNING OBJECTIVES:**

- To provide knowledge on animal cell and tissue culture and their preservation
- To empower students with latest biotechnology techniques like stem cell technology, genetic engineering, hybridoma technology, transgenic technology and their application in medicine and industry for the benefit of living organisms
- To explain *in vitro* fertilization, embryo transfer technology and other reproduction manipulation methodologies.
- To get insight in applications or recombinant DNA technology in agriculture, production of therapeutic proteins.
- To understand principles of animal culture, media preparation.

**LEARNING OUTCOMES:**

This course will provide students with a deep knowledge in animal biotechnology, by the completion of the course the graduate shall able to –

- Get knowledge of the Vectors and Restriction enzymes used in biotechnology
- Describe the gene delivery mechanism and PCR technique
- Acquire basic knowledge on media preparation and cell culture techniques
- Understand the manipulation of reproduction with the application of biotechnology
- Understand the applications of Biotechnology in the fields of industry and agriculture including animal cell/tissue culture, stem cell technology and genetic engineering.

**SYLLABUS:**

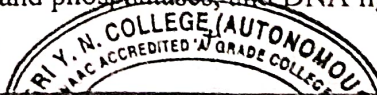
**UNIT-I:**

1.1 Enzymes and Vectors Restriction modification systems: Types I, II and III.

1.2 Mode of action, nomenclature, applications of Type II restriction enzymes in genetic engineering

1.3 DNA modifying enzymes and their applications: DNA polymerases. Terminal deoxynucleotidyl transferase, kinases and phosphatases, and DNA ligases, Cloning Vectors

Plasmid vectors: pBR and pUC series



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*Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above/ Preparation of models of Cloning vectors with biodegradable material/*

*Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity*

#### UNIT- II:

2.1 Gene delivery: Microinjection, electroporation, biolistic method (gene gun), liposome and viral mediated delivery

2.2 PCR: Basics of PCR.

2.3 Hybridization techniques: Southern, Northern and Western blotting

*Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above/ Visit to any clinical testing laboratory for hands on experience of PCR Use*

*Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity*

#### UNIT-III:

3.1 Natural and Synthetic Cell cultures: primary culture, secondary culture, continuous cell lines

3.2 Organ culture; Cryopreservation of cultures.

3.3 Hybridoma Technology: Cell fusion, Production of Monoclonal antibodies (mAb), Applications of mAb

3.4 Stem cells: Types of stem cells, applications

*Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above/ Visit to any clinical testing laboratory for observation of various cultures*

*Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity*

#### UNIT-IV:

4.1 Manipulation of reproduction in animals: Artificial Insemination, In vitro fertilization

4.2 Manipulation of reproduction in animals: Super ovulation, Embryo transfer, Embryo cloning

4.3 Transgenic Animals: Strategies of Gene transfer;

4.4 Transgenic - sheep, - fish; applications



*H. T. T. T.*  
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*Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above/ Visit to laboratory for observation of Artificial Insemination, In vitro fertilization/model preparation of transgenic animal*  
*Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity*

#### UNIT-V:

5.1 DNA fingerprinting

5.2 Application of biotechnology in fisheries – monoculture in fishes, polyploidy in fishes

5.3 Gene therapy-application

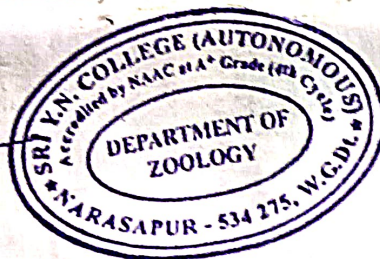
*Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above/Case study*  
*Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity*

#### REFERENCES BOOKS:

- Brown TA. (2010). Gene Cloning and DNA Analysis. 6th edition. Blackwell Publishing, Oxford, U.K.
- Clark DP and Pazdernik NJ. (2009). Biotechnology: Applying the Genetic Revolution. Elsevier Academic Press, USA
- Primrose SB and Twyman RM. (2006). Principles of Gene Manipulation and Genomics, 7th edition. Blackwell Publishing, Oxford, U.K.
- Sambrook J and Russell D. (2001). Molecular Cloning-A Laboratory Manual. 3rd edition. Cold Spring Harbor Laboratory Press
- Wiley JM, Sherwood LM and Woolverton CJ. (2008). Prescott, Harley and Klein's Microbiology. McGraw Hill Higher Education
- Brown TA. (2007). Genomes-3. Garland Science Publishers
- Primrose SB and Twyman RM. (2008). Genomics: Applications in human biology. Blackwell Publishing, Oxford, U.K.
- Animal Cells Culture and Media, D.C. Darling and S.J. Morgan, 1994. BIOS Scientific Publishers Limited.
- Methods in Cell Biology, Volume 57, Jennie P. Mathur and David Barnes, 1998. Animal Cell Culture Methods Academic Press.
- P.K. Gupta: Biotechnology and Genomics, Rastogi publishers (2003).
- B.D. Singh: Biotechnology, Kalyani publishers, 1998 (Reprint 2001)

Approved By:

1. *K. H. T.*



*M. T. J.*  
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**II: B.Sc., HONOURS IN ZOOLOGY: MAJOR**

**SEMESTER-III**

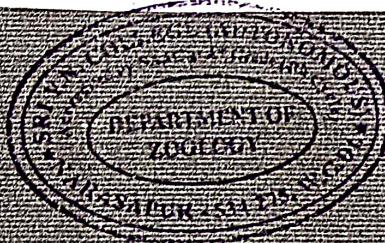
**COURSE-7-ANIAMAL BIOTECHNOLOGY**

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**Note:** The question paper setters are requested to adhere to the format given below.

| S.No. | UNIT | ESSAYS | SHORTS |
|-------|------|--------|--------|
| 1.    | I    | 2      | 2      |
| 2.    | II   | 2      | 2      |
| 3.    | III  | 2      | 1      |
| 4.    | IV   | 2      | 2      |
| 5.    | V    | 2      | 1      |

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ZOOLOGY: MAJOR- SEMESTER -III

Course-7-Animal Biotechnology

Model question Paper

Time: 3 hrs.

