SEMESTER – I & II

Core Practical – I

(Based on C_1, C_2 and C_3)

Instructional Hrs : 60 **Sub.Code : 15ZOUCPO1**

Max. Marks : CIA – 40; ESE – 60

Credits: 4

LABORATORY EXERCISES - Through charts / digital materials.

COCKROACH - Digestive system, Nervous system and Male and Female Reproductive system.

FROG - Digestive system, Arterial system, Venous system and Male and Female Urinogenital system.

FIELD STUDY - Observation and identification of any 15 insects.
Report must be submitted along with record note book.

SPOTTERS :

A.CLASSIFY GIVING REASONS :

Paramecium, Obelia, Taenia solium, Earthworm, Prawn, Starfish, Shark, Frog, Pigeon, Rabbit.

B.DRAW LABELLED SKETCH :

Obelia medusa, T.S.of earthworm, T.S. through pharynx of Amphioxus, Frog - Skull (Dorsal view and ventral view), Pectoral and Pelvic girdle.

C.COMMENT ON BIOLOGICAL SIGNIFICANCE:

Sponge gemmule, Physalia, Peripatus, Axolotyl larva, Limulus, Chaemeleon.

D. RELATED STRUCTURE AND FUNCTION :

Spicules of Sponges, Scolex of Taenia, Parapodium of Nereis, Body setae of Earthworm, Mandible of Cockroach, Salivary gland of Cockroach, Placoid scale, Quill feather.

E. WRITE DESCRIPTIVE NOTES :

Sea anemone, Lepas, Mysis larva, Bipinnaria Larva, Exocoetus, Rhacophorus, Naja naja, Flight muscles of bird.

ALLIED ZOOLOGY PRACTICALS

[Based on Paper I & II]

Instructional Hrs.: 75

Sub.Code:15ZOUAPO1

Max. Marks: CIA-20; ESE-30 **Credits: 2**

LABORATORY EXERCISES –Through charts / digital materials.

COCKROACH :

Mouth parts, Salivary glands, Digestive system, Nervous system, Male and female Reproductive system.

FROG :

Digestive system, Arterial system, Venous system, Male and female Urinogenital system.

EXPERIMENTS :

Blood grouping – ABO and Rh system.

Determination of bleeding time.

Determination of clotting time.

Squash preparation of onion root tip.

SPOTTERS :

Identify and comment on:

Paramecium, Obelia colony, Obelia medusa, Ascaris, Earthworm, Cockroach, Starfish, Amphioxus, Shark, Placoid scale, Quill feather, Frog embryology: Egg, Blastula and Gastrula, Pectoral and Pelvic girdle of Frog, Haemoglobinometer, Antisera A, B and D, Vibrio cholerae, Salmonella typhi.

SEMESTER - III & IV

Core Practical - II

(Based on C4 & C5)

Instructional Hrs.: 60 **Sub. Code : 14ZOUCP02**

Max. Marks : CIA-40; ESE-60 **Credits : 4**

DEVELOPMENTAL BIOLOGY

Different types of eggs. (Slides & Specimen)

Embryology of Frog – Slides.

Placenta of Mammals – Sheep & man.

EVOLUTION

Study of any four fossils.

ENVIRONMENTAL BIOLOGY

Estimation of dissolved Oxygen. (Pond and River water)

Estimation of Salinity. ,,

Estimation of pH using pH paper. ,,

Estimation of free Carbon di oxide. ,,

Estimation of Carbonates. ,,

Estimation of Bicarbonates. ,,

Estimation of Calcium ,,

Study of Intertidal fauna – Rocky, Muddy and Sandy shore.

Analysis of Zooplankton in given water sample.

Study of Animal relationship – Commensalism, Mutualism and Parasitism.

Visit to Shore / Pond / Zoological park / Wild life Sanctuary / Biosphere reserves.

Field Study : Observe and identify any 15 Avian fauna.

A report must be submitted along with the record.

ANIMAL BEHAVIOUR

Social behaviour – Honey Bees

SPOTTERS:

A. Descriptive notes:

Hygrometer, Anemometer, Rain gauge, Thermometer, pH meter and D.O. Meter.

B.Draw labelled sketch :

Freshwater plankton– Nauplius larva, Cypris, Daphnia, Cyclops and Zoea larva.

C. Stages of development

Frog embryology – Egg, Sperm, 2 celled stage, 4 celled stage, Blastula and Gastrula.

D. Ecological Adaptations and Animal relationship:

Int ertidal fauna –Mytilus, Balanus, Hippa, Solen, Nereis, Starfish, Sea anemone and Hermit crab – Shark and Suckerfish, Ascaris, Honeybee – Caste system.

E. Embryological / Evolutionary Importance:

Insect's egg, Hen's egg, Placenta of Sheep, Placenta of Man, Arca, Nautilus Natica and Micraster.

SEMESTER – V & VI

Core practical - III

(Based on C_6, C_7 C_8 & C_9)

Instructional Hrs.: 60 hrs. **Sub. Code : 14ZOUCP03**

Max. Marks :CIA- 40; ESE-60 **Credits : 4**

CELL MOLECULAR BIOLOGY

Squash preparation of onion root tip to show Mitosis.

Identification of Salivary gland chromosomes in Chironomous Larva (Demonstration only)

GENETICS

Culture of Drosophila.

Drosophila sex identification.

Identification of Mutant forms.

Survey of Mendelian traits in human population.

Variation in finger prints.

Identification of barr body.

MICROBIOLOGY

Sterilization methods - Autoclave – Hot air oven.

Serial dilution technique for soil samples.

Preparation of culture media for bacteria -Nutrient broth and nutrient agar.

