

Carbohydrates: Biological significance, Classification- Monosaccharides-Disaccharides-Oligosaccharides-Polysaccharides, Structure of Glucose-Sucrose-Glycogen.

Unit – IV

Bioenergetics: Nature of Energy and its Measurements- Chemical Energy- Concept of free energy, Laws of thermodynamics – First-Second-Third, Oxidation reduction Potential, ATP Bioenergetics, Negative entropy changes in living systems.

Unit – V

Analytical techniques: Principle and application of Chromatography (Paper, thin-layer, column and GLC), Centrifugation (RPM and G, Ultra centrifugation), Spectroscopic techniques (UV, visible spectroscopy, X-ray crystallography, NMR, IR, fluorescence & atomic absorption), Isotopes and their importance (GM counters & Scintillation counting).

Biochemistry and Biophysics – Practical

1. Determination of pH in body fluids
2. Preparation of buffers: Phosphate and citrate buffer.
3. Determination of Sodium and Potassium ion concentrations in body fluids.
4. Determination of clinical enzymes in body fluids
5. Total free amino acids (Ninhydrin reagent method)
6. Determination of Protein (Crude and Soluble)
7. Determination of Total soluble carbohydrates (Anthrone reagent method)
8. Centrifugation
9. Electrophoresis
10. Separation of Biomolecules by TLC

Reference Books

1. Biochemistry, by D.Voet and J.G. Voet, 2004. John Wiley & Sons, USA
2. Biochemistry, by R.H. Garrett and C.M. Grisham, (3rd Edition) 2007. Saunders College Publishers.
3. Principles of Biochemistry by Albert L. Lehninger (4th edition) 2004. CBS Publishers & Distributors, New Delhi.

4. Biochemistry by Lubert stryer (4th edition) 2000. Freeman International Edition.
5. Biochemistry by Keshav Trehan, 1990. Wiley Eastern Publications.
6. Fundamentals of Biochemistry by J.L.Jain (4th edition) 1994. S.Chand and Company
7. Biochemistry. S. C. Rastogi, 2nd edition. 2003. Tata McGraw Hill Publishing Company Ltd., N. Delhi.
8. Textbook of Organic Chemistry (A Modern Approach) Ist edition) 2002. McGraw Hill.
9. Biophysics-An Introduction, by C. Sybesma, 1989, Kluwer Academic Publisher.
10. Cellular Biophysics I and II, by Thomas F. Weiss, 1995, MIT Press.
11. Basic Biophysics for Biology, by E. K. Yeagers, 1992, CRC press.
12. Essentials of Biophysics by Narayanan, P (2000), New Age Int. Pub. New Delhi.
13. A Text Book of Biophysics by Roy R.N. (1999), New Central Book Agency.
14. Biophysics by Roland Glaser, 1999, Springer, New York

WILDLIFE BIOLOGY

Core: VI- 23B

Unit-I

Biogeography of India - patterns and distribution of ecosystems, ecological succession, biotic and abiotic factors of an ecosystem. Conservation ethics and values of wildlife. Taxonomy of common Indian wild animals- reptiles, aves and mammals.

Unit-II

Natural history of wildlife; nutritional and reproductive strategies of common wild animals such as reptiles, birds and mammals. Animal behaviour and adaptation- Kind of behavior- Methods of communication- Parental care- Units of behaviour (Behaviour pattern)-Aggression- Intraspecific aggression- Interspecific aggression- Terrestrial aggression- Dominance aggression- Sexual aggression- Parental disciplinary aggression- Weaning aggression- Antipredatory aggression .

Unit – III

Wildlife conservation in India- importance of conservation- methods of wildlife conservation – history of wildlife conservation- wildlife conservation in Indian scenario- wildlife conservation in global scenario. Endangered Fauna of India- why save endangered species? Mammals, Birds and reptiles. The world Conservation Unit (IUCN) - World wildlife fund (WWF) - Indian Board for Wildlife (IBWL)- IUCN red list- IUCN red list of Indian Mammals.

Unit – IV

Introduction- Brief history of ecology, definition, sub-divisions of ecology, approaches to the study of ecology, scope of ecology. Ecological factors -principles of limiting factors, factor interactions. Ecosystem - Brief history, components, of ecosystem, trophic structure of ecosystem, size of ecosystem, trophic level, food chain, food web, ecological pyramids, types of ecosystem, major ecosystems of the world, homeostasis and cybernetics. Biosphere- Atmosphere, hydrosphere, lithosphere; Population ecology and growth; population patterns, habits, habitats, habitat selection; prey-predator relationship.

