

**SRI VENKATESWARA UNIVERSITY :: TIRUPATI****FIRST YEAR B.Sc. ZOOLOGY****FIRST SEMESTER****Revised Syllabus Under CBCS W.E.F. 2020-21****STRUCTURE**

<b>YEAR</b>	<b>SEM</b>	<b>PAPER</b>	<b>TITLE</b>	<b>MARKS (100)</b>		<b>CREDITS</b>
				<b>MID SEMESTER</b>	<b>END SEMESTER</b>	
<b>I</b>	<b>I</b>	<b>I</b>	Animal Diversity – I	25	75	04
			Biology of Non-Chordates			
			Practical - I	25	75	01
	<b>II</b>	<b>II</b>	Animal Diversity – II	25	75	04
Biology of Chordates						
		Practical - II	25	75	01	
<b>II</b>	<b>III</b>	<b>III</b>	Cell biology, Genetics, Molecular Biology & Evolution	25	75	04
			Practical - III	25	75	01
	<b>IV</b>	<b>IV</b>	Physiology, Cellular Metabolism & Embryology	25	75	04
			Practical - IV	25	75	01
		<b>V</b>	Immunology & Animal Biotechnology	25	75	04
			Practical - V	25	75	01

**SRI VENKATESWARA UNIVERSITY :: TIRUPATI**

**FIRST YEAR B.Sc. ZOOLOGY**

**FIRST SEMESTER**

**Revised Syllabus Under CBCS W.E.F. 2020-21**

**(With Chemistry, Botany and Zoology Disciplines)**

As per the **National Education Policy, 2019 the outcomes of Higher Education** include increased critical thinking abilities, higher order thinking and deeper learning, mastery of content, problem solving, team work and communication skills besides general engagement and enjoyment of learning including systematic research in India.

The overall objectives of the learning outcomes-based curriculum framework are to:

- Help formulate graduate attributes, qualification descriptors, programme learning outcomes and course learning outcomes that are expected to be demonstrated by the holder of a qualification;
- Enable prospective students, parents, employers and others to understand the nature and level of learning outcomes (knowledge, skills, attitudes and values) or attributes a graduate of a programme should be capable of demonstrating on successful completion of the programme of study.

**Programme Educational Objectives (PEOs):**

**PEO1 Higher Education:** Empower students to pursue higher studies in various fields of Biology and Chemistry.

**PEO2 Career:** Enable students to pursue careers in Chemical, Biological and related fields as demonstrated by professional success at positions within industry, government, or academia. **PEO3 Social responsibility:** Enable students to exhibit professionalism, ethical attitude, communication skills and team work in their profession.

**Program Outcomes (POs):**

The Learning Outcomes of the programme could be in consonance with the Bloom's Taxonomy, which includes –

1. Remember (Lower order)
2. Understand (Lower Order)
3. Apply (Lower Order)
4. Analyze (Higher Order)
5. Evaluate & Problem Solving (Higher Order)
6. Create (Higher Order)

**PO1Critical thinking:** Able to understand and utilize the principles of scientific enquiry, think analytically, clearly and evaluate critically while solving problems and making decisions during biological study.

**PO2Effective communication:** Able to formally communicate Scientific ideas and investigations of the biology discipline to others using both oral and written communication skills.

**PO3Social interaction:** Able to develop individual behaviour and influence society and social structure.

**PO4Effective citizenship:** Able to work with a sense of responsibility towards social awareness and follow the ethical standards in the society.

**PO5Ethics:** Ability to demonstrate and discuss ethical conduct in scientific activities. **PO6Environment and Sustainability:** Able to understand the impact of biological science in societal and environmental contexts and demonstrate the knowledge for sustainable development.

**PO7Self-directed and life-long learning:** Able to recognize the need of life-long learning and engage in research and self-education.

**Domain Subject: ZOOLOGY**

***(Syllabus with Outcomes, Co-curricular Activities,  
References & Model Q.P for Five Courses of 1, 2, 3, 4 & 5  
Semesters)***

“The domain subject “Zoology”, embracing the fields of Animal diversity, Cell biology, Genetics, evolution, Animal physiology, Biochemistry, Embryology, Immunology, Molecular biology and Ecology gives the student a broad understanding of faunal diversity, various life processes involved in the development of an animal, its functioning, its response to environmental stimuli, molecular basis of life, new technological approach towards life, an insight for the lecturer into research and responsibility of the student towards environment”.

