B.Sc. Zoology: Semester-I, Practical's

A complete record of laboratory work will be maintained by every student. The practical work will consist of the following:

1. Study of living animals: *Amoeba, paramecium, Euglena, Hydra*, and rectal ciliates
2. Study of Nervous-system/General anatomy with the help of charts/models and simulation of *Earthworm, Prawn, Pila, Unio*.
3. Permanent preparation of Obelia colony: Ovary, setae in situ, pharyngeal and septal nephridium of earthworm, parapodia of Nereis and Heteroneris, gill radula and ospharadium of Pila, salivary glands, mouth parts and trachea of cockroach; gill lamina of Unio, statocyst and hastate plate of prawn.
4. Study of permanent slides/museum specimens/models belonging to following phyla
   Protozoa: Amoeba, Paramecium, Euglena, Ceratium and Noctiluca.
   Porifera: T.S. and L.S. of Sycon, Euplectella, Hyalonema and Spongilla.
   Coelenterata: Medusa of Obelia, larval stages of Aurelia, Physalia, Porpita, Vellela, Tubipora, Millepora, Aurelia, Gorgonium, Pennatula, Alcyonium, Adamsia.
   Annelida: T.S. of eartworm and Nereis through different body regions. Neries Heteronereis, Arenicola, Chaetopterus,
   Arthropoda: Mouth parts of insects, Pupa and larva of modquito Daphnia Cyclops and larval stages of Crustaceans. Crab, hermit crab, Lepas, Balanus, Astaxus, Squilla, millipede, mantis, cricket, stic insect, waterbug, beetle, locust, moth and butterfly, scorpion, spider, kingcrab and peripatus.
   Mollusca: Various larval stages, T.S. of Unio through gills; Chiton, Doris, Aplysia, Aeolis, Dentalium, Octopus, Loligo, Sepia, Nautilus, Teredo, Ostera, Pecten.
   Echiodermata: Various larval stages, T.S. of arm of starfish; Echinus, Ophiothrix, Holothuria, Asteria, Antedon.
   Study of following with the help of permanent slides/ museum specimens/ models/ Pictures for spotting
5. **Study of Parasites**:
   (a) **Protozoa:** *Plasmodium, Moncystis, Trypanosoma, Leishmania, Entamoeba, Giardia.*
   (b) **Helminthes:** *Fasciola, Taenia, Ascaris, Schistosoma* and filarial including larval stages.

(c) **Annelida:** Leeches

(d) **Arthropod:** Sacculina, lice, flea, bedbug, tick and mites.

(e) Life Cycle of the following:-

Entamoeba

T. solium

A. lumbricoides

F. hepatica

Schistosoma

6. **Taxonomy and Evolution**

(a) Animal collection techniques:

(b) Appliances such as cyanide bottle, aspirator, insect nets, fishing nets, Berlese funnel, Spreading board.

(c) Kinds and use of keys.

(d) Study of evolution of man with the help of Model/chart.

7. **Elementary Palaeontology:** Study of different Era/Periods of Geological Time scale based on charts & models.

B.Sc. Zoology: Semester-II, Practical's

A complete record of laboratory work will be maintained by every student. The practical work will consist of the following:

1. **Cytology experiments:**

(b) Study of mitosis and meiosis using available material

(c) Study of permanent slides showing stages of cell division, giant chromosome, mitochondria, Golgi body etc.

2. **Biotechnology**

   a. Laminar flow
   b. Autoclave
   c. PCR machine
   d. Refrigerated centrifuge

3. **Genetics**

   (i) Experiments on Mendelian and non- Mendelian inheritance.

   (ii) Study of mutants of Drosophila.

4. **Biological Techniques**

   Instruments and techniques regarding:

(i) Spectrophotometer

(ii) Chromatography

(iii) Electrophoresis

B.Sc. Zoology: Semester-III, Practical's

A complete record of laboratory work will be maintained by every student. The practical work will consist of the following:

Lower and Higher Chordate diversity:

Protochordata: Study of permanent slides of *Amphioxus* and *Balanoglossus* passing through different body regions, *Doliolum, Salpa,Oikopleura*. Museum specimens of *Herdmania , Ciona* and *Balanoglossus.*

