



JSS COLLEGE OF ARTS, COMMERCE AND SCIENCE

(Autonomous)

OOTY ROAD, MYSURU- 570 025

DEPARTMENT OF ZOOLOGY

Syllabus for

B.Sc., ZOOLOGY (UG)

I & II SEMESTERS

Framed According to the State Educational Policy(SEP 2024)

(2024-25 Batch Onwards)

BOS MEMBERS

1	Smt.Bhavani N Assistant Professor & HOD Dept.of Zoology JSS CACS,Ooty Road,Mysuru	Chairperson
2	Dr.Basavarajappa S Professor.DOS of Zoology University of Mysore	Member
3	Prof.K S Prasanna Associate Professor of Zoology Hassan Government Science College Hassan University,Hassan	Member
4	Dr.T M Devaraju Associate Professor of Zoology Government science College Bangalore University,Bangalore	Member
5	A B Doddamani Director Novel tissue private limited Mysuru	Expert
6	Dr.Chandan S Associate Professor Department of Biotechnology And Bioinformatics JSS AHER,Mysuru	Aluminus
7	Sri.Sanjay H V Assistant Professor Department of Zoology JSS CACS,Ooty Road,Mysuru	Member

Model Curriculum Structure for Degree Program

B. Sc., in Zoology

Name of the Degree Program: **B. Sc.,**

Discipline Core: **Zoology**

Starting year of implementation: **2024-25**

PROGRAM OBJECTIVES (POs)

POs1-The Programme offers both classical as well as modern concepts of Zoology in higher education.

POs2-It enables the students to study animal diversity in both local and global environments.

POs3-To make the study of animals more interesting and relevant to human studies more emphasis is given to branches like behavioural biology, evolutionary biology and economic zoology.

POs4-More of upcoming areas in cell biology, genetics, molecular biology, biochemistry, genetic engineering and bioinformatics have been also included.

POs5-Equal importance is given to practical learning and presentation skills of students.

POs6-The lab courses provide the students necessary skills required for their employability.

POs7-Skill enhancement courses in classical and applied branches of Zoology enhance enterprising skills of students.

POs8-The global practices in terms of academic standards and evaluation strategies.

POs9- Provides opportunity for the mobility of the student both within and across the world.

POs 10-The uniform grading system will benefit the students to move across institutions

Semester I- Zoology Core Course I Content:

Zoology: Paper-I: Animal Diversity I

Course Title/Code: Animal Diversity I	Course Credits: 3
Course Code: GZO101	L-T-P per week: 3-0-0
Total Contact Hours: 48	Duration of ESA: 3 Hours
Formative Assessment Marks: 20	Summative Assessment Marks:80

Course Outcomes (COs):

At the end of the course the student should be able to understand:

CO1.Study Taxonomic features of Invertebrate Organisms

CO2. Identify in depth Non-Chordata

CO3. Write down the Characteristics of Invertebrates Animals

CO4. Identify in details with Examples of Invertebrates

CO5. Learn the characteristics and classification of Invertebrates

CO6. Study the Economic Importance of Invertebrates

GZO101

I SEMESTER: ZOOLOGY
ANIMAL DIVERSITY-I (Non-chordata)

03 Credits

03 hr/ week X 16 =48 hrs

Note: Salient features should be elaborated while giving general characteristics of each group. Local examples with common and scientific names from all groups to be mentioned. Some of the examples not found in India can be included because of taxonomic/phylogenetic or other significance.

UNIT I

Biodiversity and its importance.

16hrs

Definition and scope and importance of Diverse groups of Invertebrates, Classification: Five kingdom concept, Biological nomenclature, Definition of a species, outlines of animal classification.

Concept of Metazoa; Levels of organization - Cell, tissue, organ, organ system (Definition with examples).

Protozoa: General characters and classification up to classes with examples; Locomotion (amoeboid, flagellar and ciliary- excluding theories) and reproduction (fission and conjugation) in protozoa. Plasmodium: Morphology, life cycle, pathogenicity and preventive measures of *Plasmodium vivax*.

Porifera: General characters with classification up to classes with examples; Sponge spicules- types(microscleres in detail), Canal system (Ascon, Sycon, Leucon,) and larvae amphiblastula and parenchymula).

Cnidaria: General characters and classification up to classes with examples;

Polymorphism in Cnidaria:- Obelia,

Structure of corallite, types of coral reefs, importance of corals.

