Revised practical syllabus for both I and II year of M.Sc. Zoology from this academic year 2013-14

Note : Computer aided presentations, Software/Virtual dissections may be incorporated where ever possible and necessary.

PRACTICAL – I

Animal Physiology & Endocrinology :
(Use any two species which are not in the endangered list)

1. Determination of the rate of activity of salivary amylase (Human saliva) activity.
   Ptyalin Activity in relation to temperature and calculation of Q10.
   Ptyalin activity in relation pH and calculation of Q10.
   Recording of diastolic and systolic pressure during, standing, sitting & lying posture.

2. Biological responses of animals to various osmotic concentrations and their effects.
   a. Change in weight of Earthworm in mild heteroosmotic media.
   b. Active uptake of Na+ and Cl- of a fish from the environmental water and change in salinity.
   3. Determination of the specific gravity of the blood of a human blood - by copper sulphate method.
   4. Effect of temperature on the Oxygen consumption of fish and calculation on Q10.

Molecular Cell Biology:
1. Mounting of Polytene chromosome from the salivary gland of any selected species.
2. Squash preparation of testis of any selected species to study the stage of Meiosis.
3. Isolation of DNA and RNA from an animal tissue (Demonstration only)
4. Study of different cells from the vertebrate animal. (Brain, Liver, Gonad, Kidney and Muscle from permanent slides)

Animal Biodiversity
1. Fossils Characteristics and identification of,
a) A Coelenterate
b) A Molluscan
c) An Echinoderm and
d) A Vertebrate.

2. Measurement of Biodiversity in a Terrestrial and an Aquatic Ecosystem.

Field Trip
Field Trip to Zoological parks, wildlife sanctuaries, biosphere reserves etc.

PRACTICAL – II

Genetics:

1. Genetic characteristics of a class room sample. Finger print, ear lobe, tongue rolling, mid digital hairs, widow's peak, inward bending of little finger.
2. Culture of Drosophila and identification of mutant characters. (from the given sample).
3. Blood Grouping of man to study multiple allelism and inheritance.

Biochemistry :

1. Qualitative and quantitative estimation of Carbohydrates, Proteins and Lipids from the given samples.
2. Preparation of Haemin crystals.
3. Quantitative estimation of Haemoglobin.
4. Separation of plasma, Serum and cells from blood.
5. Colorimetric estimation of glucose from blood

Bioinformatics:

1. Use of excel sheet for data processing.
2. Acid and protein sequence databases.

Biostatistics:

1. Construction of (a) Frequency polygon (b) Histograms from the Data given
(The basic data may be from any material available around)
2. Calculation of (a) Standard deviation and (b) Correlation and (c) Student's test from the given data.

Biophysics:

1. Working principle of SEM/TEM (Demo only)
2. Determination of Glucose content of a given sample. (Calorimeter method)

PRACTICAL – III

Ecology:

1. Water analysis and estimation of the following parameters:
a. Calcium b. Magnesium c. Phosphate d. Silicate e. Nitrate
2. Quantitative analysis of Planktons (Fresh water / Marine)
3. Identification of Marine and Freshwater Plankton from the slides.
4. Effect of salinity on oxygen consumption of fish.
5. Construction of Ecological pyramid using plastic animal toys.

Developmental biology:

1. Study of life-cycle of any insect.
2. Effect of Thyroxin on the growth of tadpoles. (Demonstration only)
3. Study of Embryonic developmental stages (Frog or Chick)

Immunology:

1. Study of Antigen and Antibody reaction through the study of Blood grouping.
2. Study of Rh factor through the study of Blood grouping.

A study tour to various places of ecological importance is essential. A tour report should be submitted along with the record.