## GENERAL CURRICULAR ACTIVITIES

### Lecturer-based:

- 1) **Class-room activities:** Organization of Group discussions, question-answer sessions, scientific observations, use of audio-visual aids, guidance programmes, examination and evaluation work (scheduled and surprise tests), quizzes, preparation of question banks, student study material, material for PG entrance examinations etc.
- 2) **Library activities:** Reading books and magazines taking notes from prescribed and reference books and preparation of notes on lessons as per the syllabus; Reading journals and periodicals pertaining to different subjects of study; Making files of news- paper cuttings etc.
- 3) **Lab activities:** Organization of practicals, maintenance of lab attendance registers/log registers, maintenance of glassware and chemicals
- 4) **Activities in the Seminars, workshops and conferences:** Organization of at least one seminar/workshop/conference per academic year either on academic/research aspects and inculcate research spirit among students
- 5) **Research activities:** Student study projects (General / RBPT model), Minor or Major research projects, Research guidance to research scholars, Publication of research articles/papers (at least one in 2 years) in UGC-recognized journals, Registration in Vidwan/Orcid/Scopus/Web of Science
- 6) **Smart Classroom Activities:** Organization of Departmental WhatsApp groups, Ed Modo groups/Google Class Rooms/Adobe Spark groups for quick delivery of the subject; Preparation of Moocs content & presentation tube lessons by trained lecturers; Using smart/digital/e- class rooms (mandatory) wherever present; Utilization of youtube videos (subject to copy rights) etc.

### **Student-based:**

- 1) **Class-room activities:** Power point presentations, seminars, assignments
- 2) **Library activities:** Visit to library during library hour and preparation of notes
- 3) **Lab activities:** Maintenance of observation note book and record, keeping lab clean and tidy
- 4) **Activities in the Seminars, workshops and conferences:** Participation/presentation in seminar/workshop/conference

## **CO-CURRICULAR ACTIVITIES**

### **OBJECTIVES:**

The co-curricular activities are aimed at strengthening the theoretical knowledge with an activity related to the content taught in the class room. The aesthetic development, character building, spiritual growth, physical growth, moral values, creativity of the student.

The different types of co-curricular activities relevant to Zoology domain are listed

below:



#### **Academic - based**

Preparation of Charts/Clay or Thermocol Models Debates,  
Essay Writing Competitions

Group Discussions

Departmental (Zoology) magazine Formation of Book clubs

Animal album-making Viva-Voce



#### **Lab/Research -based**

Digital dissections

Field Visit/Excursions/Zoological Tours and submission of  
report Training at research centres

(aquaculture/apiculture/sericulture etc.) Exposure to  
scientific instruments and hands-on experience

➤ **Value - based**

Organization of first-aid camp, swachhbharat, cleanliness week, girl-child importance, Nutrition and health awareness etc.

➤ **Observation of Days of National/International Importance**

World Cancer Day (February 4 <sup>th</sup> )	International Biological Diversity Day (May 22 <sup>nd</sup> )
Darwin Day (February 12 <sup>th</sup> )	World Turtle Day (May 23 <sup>rd</sup> )
National Science Day (Feb 28 <sup>th</sup> )	World blood Donor Day (June 14 <sup>th</sup> )
World Wildlife day (March 3 <sup>rd</sup> )	World Zoonoses Day (July 6 <sup>th</sup> )
National Vaccination Day (March 16 <sup>th</sup> )	World Mosquito Day (August 20 <sup>th</sup> )
World Health Day (April 7 <sup>th</sup> )	World Turtle Day (May 23 <sup>rd</sup> )
Earth Day (April 22 <sup>nd</sup> )	World Mosquito Day (August 20 <sup>th</sup> )
Malaria Day (April 25 <sup>th</sup> )	World Animal day (October 4 <sup>th</sup> )
World Hepatitis Day (May 19 <sup>th</sup> )	World Immunization Day (November 10 <sup>th</sup> )