Acnidaria: Salient features and systematic position of Ctenophora.

UNIT II

16 hrs

Concept of coelom: Acoelom, Pseudocoelom, Eucoelom (Definition with examples).

Helminthes

Platyhelminthes: General characters and classification up to classes with examples; *Taenia solium* - Life cycle, pathogenicity and preventive measures.

Aschelminthes: General characters and examples; morphology, transmission, pathogenicity and preventive measures of *Ascaris*.

Pathogenic helminthes; (any two examples with disease caused-*Ancylostoma* and *Wucheraria*).

Parasitic adaptations in helminthes.

Annelida: General characters and classification up to classes with examples.

Type study: Pheretima- Morphology, setae, digestive, excretory (nephridium), nervous and reproductive system, Leech- Morphology and parasitic adaptations;

UNIT III

16 hrs

Onychophora: Salient features of *Peripatus* and systematic position of Onychophora.

Arthropoda: General characters and classification up to classes with examples.

Type study- Cockroach- Morphology, digestive, respiratory and nervous systems;
Social organization in insects (Termite).

Mollusca: General characters and classification up to classes with examples; Type study- Fresh water Mussel- morphology, digestive and nervous systems; Diversity in Molluscan shells and economic importance of Mollusca.

Echinodermata: General characters and classification up to classes with examples;

Type study: - Star fish- morphology and water-vascular system.

Regenerative ability in invertebrates (Hydra, Planaria, Earthworm, Seurchin)

Symmetry in invertebrates.

Semester I- Zoology Core Lab Course I Content:

Zoology: Paper-I: Animal Diversity I

Course Title/Code: Animal Diversity I	Course Credits: 2
Course Code: GZO102	L-T-P per week: 0-0-2
Total Contact Hours: 48	Duration of ESA: 4 Hours
Formative Assessment Marks: 10	Summative Assessment Marks:40

Course Outcomes (COs):

At the end of the course the student should be able to understand:

CO1.Study Taxonomic features of Invertebrate Organisms

CO2. Identify in depth Non-Chordata

CO3. Write down the Characteristics of Invertebrates Animals

CO4. Identify in details with Examples of Invertebrates

CO5. Learn the characteristics and classification of Invertebrates

CO6. Study the Economic Importance of Invertebrate

I SEMESTER: ZOOLOGY
ANIMAL DIVERSITY -I (Non-chordata) Practical:2 Credits

GZO102

4 hrs/week x16= 48 hrs

1. Study of Microscope (Simple and Compound).
2. Study of permanent slides of protozoa: Amoeba, Entamoeba, Polystomella, Euglena, Paramecium, Balantidium, Vorticella.
3. Porifera: Study of slides/specimens –Sycon, Spongilla, Euspongia, Sponge Gemmule, Monaxon spicules.
4. Cnidaria: Hydra, Physalia, Aurelia, Madrepora, Pennatula, Fungia.
5. Helminthes: Planaria, Fasciola, Taenia, Ascaris-male and female, Scolex of Taenia, T.S. of Taenia.
6. Annelida: Pheritima, Nereis, Chaetopterus, Aphrodite. Leech, T.S of Nereis.
7. Observation and mounting of Cnidarian colonies: Obelia, Sertularia, Bougainvillea, Campanularia , Pennaria (any two)
8. Onychophora: Peripatus. Arthropoda : Panaeus, Scolopendra, Spirostreptus, Palamnaeus, Aranea,
9. Field study: Observation of Arthropods in and around the college campus, identifying and recording in the practical record (Minimum five).
10. Study of Arthropodan pests: Periplaneta, Rhinicerous beetle,
Study of Arthropodan vectors: Mosquito and house fly.
Study of beneficial insects: Honey bee and butterfly.
11. Study and mounting of mouth parts of insects: Cockroach, Mosquito, house fly and honey bee (any two)
12. Cockroach: Study of digestive system and nervous system.
13. Earthworm: Study of digestive system and nervous system.
14. Mollusca: Chiton, Dentalium shell, Xancus shell, Aplysia, Unio, Octopus.
15. Echinodermata: - Astropecten, Ophiothrix, Salmacis, Holothuria, Antedon and Pedicellaria of sea urchin.