Max. Marks: 60

PART- A

- I. Answer any FIVE of the following questions. Draw a neat labelled diagram wherever necessary.  $5 \times 4 = 20$

- ✓ 1. PBR Vector
- ✓ 2. Enzymes
- ✓ 3. Gene gun
- ✓ 4. Microinjection
- ✓ 5. Cell fusion
6. Embryo cloning
- ✓ 7. Transgenic fish
8. Genome

PART-II

- II. Answer any FIVE of the following questions. Draw a neat labelled diagram wherever necessary.  $5 \times 8 = 40$

Section-A

- ✓ 9. Give an account of restriction enzymes in genetic engineering.
10. Describe about DNA ligases.
- ✓ 11. Write an essay on PCR.
- ✓ 12. Describe the techniques of Southern and Western blotting.
- ✓ 13. Explain the production and applications of mAb.



Section-B

14. Write an essay on different types of stem cells and their applications.
15. Write an essay on Artificial Insemination and In vitro fertilization.
16. Write an essay on transgenic animals and their applications.
17. Write an essay on techniques and its applications of DNA fingerprinting.
18. What is the Monoculture. Explain monoculture in fishes. Name the fishes suitable for monoculture.

\*\*\*\*\*

*M. J. J. J.*



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II B.Sc Theory syllabus for batch 202~~2~~<sup>3</sup> on words (w.e.f. 2024-2025)

**SEMESTER-III- ZOOLOGY: MAJOR**

**COURSE 8: EVOLUTION AND ZOOGEOGRAPHY**

Theory

Credits: 3

3 hrs/week

**LEARNING OBJECTIVES**

- To provide knowledge on origin of life, theories and forces of evolution
- To explore the evidences of evolution
- To Explain the theories of evolution
- To understand the role of variations and mutations in evolution of organisms
- To understand the zoogeographical distribution of animals

**LEARNING OUTCOMES:**

The overall course outcome is that the student shall develop deeper understanding of what life is and how it functions at cellular level. This course will provide students with a deep knowledge in Evolution and zoo geography, by the completion of the course the graduate shall able to –

- Understand the principles and forces of evolution of life on earth, the process of evolution of new species and apply the same to develop new and advanced varieties of animals
- Explain the different evidences of evolution
- Understand the theories of evolution
- Explain the various tools for evolution
- Map the distribution of animals according to zoological realms

**SYLLABUS:**

**UNIT-I**

1.1 Origin of life: different ancient concepts -Origin of Earth and Solar system: Big Bang theory, Primitive atmosphere, formation of macromolecules

1.2 Biological evolution: Coacervates, Microspheres, formation of Nucleic acids, Nucleoproteins

1.3 Formation of primary organisms, evolution of modes of nutrition, oxygen revolution, present day atmosphere, evolution of eukaryotes.

*Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above*

*Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity*



## UNIT-II

- 2.1 Palaeontological and taxonomical evidences of evolution
- 2.2 Morphological and anatomical evidences of evolution
- 2.3 Embryological and physiological evidences of evolution

*Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above/Visit to Archaeological Museum for observation of fossils*  
*Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity*

## UNIT -III

- 3.1 Lamarckism-Neo Lamarckism
- 3.2 Darwinism-Theory of Natural selection
- 3.3 Modern synthetic theory of evolution (Neo Darwinism)

*Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above*  
*Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity*

## UNIT-IV

- 4.1 Variations-types-sources of variations- importance in evolution
- 4.2 Mutations-classification-causes-significance in evolution
- 4.3 Isolation mechanisms-role in evolution

*Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above*  
*Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity*

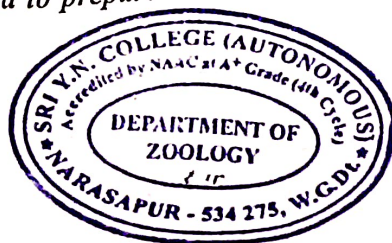
## UNIT-V

- 5.1 Zoogeographical realms – Palearctic & Nearctic regions
- 5.2 Zoogeographical realms – Neotropical & Ethiopian regions
- 5.3 Zoogeographical realms – Oriental & Australian regions

*Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above/Case study on the observation of fauna in the college locality/in the residential area*  
*Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity*

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**II: B.Sc., HONOURS IN ZOOLOGY: MAJOR**

**SEMESTER-III**

**COURSE-8-EVOLUTION & ZOOGEOGRAPHY**

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**Note:** The question paper setters are requested to adhere to the format given below.

| S.No. | UNIT | ESSAYS | SHORTS |
|-------|------|--------|--------|
| 1.    | I    | 2      | 1      |
| 2.    | II   | 2      | 1      |
| 3.    | III  | 2      | 2      |
| 4.    | IV   | 2      | 2      |
| 5.    | V    | 2      | 2      |

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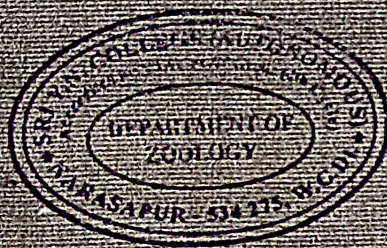
Co-curricular activities (Suggested)

- Chart on industrial melanism to teach directed selection, Darwin's finches to teach genetic drift, collection of data on weight of children born in primary health centres to teach stabilizing selection etc.