Cyclostomata: Museum specimens of *Petromyzon* and *Myxine.*

Fishes: Dissections only with the help of Simulations, charts/models of general anatomy, afferent and efferent branchial arteries, cranial nerves and internal ear of *Scoliodon* Preparation of permanent slides of ampulla of Lorenzini , placoid , Cycloid and ctenoid scales . Study of permanent slides of shark T.S. passing through different body regions and different kinds of scales of fish. Museum specimens of *Sphyrna, Pristis, Torpedo, Trygon, Acipenser, Polypterus, Hippocampus, Exocoetus, Anguilla, Echeneis, Diodon, Protopterus,,Synaptura and Chimaera.*

Amphibia: Dissections only with the help of Simulations, charts/models of cranial nerves , hyoid apparatus , brain and columella of frog. Study of museum specimen of *Salamandra, Proteus, Amphiuma, Nectures, Siren, Ambyostoma,* Axolotl larva. *Rhacophorus, Alytes, Hyla, Pipa* and *Bufo*. Study of skeleton of frog and permanent histological slides of Amphibia .

Reptilia: Study of the skeleton of Varanus. Study of museum specimen of following:

Varanus, Heloderma, Hemidactylus, Phrynosoma, Chameleon, Draco, Calotes, Cobra, Pit-viper, Pitless –viper, Rattle snake, Krait, Dhaman, Typhlops and marine snake; Alligator, Crocodile, Gavialis, Turtle and tortoise.

Aves: Permanent preparation of filoplume and down feather. Study of the skeleton of fowl. Study of museum specimens of *Psittacula, Corvus, Pavo, Bubo,* and model of Archaeopteryx.

Mammalia: Dissection only with the help of Simulations, charts/models of the general anatomy and blood vascular system of a mammal. Study of permanent slides of mammals .

Study of the skeleton of rabbit . Study of the museum specimens of *Tachyglossus* and *Ornithorynchus* (models) *Pangolin* , *Funambulus, Pteropus*, Hedgehog and Loris.

Ecology:

I. Estimation of the pH of water/ soil sample.

II. Determination of dissolved oxygen and carbon dioxide in water sample.

III. Study of adaptations in animals inhabiting different ecological environments.

Environment Biology:

I. Study of wild animals with the help of stuffed preparations/ models/ charts/ photographs.

II. Study of indicator organisms of different kinds of water pollution

III. Simple experiments on the effect of environmental pollution on animals.

B.Sc. Zoology: Semester-IV, Practical's

Developmental biology:

Study of the permanent slides of the chick embryos (whole mounts) and those showing the embryology of frog.

Applied Zoology:

Specimens / slides of Apis, silk moth, Lac insect, phytoparsitic nematodes, major carps. Study of life cycles and control measures of insects of economic impotence (Stored grains pests, pest of fruits and vegetables); and study of structural organization of Bee hive. Pictures of commercially important varieties of poultry and pigs.

B.Sc. Zoology: Semester-V, Practical's

Microbiology:

(i) Cleaning of glassware and sterilization

(ii) Preparation of liquid and solid media for cultivation of bacteria

(iii) Preparation of media for the culture of fungi.

(iv) Isolation of microorganisms from water/soil.

(v) Gram staining of bacteria

(vi) Micrometry of microorganisms

Animal behaviour:

Study of different kinds of behaviour with the help of photographs.

Toxicology:

Calculation of LC_{50} with the help of data provided. Study of behavioural responses (in fish, insects or any other locally available animal) to some important toxicants.

Histology:

Study of the permanent slides of cartilage, bone, epithelium, connective tissue, nervous tissue, blood, striped and unstriped muscles, liver, kidney, lungs, pancreas, pituitary, thyroid, and adrenal of mammals. Preparation of smooth and striped muscles.

Biostatistics:

(i) Calculation regarding mean, median, SD and SE from given data.

(ii) Preparation of histogram and pie diagram with the help of data provided.

Bioinformatics: Brief knowledge of computer and its application.

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B.Sc. Zoology: Semester-VI, Practical's

Animal Physiology / Biochemistry:

(i) Preparation of haemin crystals from human blood

(ii) Determination of clotting and bleeding time

(iii) Counting of RBCs in human blood

(iv) Counting of WBCs in human blood

(v) Determination of haemoglobin percentage in human blood

(vi) Qualitative identification of carbohydrate, protein and lipoid.

(vii) Analysis of urine for identification of sugar, albumin, ketone bodies , etc.

(viii) Study of the action of salivary amylase on starch.

(ix) Study of endocrine glands and related disorders with the help of slides/photographs/ charts/ models.

(x) Induced breeding agents.

Elementary Entomology and Ichthyology:

Salient features and outline classification (up to order) of various insect groups as covered under respective taxonomic groups.

Salient features and outline classification (up to order) of various fishes as covered under respective taxonomic groups.