Note: Dissection on availability of lab bred specimens

ANIMAL DIVERSITY - I (NON CHORDATA)

Scheme of Practical Examination

Duration 3 Hours

Max. Marks 40 Marks

- | | |
|--|---------|
| 1. Dissection: Flag labeling of the given display
(Cockroach: Digestive/ Nervous system.
Earth worm : Digestive/ Nervous system) | 10 M |
| 2. Mounting:
(cockroach/ Honey bee mouth part/ earth worm setae/
spicules/ coelenterate colony/ foraminiferan shells) | 5 M |
| 3. Identify the specimen/ slide A to C with reasons
(Protozoa to Echinodermata specimens/ slides) | 4x3=12M |
| 4. Identify and comment on spot D
(pest/ vector/ beneficial insects) | 3 M |
| 5. Practical record and viva | 10 M |
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ANIMAL DIVERSITY - I (NON CHORDATA)

SCHEME OF VALUATION

1. Dissection and display-10M/ Flag labeling with diagram-10M
 2. Mounting-04M, Identification-01M
 3. Identification with classification-01M, Labeled diagram with reasons-03M
 4. Identification -01M, Comments-02M
 5. Record-07M, Viva-03M.
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Semester II- Zoology Core Course I Content:

Zoology: Paper-II: Animal Diversity II

Course Title/Code: Animal Diversity II	Course Credits: 3
Course Code: GZO201	L-T-P per week: 3-0-0
Total Contact Hours: 48	Duration of ESA: 3 Hours
Formative Assessment Marks: 20	Summative Assessment Marks:80

Course Outcomes (COs):

At the end of the course the student should be able to understand:

CO1.Study Taxonomic features of vertebrate Organisms

CO2. Identify in depth Chordata

CO3. Write down the Characteristics of vertebrates Animals

CO4. Identify in details with Examples of vertebrates

CO5. Learn the characteristics and classification of vertebrates

CO6. Study the Economic Importance of vertebrates

ANIMAL DIVERSITY- II (Chordata)

3 Credits

03hr/week X 16=48hrs

UNIT I

16 hrs

Chordata: General characters and classification up to classes with examples; concept of protochordata.

Hemichordata: General characters, Balanoglossus- externals, Tornaria larva; Affinities of Hemichordata with Annelida, Echinodermata and Chordata.

Cephalochordata: Amphioxus- externals, feeding mechanism, digestive and circulatory system.

Urochordata: Ascidia- externals and brief description of internal morphology, larva and metamorphosis.

Cyclostomata: Salient features of Petromyzon, Ammocoetes larva and its significance.

Vertebrata: General characters and classification with examples.

Pisces: General characteristics of fishes; Differences between Chondrichthyes and Osteichthyes; Type study: *Scoliodon*- Morphology, respiratory and lateral line systems; Scales in fishes, Salient features and discontinuous distribution of Dipnoi.

UNIT II

16 hrs

Amphibia: General characters and classification up to orders, distinguishing features of living amphibians with suitable examples; Type study-Frog: Externals, digestive, respiratory,

Reptilia: General characters and classification of living orders with suitable examples; Temporal fossae and arcades in reptiles and their significance; Poison apparatus, Key identification of poisonous and nonpoisonous snakes.

Aves: General characters and classification up to sub classes, Distinctive features of Archaeornithes and Neornithes - Palaeognathae, Impennaee and Neognathae with suitable examples; *Archaeopteryx*- evolutionary significance. Flight Adaptations in birds - morphological, anatomical and physiological; Bird migration-causes, types and advantages.

UNIT III

16 hrs

Mammalia: General characters and classification up to subclasses; Distinctive features of prototheria, metatheria and eutheria with important examples; **Type study-** Rabbit: Externals, digestive, respiratory.

Important characters and distribution with examples – Primates, Chiroptera, Cetacea, Perissodactyla, Artiodactyla, Carnivora, Rodentia and Proboscidea; Dentition in mammals – tooth structure, types, specialization and dental formula in Carnivora (cat, dog), Rodentia (rat), Proboscidea (Elephant), Artiodactyla (Horse), Perissodactyla (Cow) and Primates (Man and Monkey).

Comparative anatomy: Comparative anatomy of heart- Pisces (Shark), Amphibia (frog), Reptilia (Garden lizard) Aves (pigeon), Mammalia (man); Evolution of brain in vertebrates- brain of shark, frog, varanus, pigeon and man.