#### REFERENCES BOOKS:

- Ridley, M. (2004). Evolution. III Edition. Blackwell Publishing
- Hall, B. K. and Hallgrimsson, B. (2008). Evolution. IV Edition. Jones and Bartlett Publishers
- Douglas, J. Futuyma (1997). Evolutionary Biology. Sinauer Associates.
- Minkoff, E. (1983). Evolutionary Biology. Addison-Wesley.
- Organic evolution by Organic evolution by Dr. Veer Bala Rastogi, 2019 Kedar Nath Ramnath
- Palaeontology and Zoogeography Organic evolution by Dr. Veer Bala Rastogi, 2019 Kedar Nath Ramnath
- Rastogi VB. 1991. *Organic Evolution*. Kedar Nath Ram Nath Publications, Meerut, Uttar Pradesh, India.
- Stahl FW. 1965. *Mechanics of Inheritance*. Prentice-Hall.
- White MJD. 1973. *Animal Cytology and Evolution*. Cambridge Univ. Press

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**ZOOLOGY: MAJOR-SEMESTER -III**

**Course-8-Evolution and Zoogeography**

**Model question Paper**

Time: 3 hrs.

Max. Marks: 60

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**PART- A**

- I. Answer any FIVE of the following questions. Draw a neat labelled diagram wherever necessary. 5 x 4 = 20

1. Big bang theory
2. Anatomical evidences( any two)
3. Natural selection
4. Gene mutations
5. Neo Darwinism
6. Selective mating
7. Sexual selection
8. Isolation

**PART-II**

- II. Answer any FIVE of the following questions. Draw a neat labelled diagram wherever necessary. 5 x 8 = 40

**Section-A**

9. Write about Origin of Life. Add note on different ancient concepts.
10. Write about the evolution of Eukaryotes.
11. Write about the Paleontological evidences of Evolution.
12. Write about the Physiological evidences of Evolution.
13. Describe the evolutionary theory of Lamarck.



Section-B

14. Write an essay on the modern synthetic theory of evolution.(Neo Darwinism)
15. Write an essay on types and sources of variations.
16. Define mutations. And explain about the classification of mutations.
17. Describe the climatic features and fauna of Ethiopian region.
18. Describe the climatic features and fauna of Oriental region.

\*\*\*\*\*

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SRI Y.N.COLLEGE(Autonomous), Narsapur

Affiliated to Adikavi Nannaya University

III B.Sc. (H) Zoology

Minor Syllabus for theory

Semester V : Course : **5 : POULTRY MANAGEMENT-I (POULTRY FARMING)**

(for 2023-26 batch w. e. f 2025-2026)

### LEARNING OUTCOMES:

Students at the successful completion of the course will be able to

- Evaluate the status of Indian Poultry Industry
- Explain the Scientific Poultry keeping
- Compare the diversified Poultry practices
- Inspect the different breeds of chicken

### SYLLABUS:

#### Unit 1 Indian poultry Industry:

- 1.1 Importance of poultry farming and poultry development in India.
- 1.2 Present status and future prospectus of poultry Industry
- 1.3 Classification of poultry based on genetics Utility

#### Unit -2 Scientific Poultry Keeping

- 2.1 Modern breeds of Chicken
- 2.2 Present day egg production lines- meat production lines
- 2.3 Mini breeds- dwarfism in mini-Leghorns

#### Unit-3 Diversified Poultry

- 3.1 Ducks and Geese-classification- rearing system-classification-advantages
- 3.2 Guinea fowls - guinea fowl farming in India-Production-varieties
- 3.3 Emu-rearing- Economical aspects-commercial products

#### Unit-4 Desi Chickens:

- 4.1 Indigenous breeds and economical aspects of desi chicken
- 4.2 Indigenous breeds-Aseel-Chittagong-Kadaknath-Bursa
- 4.3 Improved varieties in India – Giriraja-Vanaraja-Girirani-Kalinga brown, Gramapriya, Swarnandhra

#### Unit -5 Breeds from Central Avian Research Institute – Izatnagar

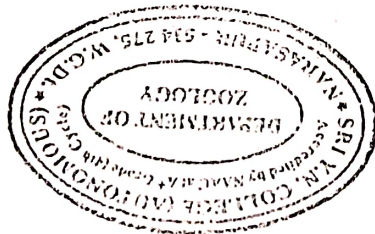
- 5.1 CARI Nirbheek - CARI- Shyama-HITCARI (Naked Neck Cross)
- 5.2 CARI- Priya Layer, CARI- Sonali Layer
- 5.3 CARIBRO-VISHAL, CARI-RAINBRO
- 5.4 Nandanam chicken-I, Nandanam Chicken-II, Nandanm-Quail

