Proposed

F.Y.B.Sc. Syllabus

ZOOLOGY

Proposed Syllabus For F Y B Sc : Zoology

SNDT UNIVERSITY

Zoology Course 1.01

ANIMAL DIVERSITY AND PHYSIOLOGY

2 CREDITS

Objectives

- To study the invertebrate classification.
- To understand some of the specialized features of each invertebrate phylum
- To get a basic knowledge of the working of the various physiological systems within the animal kingdom.

UNIT I: DIVERSITY OF ANIMAL KINGDOM - I (15 Lectures)

General characteristics upto classes with examples:
Phylum – Protozoa – Skeleton and Reproduction in Protozoa
Phylum – Porifera – Spicules, Canal system and Reproduction in Poriferan
Phylum – Coelenterata – Polymorphism, Corals and Coral reefs in Coelenterata
Phylum – Platyhelminthes – Parasitic adaptations in Helminthes
Phylum – Aschelminthes – Life cycle of Ascaris
Phylum – Annelida – Reproduction in Annelida
Phylum – Arthropoda - Metamorphosis in insects
Phylum – Mollusca – Foot and Shell in Mollusca
Phylum – Echinodrmata – Water Vascular System in Starfish

UNIT II: BASIC ANIMAL PHYSIOLOGY (15 Lectures)

Locomotion – Cilia, Flagella, Pseudopodia, Parapodia, Striated Muscle Fiber
Nutrition – Modes of Nutrition, Intracellular and Extracellular Digestion, Incomplete and Complete Digestion
Excretion – Contractile Vacuole, Nephridium, Flame cells, Antennary Gland, Nephron
Circulation – Open, Closed Single and Double Circulation, Types of hearts based on structure and function
Respiration – Skin, Gills and Lungs
Nervous System – Nerve Plexus, Structure of neuron, Mammalian Brain
Reproduction – Hermaphroditism, Asexual and Sexual Reproduction, Parthenogenesis

Zoology Course 1.02

ANIMAL DIVERSITY, ECOLOGY AND BIODIVERSITY

2 CREDITS

Objectives

- To study the vertebrate classification.
- To understand some of the specialized features of each vertebrate class
- To study the interactions between animals and the environment

UNIT I: DIVERSITY OF ANIMAL KINGDOM II (15 Lectures)

General characteristics of the vertebrate classes with examples:
Class – Pisces – Swimbladder in Fishes.
Class – Amphibia – Parental Care in Amphibians.
Class – Reptilia – Adaptive Radiation in Reptiles.
Class – Aves – Types of beaks and feet in birds.
Class – Mammalia – Aquatic Mammals and their Adaptations.

UNIT II: ECOLOGY AND BIODIVERSITY (15 Lectures)

Ecology
Types of Ecosystems
Energy Flow
Food Chain and Food Web
Biogeochemical Cycles: Water, CO_2, Nitrogen and Phosphate

Biodiversity
Definition of biodiversity
Benefits and Conservation of Biodiversity
Factors affecting Biodiversity

REFERENCES:

1. Invertebrate Zoology by E.L Jordan and P.S. Verma
2. Invertebrate Zoology by P.S. Dhami and J.K. Dhami
3. Modern Textbook of Zoology - invertebrates by Kotpal
4. Invertebrate Zoology by Ruppert Barnes
5. Vertebrates by R.L.Kotpal
6. Chordate Zoology by Dhami and Dhami
7. Vertebrates by Jordan and Verma
8. Ecology: Principles and application by Chapman and Reiss
9. Principals of Ecology by Odum
10. Essentials of Ecology by Tyler and Miller
11. Biodiversity by SVS Rana
12. Fundamentals of Ecology by M C Dash
13. Ecology by N.S. Subrahmanyam and A.V.S.S. Sambamurty
14. Comparative animal physiology by P.C. Withers
15. Comparative animal physiology by Knut Schmidt-Neilson
16. Animal Physiology by Nagabhushanam
17. Animal Physiology by Satyanarayanan

PRACTICAL 1.03

(BASED ON COURSES 1.01 AND 1.02)

2 CREDITS

1. Animal classification

Protozoa:	Amoeba, Euglena, Paramoecium, Plasmodium
Porifera:	Leucosolenia, bath sponge
Coelenterata:	Hydra, Obelia colony, Aurelia, any one coral
Platyhelminthes:	Planaria, Liver fluke, Tapeworm
Nemathelminthes:	Ascaris (male and female)
Annelida:	Nereis, Earthworm and Leech
	Arthropoda: Crab, lobster, Lepisma, beetle, dragonfly, butterfly, spider, centipede, millipede
Mollusca:	Chiton, Dentalium, Pila, bivalve, Sepia, Nautilus
Echinodermata:	Starfish, brittle star, sea urchin, sea cucumber, feather star
Pisces:	Chondrichthyes – Shark, Sting ray, Electric ray
	Osteichthyes – Bombay duck, Mackerel, Pomfret, Rohu
Amphibia:	Frog, toad, Caecilian, salamander, Siren
Reptilia:	Chameleon, Calotes/Gecko, turtle, tortoise, snake, crocodile, Phrynosoma
Aves:	Kite, duck, Owl
Mammalia:	Hedgehog, Bat, Guinea pig

2. Mounting of Spicules from Sponge
3. Nutritional apparatus in animals
4. Respiratory organs in vertebrates.
5. Circulatory system – Types of Hearts
6. Excretory system – L.S. and T.S of Kidney
7. Mounting of Septal nephridium and setae
8. Determination of pH of soil
9. Estimation of Dissolved Oxygen in the water sample
10. Estimation of Hardness of water in the water sample