Semester II- Zoology Core Lab Course I Content:

Zoology: Paper-II: Animal Diversity II

Course Title/Code: Animal Diversity I	Course Credits: 2
Course Code: GZO202	L-T-P per week: 0-0-2
Total Contact Hours: 48	Duration of ESA: 4 Hours
Formative Assessment Marks: 10	Summative Assessment Marks:40

Course Outcomes (COs):

At the end of the course the student should be able to understand:

CO1.Study Taxonomic features of vertebrate Organisms

CO2. Identify in depth Chordata

CO3. Write down the Characteristics of vertebrates Animals

CO4. Identify in details with Examples of vertebrates

CO5. Learn the characteristics and classification of vertebrates

CO6. Study the Economic Importance of vertebrate

II SEMESTER: ZOOLOGY PRACTICAL **2 Credit**
ANIMAL DIVERSITY -II (Chordata) **4 hrs/week x16= 64 hrs**

1. Hemichordata: Balanoglossus, T.S. through proboscis, collar, branchio-genital region. Urochordata: Ascidia.
2. Cephalochordata: Amphioxus, T.S. through pharynx and intestine.

Cyclostomata: Petromyzon, Ammocoetes larva, Myxine.
3. Fishes: Scoliodon, Zygaena, Pristis, Narcin, Trygon.: Echeinis, Hippocampus, Anguilla.
4. Mounting: placoid, cycloid and ctenoid scales.
5. Amphibia: Ichthyophis. Salamander, Axolotl larva, Rana,
6. Reptilia: Varanus, Chelone, cobra, Viper, Krait,, sea snake, Rat snake.
7. Aves: Kingfisher, Parakeet, Woodpecker, Crow, Owl, Duck. Structure of a quill feather.
8. Mammalia: Rabbit, Rat, Bat, Loris.
9. Osteology: Skulls of Frog, Pigeon and Rabbit.
10. Osteology: Vertebrae (atlas, pro, amphi, and acoelous) of frog, Pigeon (atlas, heterocoelous and synsacrum) and Rabbit (atlas, axis and thoracic).
11. Osteology: Pectoral girdles and forelimb skeletons of Frog, Pigeon and Rabbit.
12. Pelvic girdles and hind-limbs of Frog, Pigeon and Rabbit.
13. Study of organ systems-Frog- Circulatory system (arterial and venous); Urinogenital system (Male and Female).
14. Study of organ systems-Rabbit- Circulatory system(arterial and venous); Urinogenital system (Male and Female).
15. Bird watching: Preparation and submission of checklist of birds in and around the college the campus/ near by places.

ANIMAL DIVERSITY - II (CHORDATA)

Scheme of Practical Examination

Duration 3 Hours

Max. Marks 40 Marks

- | | |
|--|---------|
| 1. Flag labeling of the given display
(Frog: Arterial/ Venous system; Male / Female urino-genital system;/
Rabbit: Arterial/ Venous system; Male / Female urino-genital system). | 10 M |
| 2. Mounting:
(Placoid/ Ctenoid/ Cycloid Scales of fishes) | 5 M |
| 3. Identify the specimen/ slide A to C with reasons
(Protochordata to mammalian specimens/ slides) | 3x4=12M |
| 4. Identify and comment on spot D
(one Axial OR one appendicular skeleton) | 3x1=3 M |
| 5. Practical Record and Viva | 10 M |
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ANIMAL DIVERSITY - II (CHORDATA)

SCHEME OF VALUATION

1. Flag labeling with diagram-10M
2. Mounting-04M, Identification-01M
3. Identification-01M, with classification-01M, Labeled diagram with reasons-02M
4. Identification -01M, Comments-02M
5. Record-07M, Viva-03M.

COMPULSORY FIELD VISIT / STUDY TOUR: A study tour, accompanied by teachers should be arranged for on the spot study of the bio-diversity.

Theory Question paper pattern for Semester End examination (C3)

(Common to all semesters I to VI semester paper)

Duration: 3 Hours

Max. Marks 80 M.

I. Answer any FIVE of the following.

1x5=05.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

II. Write short notes on any FIVE of the following.

3x 5= 15.

- 7.
- 8.
- 9.
- 10.
- 11.
- 12.

III. Write Explanatory note on any FIVE of the following.

6x 5= 30.

- 13.
- 14.
- 15.
- 16.
- 17.
- 18.

IV. Answer any THREE of the following.

10x3=30.

- 19.
- 20.
- 21.
- 22.