### REFERENCES:

1. Text Book of Poultry Science, P V Sreenivasaiah, Write and Print Publications, ISBN No. 9788192970592, 8192970590
2. Poultry Science Practices, Nilothpal Ghosh, CBS Publication & Distributions, 2015
3. Principles of Poultry Science, 1996, CAB Publishers, ISBN 9780851991221
4. A Text Book of Animal Husbandry, C. C. Banerjee, Oxford and IBH, PVT. LTD., ISBN: 9788120412606

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1. *K. H. D.*  
2. *J. M. M.*



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SRI Y.N.COLLEGE(Autonomous), Narsapur  
Affiliated to Adikavi Nannaya University  
III B.Sc. (H) Zoology Minor

Semester V : Course : 5 : POULTRY MANAGEMENT-I (POULTRY FARMING)  
Model Question Paper(for 2023-26 batch w. e. f 2025-2026)

Time: 3Hrs

Max. Marks:60

I. Answer any five of the following questions. Draw a neat diagram wherever necessary.

5 x 4= 20M

**PART - I**

1. Cage system
2. Broiler management
3. Caster egger
4. Orpington
5. Types of Duck
6. Duck farming
7. Broilers and layers
8. CARI – Swetambari

**PART – II**

II. Answer any five of the following questions choosing atleast two questions from each section. Draw a diagram wherever necessary.

5 x 8 = 40M

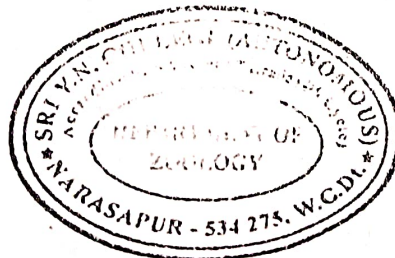
**SECTION – A**

9. Define Poultry Farming. Explain in detail about the past and present scenario of poultry industry in India.
10. What are poultry houses? Explain in detail about the layout of a poultry farm.
11. Write an essay on <sup>modern</sup> many breeds of Poultry farming.
12. Explain in detail about present day egg and meat production lines.
13. Explain detail about the anatomy of duck.

**SECTION – B**

14. Give a brief account on duck rearing system.
15. Explain about the exotic breeds.
16. Write about the improved varieties of chicken in India.
17. What is CARI and mention its importance in detail.
18. Mention from breeds from CARI Izafnagar.

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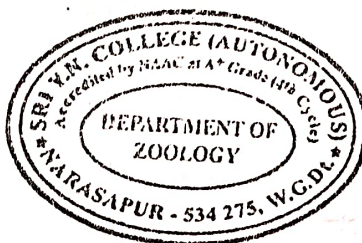
Semester V : Course : 5 : POULTRY MANAGEMENT-I (POULTRY FARMING)

Note : The question paper setters are requested to adhere to the format give below.

| S.No | Unit | Essays | Shorts |
|------|------|--------|--------|
| 1    | I    | 2      | 2      |
| 2    | II   | 2      | 2      |
| 3    | III  | 2      | 2      |
| 4    | IV   | 2      | 1      |
| 5    | V    | 2      | 1      |

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III B.Sc. (II) Zoology Minor Syllabus for theory

Semester V : Course : 6 : POULTRY MANAGEMENT-I  
(POULTRY PRODUCTION AND MANAGEMENT)

(for 2023-26 batch w. e. f 2025-2026)

### **LEARNING OUTCOMES:**

Students at the successful completion of the course will be able to

- Suggest measure for Health care in Poultry
- Evaluate the economics of poultry production
- Elaborate the poultry Breeder flock management
- Differentiate the poultry hatchery practices

### **SYLLABUS:**

#### **Unit 1 HEALTH CARE:**

- 1.1 Common poultry diseases: bacterial, viral, fungal, parasitic and nutritional deficiencies.
- 1.2 Vaccination schedule for commercial layers and broilers: factors that govern vaccination schedule; vaccination principles type, methods, pre and post vaccination care.
- 1.3 Disinfection: Types of disinfectants; mode of action; recommended procedure; precaution and handling.

#### **Unit -2 ECONOMICS**

- 2.1 Economics of layer and broiler production
- 2.2 Projects reports in different systems of rearing for layer & broilers.
- 2.3 Feasibility studies on poultry rearing- in context of small units and their profitability.
- 2.4 Export/import of poultry and poultry products.

#### **Unit-3 BREEDER FLOCK MANAGEMENT**

- 3.1 Layer and broiler breeder flock management housing & space requirements
- 3.2 Different stage of management during life cycle; Light management during growing and laying period, Artificial insemination.
- 3.3 Feeding: Feed restriction, separate male feeding. Nutrient requirement of layer and broiler breeders of different age groups..