Zoology Course 2.01

GENETICS, BIOCHEMISTRY AND EVOLUTION

2 CREDITS

Objectives

- To study the basics of genetics
- To understand the biochemistry within the animal system
- To study how the animal life evolved

UNIT I: GENETICS AND BIOCHEMISTRY (15 Lectures)

Genetics
Genes and Gene Concept
Mendelian Genetics – Monohybrid and Dihybrid Crosses
Epistasis
Multiple Alleles: With respect to ABO blood groups
Human Pedigree
Chromosomal and Physical Aberrations – Inversion, Translocation, Deletion

Biochemistry
Definition, Classification, Structures and Biological Role of:
Proteins
Carbohydrates
Lipids

UNIT II: EVOLUTION (15 Lectures)

Evolution
Concept of evolution
Origin of life on earth
Origin of Prokaryotic and Eukaryotic cells
Variations, Mutations, Natural selection
Concept of species and speciation
Micro and Macro evolution
Ecological niche

Zoology Course 2.02

BASIC EMBRYOLOGY AND BIOTECHNOLOGY

2 CREDITS

Objectives

- To study the basic concept of embryology
- To study basic biotechnology and its applications
- To study how the animal life evolved

UNIT I: BASIC EMBRYOLOGY (15 Lectures)

Fertilization
Types of eggs: Microlecithal, Mesolecithal, Macrolecithal, Isolecithal, Telolecithal and Centrolecithal.
Types of cleavage
Blastulation and Gastrulation
Types of blastula / blastulation in Amphioxus, Sea Urchin, Amphibians and Birds
Types of gastrula / gastrulation in Amphioxus, Sea Urchin, Amphibians and Birds

UNIT II: BASIC BIOTECHNOLOGY (15 Lectures)

Basic Biotechnology
Concept of biotechnology
Fundamentals in laboratory techniques in biotechnology: Safe handling of instruments, Sterilization technique, Chromatography and Electrophoresis technique.
Food biotechnology
Enzyme technology
Environmental biotechnology

REFERENCES

1. Biochemistry - Lehninger, 5th Edition, Pal Grav Mc Millan Publication
2. Biochemistry – Harper, Mc Graw Hill Publication
3. Outlines of Biochemistry - Conn & Stumpf, Wiley Eastern Ltd.
4. Introduction to Biochemistry – Dr. A.C. Deb, New Central Book Agency (P) Ltd.
   Biochemistry – Satyanarayan, Elite Publication
5. Genetics – by Winchester
6. Cell biology and Genetics by C. Stan and R. Tagari
7. Genetics by Strickberger
8. Principals of Genetics by Tamarin
9. Biotechnology: Fundamentals and Application, 3rd Ed, Agrobios
10. Basic biotechnology, Fr. Ignasimuthu, Tata McGraw Hill
11. Introduction to evolution by Moody
12. Evolution by Strickberger
13. Theory of Evolution by Smith
14. Evolution by P.S.Verma and Agarwal

PRACTICAL 2.03

(BASED ON COURSES 2.01 AND 2.02)

2 CREDITS

1. Extraction and qualitative detection of nucleic acids: DNA (SDS-NaCl extraction), RNA (Phenol extraction)
2. Qualitative tests for proteins, lipids and carbohydrates.
3. Introduction to basic laboratory safety practices, precautions and safety rules
4. Handling of common laboratory equipments
5. Separation of amino acids by paper chromatography
6. Separation of lipids by thin layer chromatography
7. Separation of pigments by adsorption chromatography
8. Effect of Papain (Raw papaya extract) as a meat tenderizer
9. To evaluate the quality of milk by methylene blue reduction method
10. Study fossils (Trilobite, Ammonite, Lingula and Limulus)

N.B. One Short Excursion for habitat studies / visit to institutes of educational interests is **COMPULSORY**

While planning the practical syllabus, the following should be taken into account:

I) It is pertinent to note that we have to adhere strictly to the directions as given in the UGC Circular F14-4/2006 (CPP-II).

II) Apart from the institutional Animal Ethics Committee (IAEC) and any other Committee appointed by a Competent Authority/Body from time to time, every college should constitute the following Committees:

1) A Committee for the Purpose of Care and Supervision of Experimental Animals (CPCSEA) and
2) A Dissection Monitoring Committee (DMC)

Composition of DMC shall be as follows:

i) Head of the Concerned Department (Convener/Chairperson)
ii) Two Senior Faculty Members of the concerned Department
iii) One Faculty of related department from the same College
iv) One or two members of related department from neighboring colleges.

THEORY QUESTION PAPER PATTERN

FIRST AND SECOND SEMESTER

(COURSES 1.01, 1.02, 2.01 AND 2.02)

Time: 2hrs **Max. Marks: 50**

N.B. All Questions are Compulsory

Q1. Attempt any seven of the following questions. **14 marks**
(i to x)

Q2. Answer any two of the following question. **12marks**
(i to iv)

Q3. Describe any three of the following. **12 marks**
(i to iv)

Q4. Write an account on any three of the following. **12 marks**
(i to iv)

PRACTICAL QUESTION PAPER PATTERN

FIRST AND SECOND SEMESTER

(PRACTICAL COURSES I.03 AND 2.03)

Time: 3hrs **Max. Marks: 50**

Q1. Practical based on Unit I. **20 marks**

Q2. Practical based on Unit II. **20 marks**

Q3. Viva / Field Report **05 marks**

Q3. Journal **05 marks**