Determination of texture, pH and temperature in soil samples.(Red soil, Loamy soil, Clay soil)

Perform hanging drop mount method to examine the motility of bacteria.

Differential staining of given culture to identify gram positive and gram negative bacteria.

IMMUNOLOGY

Preparation of blood smear.

Leucocyte – differential count.

Lymphoid organs – Thymus, Spleen.

BIOSTATISTICS AND COMPUTER

Find out arithmetic mean, median and mode for biological data.

Find out standard deviation for biological data.

Study of computer components.

SPOTTERS:

A. Comment on the stage of cell division/cell organelles

Stages of Mitosis – Prophase, Metaphase, Anaphase and Telophase.

Cell organelles – Mitochondria, Endoplasmic reticulum, Nucleus.

B. Genetic Importance

Drosophila- Normal – male and female, Mutant – Bar eye, Vestigeal wing, Polytene chromosome and Lamp brush chromosome.

C. Microbiological Significance

Vibriocholerae, Lactobacilli, HIV, Bacterio phage, Yeast, Mushroom, Pencillium.

D. Immunological Significance

Thymus, Spleen,Vaccine - BCG, TAB, DPT, Hepatitis B.

E. Descriptive Notes

Autoclave, Hot air oven,Nutrient agar medium,Inoculation needle, Culture late,Colony counter.

Computer Components - Key board, Mouse, CPU and Monitor.

SEMESTER – V& VI

Core Practical – IV

(Based on C_{10}, C_{11} & C_{12})

Instructional Hrs : 90 **Sub.Code : 14ZOUCPO4**

Max. Marks : CIA – 40; ESE – 60 **Credits: 4**

BIOCHEMISTRY

Biochemical detection of Carbohydrate, Proteins and Lipids.

Gel electrophoresis (Demonstration only)

Separation of aminoacids by paper chromatography

PHYSIOLOGY

Qualitative detection of excretory products.

Qualitative detection of Albumin, Urea and sugar in urine sample.

Total count of RBC

Total count of WBC.

Demonstration of blood pressure in man.

BIOTECHNOLOGY

Blotting techniques – Observation of photographs.

Isolation of human DNA from buccal cavity.

Immobilization of cells

Visit to Biotechnology Industry / Laboratory – A report to be submitted along with the record.

SPOTTERS

A. Comment on

Brain, Lung, Heart, Liver, Kidney**.**

B. Histology of endocrine glands

Pituitary, Thyroid, Adrenal, Testis, Ovary

C. Draw labeled sketch

Striated muscle, Non-striated muscle,Cardiac muscle, Neuron, Human blood.

D. Descriptive notes

Stethoscope, Sphygmomanometer, Southern blotting, Western blotting, Paper chromatography, Gel electrophoresis,Spectophotometer,Laminar air flow.

E. Biotechnological significance

E.coli, Recombinant pBR 322 plasmid, Insulin, Spirulina, Biofertilizer – Rhizobium and

Biopesticide – Bacillus thuringiensis, Bio reactor.

SEMESTER V

Core Paper X: BIOPHYSICS, BIOCHEMISTRY AND BIOINSTRUMENTATION

Instructional Hours : 60 Hrs **Code: 14ZOUC510**

Max.Marks : CIA-25;ESE-75 **Credits:4**

Objectives: To understand the basic principles of Biophysics, Biochemistry and Instruments useful for biological studies.

Unit I **12 Hrs**

Physical quantities and their units – Metric system, Conversion of units. Membrane Biophysics – Active transport, Passive transport, Diffusion, *Osmosis*, Hydrotrophy, Adsorption.

Unit II **12 Hrs**

Classification, structure and functions of Carbohydrates, Proteins and Lipids. Enzymes – Classification – Properties, chemical nature and mechanism of enzyme action – Factors affecting enzyme action – *Enzyme inhibition*.

Unit III **12 Hrs**

Water and mineral metabolism – Distribution of fluids in the body – Water metabolism – Physiological functions of water – Dehydration. Mineral metabolism – Calcium – Sodium – Potassium – Chlorine – Sulphur Trace elements - Iron – Iodine. Acid – Base regulation – Buffers – Acid-Base imbalance – *Alkalosis.*

Unit IV **12 Hrs**

Microscopy – Principles and types (*Light*, Phase contrast and Electron microscope). Centrifuge – Principle and types (Clinical and Ultra centrifuge). pH meter principles and applications. Spectrophotometer – Principles & applications.

Unit V **12 Hrs**

Chromatography – Principles, types and applications (*Paper*, Thin layer and Column). Electrophoresis – Principles & types (Paper and gel) – PAGE. Radio isotopic techniques – Radio immune assay, Biochemical applications of Radio isotopes.

Note: *Italics* denotes topics for self study.

TEXT BOOKS

1. **Narayanan L.M. et al.,** *Biochemistry,* Saras Publications, 2013.
2. **Arumugam. N. & Kumaresan.** V., *Principles and techniques of Biophysics*, Saras Publications, Nagercoil, 2015.
3. **Anne & Arumugam**, *Biochemistry and Biophysics*, Saras Publications, 2014.

REFERENCE BOOKS

1. **Powar C.B. and Chatwal. G.R.,** *Biochemistry,* Himalaya Publishing House, Delhi,2012.
2. **Ramakrishnan.S., Prasannan. K.G., and Rajan. R.,** *Text Book of Medical Biochemistry,* Orient Longman Limited, 2012.
3. **Albert. L.Lehninger, David.L.Nelson., Micheal.M.Cox,** *Principles of Biochemistry,* CBS Publishers & Distributors, Delhi, 2012.
4. **Harold Varley,** *Practical Clinical Biochemistry,* CBS Publishers, 2010.