#### **Unit-4 BREEDER HEALTHCARE**

- 4.1 Vaccination of breeder flock; difference between vaccination schedule of broilers and commercial birds.
- 4.2 Common diseases of breeders (Infectious and metabolic disorders)-prevention.
- 4.3 Fertility disorder- etiology, diagnosis and corrective measures. Selection and culling of breeder flocks



**Unit -5 HATCHERY PRACTICES**

- 5.1 Management principles of incubation.
- 5.2 Factors affecting fertility and hatchability. Selection, care and incubation of hatching eggs. Fumigation; sanitation and hatchery hygiene.
- 5.3 Importance of hatchery records, break even analysis of unhatched eggs.
- 5.4 Computer applications for hatchery management

**REFERENCES:**

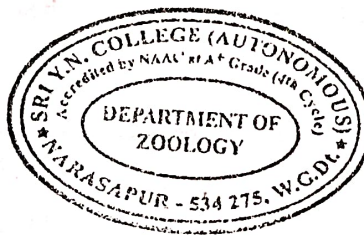
1. HVS Chauhan, S. Roy, Poultry Diseases, Diagnosis and Treatment, New Age International Publishers-2018

**Web resources:**

2. <https://www.drivet.in/p/e-books.html>
3. <https://byjus.com/biology/animal-husbandry-poultry-farming/>
4. [https://www.helpforag.app/2018/02/livestock-production-and-management-lpm\\_14.html?m=1](https://www.helpforag.app/2018/02/livestock-production-and-management-lpm_14.html?m=1)

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2: *J. M. S.*



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III B.Sc. (H) Zoology Minor  
Semester V : Course : 6 : POULTRY MANAGEMENT-II  
(POULTRY PRODUCTION AND MANAGEMENT)  
Model Question Paper(for 2023-26 batch w. e. f 2025-2026)

Time: 3Hrs

Max. Marks:60

I. Answer any five of the following questions. Each question carries four marks. Draw a neat diagram wherever necessary.

5 x 4 = 20M

PART - I

1. Bacterial diseases in Poultry
2. Nutritive requirement in Poultry Birds
3. By - product of Poultry
4. Commercial breeders
5. Characteristics of Good Semen
6. Feeder and types of Feeders
7. Culling
8. Fumigation

PART - II

II. Answer any five of the following questions choosing atleast two questions from each section. Each question carries eight marks. Draw a diagram wherever necessary.

5 x 8 = 40M

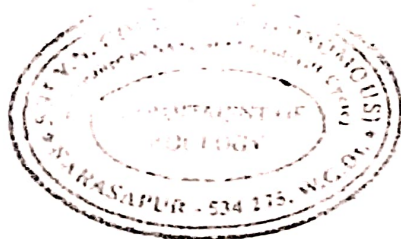
SECTION - A

9. What are the common diseases in Poultry Birds.
10. Explain in detail about the vaccination programme in Poultry.
11. Write in detail about the economics of layer and broiler production.
12. Write brief notes on packing and transport of Eggs.
13. Write about the process of Artificial in semination of Poultry.

SECTION - B

14. What includes Poultry Feed? Explain about the principles of feeding in Poultry.
15. Write the differences in vaccination schedule of broilers and commercial birds.
16. Write short note on diseases internal parasites or endoparasites of Poultry.
17. What is Hatching? Explain various methods of Hatching.
18. Write in detail about Hatchery records and maintenance.

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2. *J. Mani*



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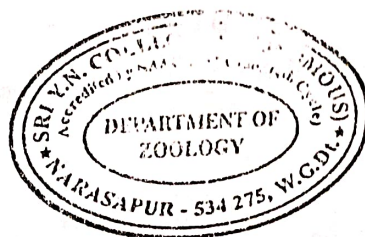
Semester V : Course : ~~S~~ : POULTRY MANAGEMENT-II  
(POULTRY PRODUCTION AND MANAGEMENT)

Note : The question paper setters are requested to adhere to the format give below.

| S.No                   | Unit | Essays | Shorts | Marks allotted to the unit |
|------------------------|------|--------|--------|----------------------------|
| 1                      | I    | 2      | 2      | 24                         |
| 2                      | II   | 2      | 2      | 24                         |
| 3                      | III  | 2      | 2      | 4                          |
| 4                      | IV   | 2      | 1      | 20                         |
| 5                      | V    | 2      | 1      | 20                         |
| Total including choice |      |        |        | 112                        |

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2. *J. M. S.*



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**III B.Sc. (H) Zoology Major Semester V Syllabus for theory**

**Course : 14 : SUSTAINABLE AQUACULTURE MANAGEMENT  
(for 2023-26 batch w. e. f 2025-2026)**

**Learning Outcomes:**

Students at the successful completion of this course will be able to

- Evaluate the present status of aquaculture at the Global level and National level
- Classify different types of ponds used in aquaculture
- Demonstrate induced breeding of carps
- Acquire critical knowledge on commercial importance of shrimps
- Identify fin and shell fish diseases

**Unit:1**

- 1.1 Present status of Aquaculture – Global and National scenario
- 1.2 Major cultivable species for aquaculture: freshwater.
- 1.3 Extensive, semi-intensive and intensive cultures of fish
- 1.4 Design and construction of fish farm

**Unit:2**

- 2.1 Functional classification of ponds – head pond, hatchery, nursery ponds
- 2.2 Functional classification of ponds -rearing, production, stocking and quarantine ponds
- 2.3 Need of fertilizer and manure application in culture ponds
- 2.4 Physio-chemical conditions of soil and water optimum for culture (Temperature, depth, turbidity, light, water, PH, CO<sub>2</sub> and nutrients)

**Unit:3**

- 3.1. Induced breeding in fishes
- 3.2. Culture of Indian major carps: Pre-stocking management (Dewatering, drying, ploughing/desilting; Predators, weeds and algal blooms and their control, Liming and fertilization)

**Unit:4**

- 4.1 Commercial importance of shrimp & prawn
- 4.2 Macrobrachium rosenbergii-biology, seed production.
- 4.3 Mixed culture of fish and prawns