**SRI VENKATESWARA UNIVERSITY :: TIRUPATI**

**FIRST YEAR B.Sc. ZOOLOGY**

**FIRST SEMESTER**

**Revised Syllabus Under CBCS W.E.F. 2020-21**

**PAPER – I: ANIMAL DIVERSITY – BIOLOGY OF NONCHORDATES**

**HOURS: 60 (5X12)**

**Max. Marks: 100**

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**Course Outcomes:** By the completion of the course the graduate should able to –

- C01** Describe general taxonomic rules on animal classification
- C02** Classify Protozoa to Coelenterata with taxonomic keys
- C03** Classify Phylum Platy hemninthes to Annelida phylum using examples from parasitic adaptation and vermin composting
- C04** Describe Phylum Arthropoda to Mollusca using examples and importance of insects and Molluscans
- C05** Describe Echinodermata to Hemi chordata with suitable examples and larval stages in relation to the phylogeny

**Learning objectives**

1. To understand the taxonomic position of protozoa to helminthes.
2. To understand the general characteristics of animals belonging to protozoa to hemichordata.
3. To understand the structural organization of animals phylum from protozoa to hemichordata.
4. To understand the origin and evolutionary relationship of different phyla from protozoa to hemichordata.
5. To understand the origin and evolutionary relationship of different phylum from annelids to hemichordates.

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**UNIT I**

**Phylum Protozoa**

General Characters and classification of protozoa up to classes with suitable examples

Locomotion in Protozoans

*Elphidium (type study)*

**UNIT -II**

**Phylum Porifera**

General characters and classification up to classes with suitable examples

Skeleton in Sponges

Canal system in sponges

**Phylum Coelenterata**

General characters and classification up to classes with suitable examples

Metagenesis in *Obelia*

Polymorphism in coelenterates

Corals and coral reefs

**Unit - III**

**Phylum Platyhelminthes**

General characters and classification up to classes with suitable examples

Life cycle and pathogenicity of *Fasciola hepatica*

**Phylum Nematelminthes**

3.4 General characters and classification up to classes with suitable examples

Life cycle and pathogenicity of *Ascaris lumbricoides*

## **Unit – IV**

### **Phylum Annelida**

4.1 General characters and classification up to classes with suitable examples

Vermiculture - Scope, significance, earthworm species, processing, Vermicompost, economic importance of vermicompost

### **Phylum Arthropoda**

General characters and classification up to classes with suitable examples

Vision and respiration in Arthropoda

Metamorphosis in Insects

*Peripatus* - Structure and affinities

## **Unit – V**

### **Phylum Mollusca**

General characters and classification up to classes with suitable examples  
Pearl formation in Pelecypoda

### **Phylum Echinodermata**

General characters and classification up to classes with suitable examples  
Water vascular system in star fish

### **Phylum Hemichordata**

General characters and classification up to classes with suitable examples  
*Balanoglossus* - Structure and affinities

### **Co-curricular activities (suggested)**

Preparation of chart/model of phylogenic tree of life, 5-kingdom classification, *Elphidium*

life cycle etc.

Visit to Zoology museum or Coral island as part of

Zoological tour Charts on life cycle of *Obelia*,

polymorphism, sponge spicules

Clay models of canal system in sponges

Preparation of charts on life cycles of *Fasciola* and *Ascaris*

Visit to adopted village and conducting awareness campaign on diseases, to people as part of Social Responsibility.

Plaster-of-paris or Thermocol model of *Peripatus*

Construction of a vermicompost in each college, manufacture of manure by students and donating to local farmers

Models of compound eye, bee hive and termitarium (termitaria) by students

Visit to apiculture centre and short-term training as part of apprenticeship programme of the govt. Of Andhra Pradesh

Chart on pearl forming layers using clay or

Thermocol Visit to a pearl culture rearing

industry/institute

Live model of water vascular system

Phylogeny chart on echinoderm larvae and their evolutionary significance

Preparation of charts depicting the feeding mechanism, 3 coeloms, tornaria larva etc., of