PRACTICAL – IV

Microbiology:

1. Sterilization – Principles and methods.
2. Media preparation – Liquid and Solid media, Agar deep , slant and plate.
3. Pure culture techniques – Streak plate, pour plate, spread plate.
4. Identification of Gram positive and Gram negative bacterial strains.
5. Enumeration of microorganisms from soil.
6. Water quality analysis – MPN.
7. .Isolation of microorganisms from spoiled foods – Meat, milk, Cereals and Bread.
8. Milk quality – Dye reduction test.

Animal Behaviour:

1. To study the geotaxis behaviour of earthworm (Demonstration only)

ELECTIVE I PRACTICAL– ENVIRONMENTAL BIOLOGY

I. Analysis of water – Determination of:-

Pond/Pool water, Canal/River water, Sewage water

1. pH
2. Total dissolved solids
3. Turbidity / light penetration
4. CO2 and O2
5. Hardness (Temporary and permanent)
6. Sulphates and sulphites
7. BOD and COD (Demonstration only)

II. Analysis of soil – Determination of:-

Clayey soil, Sandy soil, Garden soil / Red soil

1. Soil Moisture
2. Chlorides
3. Sulphates
4. Nitrates
5. Total Phosphates
6. Total organic matter
7. Humous
8. Chlorophylls and Phaeopigments

III. Biological analysis (Spotters)

1. Qualitative analysis of organisms (Pollution indicator) such as diatoms / algae, flagellates, ciliates, Rotifers and larvae of insects.
2. Biological analysis of sewage water and industrial effluent

Field study

1. Detailed study of Pond / Pool ecosystems
   a. Physico-chemical parameter
   b. Qualitative and Quantitative analysis of plankton
2. Study of an industrial effluent

Field trips

1. Visit to – Drinking water treatment plant; Industrial effluent treatment plant; Pollution control lab.

Submission at the time of Practical Examination

1. Report on the Field study and Field trips
2. A minimum of 5 whole mounts of Planktons
3. Bonafide Record

ELECTIVET I PRACTICAL – TOXICOLOGY

Note : 1. Only limited number of animals should be used, which are not included in endangered species.

2. Only mild concentration of Toxicants should be used.

1. Evaluation of Toxicity of a pollutant through LC50 at 96 hours in aquatic organisms.
2. Determination of the effect of Temperature in the toxicity of a pollutant.
3. Determination of the effect of pH in the toxicity of a pollutant.
4. Analysis of pesticide residues by finger printing technique.
5. Effect of Toxicant on the total RBC count in the blood of fish.
6. Effect of Toxicant on the total WBC count in the blood of fish.
7. Observation of Histopathological alterations in pollutant treated animals.
8. Effect of Toxicant on the haemoglobin content of the blood of fish.
9. Estimation of Calcium, Magnesium count in the blood of fish.
10. Determination of biochemical parameters of Carbohydrates.
11. Determination of biochemical parameters of Proteins.

Spotters related to Practical.

Submission of 10 slides showing histopathology of fish.

Bonafide Records.

ELECTIVE II PRACTICAL - ENTOMOLOGY

1. Identification of Insects
a. Key to each order
b. One insect for each order (South Indian insects only)

2. Dissection – Digestive system, Nervous system and Reproductive system

(Any **two**)
Cockroach
Gryllotalpa
Nepa
Cybister
Silk moth

3. Mounting – Mouthparts and Salivary gland in any two selected insects.
Bed bug
Cockroach
House fly
Mosquito

4a. Qualitative study of haemocyte in the haemolymph of cockroach

4b. Qualitative study of lipids, carbohydrates and proteins in the haemolymph of cockroach.

4c. Identification of Insect pests of the following (3 major pests in each)
i. Paddy ii. Cotton iii. Sugarcane iv. Vegetables v. Storage products

5. Submission – Insects (only photographic album/chart)

6. Spotters
a. Systematics
b. Pests
c. Medical importance
d. Veterinary importance
e. Economic importance
f. Insect whole mounts – 10 slides

7. Record
A complete record of the works done during the practical hours of the year should be submitted with duly bonafide certificate.