**Unit:5**

- 5.1 Viral diseases of Fin Fish & shellfish
- 5.2 Fungal diseases of Fin & Shellfish
- 5.3 Bacterial diseases of Finfish & Shell fish



### References:

1. PillayTVR & M.A.Dill, 1979. Advances in Aquaculture. Fishing News Books Ltd., London
2. StickneyRR 1979. Principles of Warm Water Aquaculture. John Wiley & Sons Inc.1981
3. Boyd CE 1982. Water Quality Management for Pond Fish Culture. Elsvier Scientific Publishing Company.
4. Bose AN et.al. 1991. Costal Aquaculture Engineering. Oxford & IBH Publishing Company Pvt. Ltd. Web resources

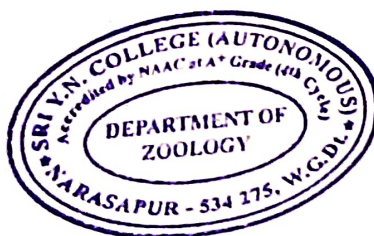
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Note: The question paper setters are requested to adhere to the format given below.

| Unit No.                     | Essay questions | Short Questions | Marks allotted to the Unit | Remarks           |
|------------------------------|-----------------|-----------------|----------------------------|-------------------|
| Unit - 1                     | 2               | 2               | 24                         | 2 Essay Questions |
| Unit - 2                     | 2               | 2               | 24                         | 2 Essay Questions |
| Unit - 3                     | 2               | 1               | 20                         | 2 Essay Questions |
| Unit - 4                     | 2               | 2               | 24                         | 2 Essay Questions |
| Unit - 5                     | 2               | 1               | 20                         | 2 Essay Questions |
| Total Marks including Choice |                 |                 | 112                        |                   |

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III B.Sc. (H) Zoology Major Semester V  
Course : 14 : SUSTAINABLE AQUACULTURE MANAGEMENT  
(for 2023-26 batch w. e. f 2025-2026)  
Model Question Paper

Time : 3Hrs

Max.Marks:60

SECTION – I

Answer any FIVE of the following. Draw labelled diagrams wherever necessary.  
5 x 4 = 20M

1. Food fishes of Fresh water
2. Intensive farming
3. Nursery ponds
4. Manure applications in culture ponds
5. Stocking management
6. Commercial importance of prawns
7. Mixed culture
8. Fungal diseases of fin fish

Answer any FIVE questions choosing atleast two from each section. Draw labelled diagrams wherever necessary.

5 x 8 = 40M

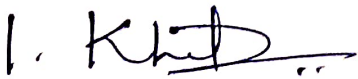
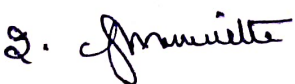
SECTION – II

9. What is the current status of aquaculture at global and national level?
10. Give an account of the design and construction of culture ponds.
11. Describe the organic and inorganic fertilizers used in fresh water culture ponds.
12. Write an essay on physical – chemical characters of fresh water culture ponds.
13. Write an essay on induced breeding technique if fishes.

SECTION – III

14. Describe the detailed account on Aquatic weeds and their control in Aquaculture ponds.
15. Write an essay on biology of Macro branchium Rosenberg.
16. Write an essay on mixed culture of fish and prawns.
17. Give an account on viral diseases of fishes.
18. Give an account on Bacterial diseases of fin fish and shell fish.

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**III B.Sc. (H) Zoology Major Semester V Syllabus for Practical**  
**Course : 14 : SUSTAINABLE AQUACULTURE MANAGEMENT**  
(for 2023-26 batch w. e. f 2025-2026)

**LEARNING OUTCOMES:**

On successful completion of this practical course, student shall be able to:

- Identify the characters of Fresh water cultivable species
  - Estimate physico chemical characteristics of water used for aquaculture
  - Examine the diseases of fin and shell fish
  - Suggest measures to prevent diseases in aquaculture
1. Fresh water Cultivable species any (Fin & Shell Fish Specimens – Observation of morphological characters by observation and drawings)-5
  2. Brackish water cultivable species (Fin & Shell fish- Specimens- Observation of Morphological Character by observing drawing) -5
  3. Hands on training on the use of kits for determination of water quality in aquaculture (DO, Salinity, pH, Turbidity- Testing kits to be used for the estimation of various parameters/ Standard procedure can be demonstrated for the same)
  4. Demonstration of Hypophysation (Procedure of hypophysation to be demonstrated in the practical lab with any edible fish as model)
  5. Viral diseases of Fin & Shell Fish (Observation of his to pathological slides / Charts/ Models of viral pathogens in fin/ shell fish – one edible specimen can be used for observation of same in the laboratory)
  6. Bacterial diseases of Fin & Shell Fish (Observation of his to pathological slides / Charts/ Models of Bacterial pathogens in fin/ shell fish – One edible specimen can be used for observation of same in the laboratory)
  7. Fungal diseases of Fin & Shell Fish (Observation of his to pathological slides / Charts/ Models of Bacterial pathogens in fin/ shell fish – One edible specimen can be used for observation of same in the laboratory)

**Lab References:**

1. Boyd CE 1982. Water Quality Management for Pond Fish Culture. Elsevier Scientific Publishing Company

**Co-Curricular Activities**

**Mandatory:** (Student training by teacher in field skills: Total 15 hrs., Lab: 10 + field 05)

For Teacher: Training of students by the teacher in laboratory/field for not less than 15 hours on Breeding- Induced breeding in carps - hatchery technology of L. Vennami- Farming techniques- disease diagnostic techniques—concepts – Demonstration @ any aqua laboratory

For Student: Students shall (individually) visit a Hatchery/Farm/ Aqua diagnostic center and make careful observation of the process method and implements- protocols and report on the same in 10 pages hand written Fieldwork/Project work Report.