*Balanoglossus*

## REFERENCE BOOKS

1. **L.H. Hyman** '*The Invertebrates*' Vol I, II and V. – M.C. Graw Hill Company Ltd.
2. **Kotpal, R.L. 1988 - 1992** Protozoa, Porifera, Coelenterata, Helminthes, Arthropoda, Mollusca, Echinodermata. Rastogi Publications, Meerut.
3. **E.L. Jordan and P.S. Verma** '*Invertebrate Zoology*' S. Chand and Company.
4. **R.D. Barnes** '*Invertebrate Zoology*' by: W.B. Saunders CO., 1986.
5. **Barrington. E.J.W.**, '*Invertebrate structure and Function*' by ELBS.
6. **P.S. Dhami and J.K. Dhami.** *Invertebrate Zoology*. S. Chand and Co. New Delhi.
7. **Parker, T.J. and Haswell** '*A text book of Zoology*' by, W.A., Mac Millan Co. London.
8. **Barnes, R.D. (1982).** *Invertebrate Zoology*, V Edition”

**B.Sc. ZOOLOGY PRACTICAL SYLLABUS FOR**  
**SEMESTER-I W.E.F. 2020-21**

**PAPER - I**

**ANIMAL DIVERSITY - BIOLOGY OF NONCHORDATES**

**Periods: 24**

**Max. Marks: 50**

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**Learning Outcomes:**

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. Study of museum slides / specimens / models (Classification of animals up to orders)**

**Protozoa:** *Amoeba, Paramecium, Paramecium Binary fission and Conjugation, Vorticella, Entamoeba histolytica, Plasmodium vivax*

**Porifera:** *Sycon, Spongilla, Euspongia, Sycon- T.S & L.S, Spicules, Gemmule* **Coelenterata:** *Obelia – Colony & Medusa, Aurelia, Physalia, Velella, Corallium, Gorgonia, Pennatulav.*

**Platyhelminthes:** *Planaria, Fasciola hepatica, Fasciolalarval forms – Miracidium, Redia, Cercaria, Echinococcus granulosus, Taeniasolium, Schistosoma haematobium* vii.

**Nemathelminthes:** *Ascaris (Male & Female), Dracunculus, Ancylostoma, Wuchereria*

**Annelida:** *Nereis, Aphrodite, Chaetopterus, Hirudinaria, Trochophore larva* **Arthropoda:** *Cancer, Palaemon, Scorpion, Scolopendra, Sacculina, Limulus, Peripatus, Larvae - Nauplius, Mysis, Zoea, Mouth parts of male & female Anopheles and Culex, Mouthparts of Housefly and Butterfly.* xiii.

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

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

**Hemichordata:** *Balanoglossus*, *Tornaria* larva

## **2. Dissections:**

**1.Prawn:** Appendages, Digestive system, Nervous system, Mounting of Statocyst

**2.Insect** Mouth Parts

**3.Laboratory Record work shall be submitted at the time of practical examination**

**4.**An “**Animal album**” containing photographs, cut outs, with appropriate write up about the above mentioned taxa. Different taxa/ topics may be given to different sets of students for this purpose

**5.Computer - aided techniques should be adopted or show virtual dissections**

## **REFERENCE MANUALS:**

1. Practical Zoology- Invertebrates S.S. Lal
2. Practical Zoology - Invertebrates P.S. Verma
3. Practical Zoology - Invertebrates K.P. Kurl
4. Ruppert and Barnes (2006) Invertebrate Zoology, 8<sup>th</sup> Edition, Holt Saunders International Edition

**ZOOLOGY MODEL PAPER FOR I SEMESTER**

**ZOOLOGY - PAPER - I**

W.E.F.2020-21

**ANIMAL DIVERSITY – BIOLOGY OF NONCHORDATES**

**Time : 3 hrs**

**Max. Marks : 75**

**I. Answer any FIVE of the following :**

**5x5=25**

**Draw labeled diagrams wherever necessary**

1. Locomotion in protozoa.
2. Scleroblasts.
3. Anthozoa.
4. Nematelminthes general characters.
5. Respiration in Arthropoda.
6. Gastropoda.
7. Bipinnaria larva.
8. Balanoglossus.

**II. Answer any FIVE of the following:**

**5x10=50**

**Draw labeled diagrams wherever necessary**

9. Explain about general character of protozoa and classify upto class with examples

OR

Write about structure of Elphidium and life cycle.

10. Write about canal system in Sponges.

OR

Write about Polymorphism in Coelenterates.

11. Write about life cycle of Fasciola hepatica.

OR

Life cycle of Ascaris lumbricoides.

12. Write about Vermiculture.

OR

Write about structure and affinities of Peripatus.

13. Write about Pearl formation in Pelecypoda.

OR

Write about water vascular system in Starfish.