Max marks for Fieldwork/Project work Report: 05.

Suggested Format for Fieldwork/Project work: Title page, student details, index page, details of place visited, observations made, findings and acknowledgements.



SRI Y.N.COLLEGE(Autonomous), Narsapur  
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III B.Sc. (II) Zoology Major Semester V  
Course : 14 : SUSTAINABLE AQUACULTURE MANAGEMENT  
(for 2023-26 batch w. e. f 2025-2026)  
Practical Model Question Paper

Time : 3Hrs

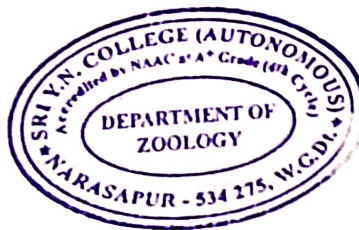
Max.Marks:50

1. Fresh water cultivable species any three \_\_\_\_\_ 3 x 5 = 15M  
A  
B  
C
2. Determination of water quality in \_\_\_\_\_ 10M
3. Viral diseases ( identify, draw and comment on ) 3 x 5 = 15M  
A  
B  
C
4. Record + Viva 10M

Total :

50M

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**III B.Sc. (II) Zoology Major Semester V Syllabus for theory**

**Course : 15 : POST HARVEST TECHNOLOGY OF FISH AND FISHERIES**  
**(for 2023-26 batch w. e. f 2025-2026)**

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**Learning Outcomes:**

Students at the successful completion of this course will be able to

- Identify the types of preservation methods employed in aquaculture
- Choose the suitable Processing methods in aquaculture
- Maintain the standard quality control protocols laid down in aqua industry
- Identify the best Seafood quality assurance system

**Unit – I Handling and Principles of fish Preservation**

- 1.1 Handling of fresh fish, storage and transport of fresh fish, post mortem changes (rigor mortis and spoilage), spoilage in marine fish and freshwater fish.
- 1.2 Principles of preservation – cleaning, lowering of temperature, rising of temperature, denudation, use of salt, use of fish preservatives, exposure to low radiation of gamma rays.

**Unit – II Methods of fish Preservation**

- 2.1 Traditional methods - sun drying, salt curing, pickling and smoking.
- 2.2. Advanced methods – chilling or icing, refrigerated sea water, freezing, canning,

**Unit–III Processing and preservation of fish and fish by-products**

- 3.1 Fish products – fish minced meat, fish meal, fish oil, fish liquid (ensilage), fish protein concentrate, fish chowder, fish cake, fish sauce, fish salads, fish powder, pet food from trash fish, fish manure.
- 3.2 Fish by-products – fish glue, Using glass, chitosan, pearl essence, shark fins, fish Leather and fish maws.

**Unit–IV Sanitation and Quality control**

- 4.1 Sanitation in processing plants-Environmental hygiene and Personal hygiene in processing plants.
- 4.2 Quality Control of fish and fishery products – pre-processing control, control during processing and control after processing.

**Unit–V Quality Assurance, Management and Certification**

- 5.1 Seafood Quality Assurance and Systems: Good Manufacturing Practices (GMPs); Good Laboratory Practices (GLPs); Standard Operating Procedures (SOPs); Concept of Hazard Analysis and Critical Control Points (HACCP) in seafood safety.
- 5.2 National and International standards–  
ISO9000:2000 Series of Quality Assurance System, Codex Alimentarius.



**References:**

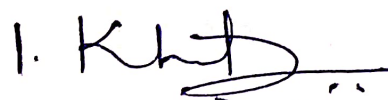
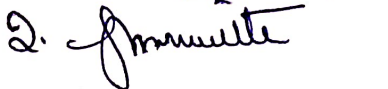
1. Santharam R, N Sukumaran and P Natarajan 1987. A manual of aquaculture, Oxford-IBH, NewDelhi
2. Lakshmi Prasad's, Fish Processing Technology 2012, Arjun Publishing House
3. DrSunitha Rai, Fish Processing Technology, 2015, Random Publications
4. Safety and Quality Issues in Fish Processing (Woodhead Publishing Series in Food Science, Technology and Nutrition) by H A Bremner
5. K.A Mahanthy, Innovations in Fishing and Fish Processing Technologies, January 2021

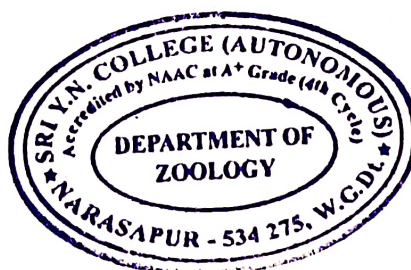
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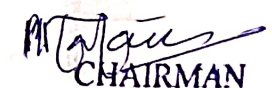
Note: The question paper setters are requested to adhere to the format given below.

| Unit No.                     | Essay questions | Short Questions | Marks allotted to the Unit | Remarks           |
|------------------------------|-----------------|-----------------|----------------------------|-------------------|
| Unit - 1                     | 2               | 1               | 20                         | 2 Essay Questions |
| Unit - 2                     | 2               | 2               | 24                         | 2 Essay Questions |
| Unit - 3                     | 2               | 2               | 24                         | 2 Essay Questions |
| Unit - 4                     | 2               | 2               | 24                         | 2 Essay Questions |
| Unit - 5                     | 2               | 1               | 20                         | 2 Essay Questions |
| Total Marks including Choice |                 |                 | 112                        |                   |

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**III B.Sc. (H) Zoology Major Semester V Syllabus for Practical**

**Course : 15 : POST HARVEST TECHNOLOGY OF FISH AND FISHERIES**

**(for 2023-26 batch w. e. f 2025-2026)**

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**LEARNING OUTCOMES:**

On successful completion of this practical course, student shall be able to:

- Identify the quality of aqua processed products.
- Determine the quality of fishery products by observation
- Analyze the protocols of aqua processing methods

**Syllabus**

1. Evaluation of fish/ fishery products for organoleptic, chemical and microbial quality.
2. Preparation of dried, cured and fermented fish products
3. Examination of salt, protein, moisture in dried / cured products
4. Examination of spoilage of dried / cured fish products, marinades, pickles, sauce.
5. Preparation of isinglass, collagen and chitosan from shrimp and crab shell.
6. Developing flow charts and exercises in identification of hazards – preparation of hazard analysis worksheet
7. Corrective action procedures in processing of fish- flow chart- work sheet preparation.

**References:**

DrSunithaRai, Fish Processing Technology, 2015, Random Publications

**Co-Curricular Activities**

**Mandatory:**

1. For Teacher: Training of students by the teacher in laboratory/field in various steps of post-harvest techniques of fishes, on the advanced techniques in post-harvest technology – Training of students on other employability skills in the Post-harvest sector of Aquaculture Industry- like Processing, Packing, marketing of processed aqua products.
2. For Student: Students shall (individually) visit - Any fish/shrimp Processing Plant/Packing industry and make observations on post harvesting techniques and submit a brief handwritten Fieldwork/Project work Report with pictures and data /survey in 10 pages.
3. Max marks for Fieldwork/Project work Report: 05. 4. Suggested Format for Fieldwork/Project work: Title page, student details, index page, details of place visited, observations made, findings and acknowledgements



SRI Y.N.COLLEGE(Autonomous), Narsapur  
Affiliated to Adikavi Nannaya University  
III B.Sc. (H) Zoology Major Semester V Syllabus for theory  
Course : 15 : POST HARVEST TECHNOLOGY OF FISH AND FISHERIES  
(for 2023-26 batch w. e. f 2025-2026)  
Model Question Paper

Time : 3Hrs

Max.Marks:60

**SECTION – I**

Answer any FIVE of the following. Draw labelled diagrams wherever necessary.  
5 x 4 = 20M

1. Transport of fresh fish
2. Smoking
3. Canning
4. Fish oils
5. Fish maws
6. Personal Hygiene in processing plants
7. Good Manufacturing Practices (GMPs)
8. SOPs

Answer any FIVE questions choosing atleast two from each section. Draw labelled diagrams wherever necessary.

5 x 8 = 40M

**SECTION – II**

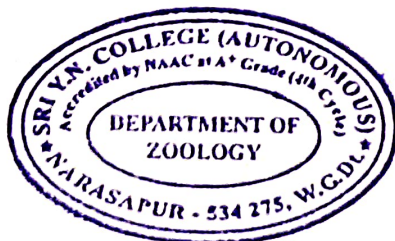
9. Write an essay on different ways through which fish get spoiled.
10. Describe various principles followed for preservation of fish.
11. Give an account on Traditional methods of Fish Preservation.
12. Write an essay on advanced methods of Fish Preservation.
13. Explain about various products obtained from fish.

**SECTION –III**

14. Give an account on the fish by products and their importance.
15. Describe the role of environmental by products hygiene in sea food industry.
16. Explain the significance of quality control in food industry.
17. Write an essay on HACCP in Sea Food Industry
18. What do you understand by ISO 9000:2000 standard series of quality assurance system.

**APPROVED**

1. *K. H. J.*  
2. *J. M. V.*



*M. J. J.*  
CHAIRMAN  
BOARD OF STUDIES  
DEPARTMENT OF ZOOLOGY  
Sri Y.N. College (Autonomous)  
Accredited by NAAC at A+ Grade (1st Cycle)  
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Practical Model Question Paper

Time : 3Hrs

Max.Marks:50

1. Evolution of Fish\_\_\_\_\_

15 M

2. Preparation of \_\_\_\_\_procedure method

10M

3. Examination of \_\_\_\_\_products

3 x 5 = 15M

A

B

C

4. Record + Viva

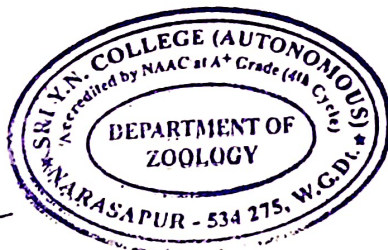
5 + 5 = 10M

Total :

50M

APPROVED

1. *Khit*  
2. *Immuille*



*M. Talwar*

CHAIRMAN

BOARD OF STUDIES

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Sri Y.N. College (Autonomous)

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