Unit – V

Wildlife conservation and Management- Historical Background- causes of loss of wildlife- Reasons for the conservation of wildlife- Ecological basis of the wildlife management- Role of NGO's- Biosphere Reserve- National Parks- wildlife sanctuaries- GIR lion sanctuary project- Project crocodile- Management Objectives- the success of the crocodile conservation project- Project elephant – project tiger.

Recommended Readings:

1. Dasmann, R.F. 1982. : **WildLife Biology**, Wiley eastern Ltd. New Delhi.
2. Krishnan, M: **India's WildLife**, 1972. Bombay Natural His. Soc.
3. Mani, M.S. : **Ecology and Biogeography of India**, 1974. Junk. Publ. The Hague.
4. Giler, R.F. : **WildLife Management and Techniques**, 1971. WildLife Soc.
5. Stracey, P.D. : **WildLife in India – Conservation and Control**, 1963. Ministry of Agriculture Govt. India.
6. Hind, R.A.: **Animal Behaviour**, 1966. McGraw Hill, New York.
7. Stillwell, F.: **The wards of WildLife**, 2004. W.W.F.
8. Seber, G.A.F.: **The estimation of animal abundance and related parameters, 1973**. Chapman and Hall.
9. Gee, E.P. : **The WildLife of India**, 1964. Colling London.
10. Rajesh Gopal 1992 : Fundamentals of wildlife management Justice Home, Allhabad, India.
11. T. K. Saha, 2007 Ecology and Enviromental biology, Books and Allied (P) Ltd.

Core Practical- II- 23P ANIMAL PHYSIOLOGY, WILDLIFE BIOLOGY, EXPERIMENTAL EMBRYOLOGY AND ECONOMIC ZOOLOGY

Animal Physiology

1. Influence of pH on salivary amylase activity.
2. Biochemical analysis (Qualitative) – carbohydrate, proteins and fats.
3. Estimation of haemoglobin (Sahli's method), RBC and WBC.
4. Estimation of glucose (O-toluidine method)
5. **Models:** Stomach, Eye, Ear, Liver, Brain, Heart and Kidney.

Wildlife Biology

1. Taxonomic keys: Using insect models
2. Ecological sampling and censuses techniques
3. Measuring species diversity in nearby aquatic community
4. Biodiversity indices - Shannon- wiener index and Simpson's index
5. Collection and Preservation of Museum Specimens
6. Preparation of ethogram and libitum observations on wild fauna
7. Designing and preparation of educational resource material for biodiversity Conservation to school, college and public
8. GIS in wildlife conservation

Experimental Embryology

1. **Spotters** :
 - a) Oogenesis, Spermatogenesis
 - b) **Frog:** Four cell stage, Late cleavage, Blastula, Gastrula, Gastrula yolk plug stage,
 - c) **Chick:** 36 Hours stage, 48 Hours stage, 56 Hours stage, 72 Hours stage, 96 Hours stage.
2. Serial sections of chick embryo.
3. Mounting of chick Blastoderm.

Economic Zoology

1. Parasitic protozoa – Amoeba, Plasmodium and Trypanosoma
2. Helminthes worms – Liver fluke, Tape worm and Filarial worm
3. Insect Pests – Trips, Nematode, Caterpillar and Rhinoceros beetle
4. Value added products of dairy, poultry and fishery
5. Methods for the microbiological examination of water and foods.

Core Practical – III – 33P

MOLECULAR GENETICS, IMMUNOLOGY, ENVIRONMENTAL BIOLOGY AND TOXICOLOGY, CONSERVATION BIOLOGY AND BIOETHICS AND BIOSAFETY

Molecular Genetics

1. Buccal smear test.
2. Peripheral blood leucocyte culture for chromosomal.
3. Banding techniques G, C, and Q (Demonstration)
4. Micronucleus test
5. Sister Chromatid exchange.
6. Identification of drumstick chromosomes in human blood.
7. PCR technique - DNA analysis - Demonstration.

Immunology

1. Blood group determination by slide agglutination; Rh factor determination by agglutination reaction.
2. Total count of blood cells and differential counts.
3. Total hemoglobin determination.
4. Ag-Ab reaction (Model) – Raising antibodies of Ag injection (Model).
5. Elisa Technique (Demonstration).
6. Immunoelectrophoresis- Western Blotting (Demonstration).

Environmental Biology and Toxicology

1. Determination of pH, dissolved oxygen, salinity, and free CO₂ in water
2. Determination of carbonates and bicarbonates in water
3. Estimation of chlorides in water
4. Estimation of dissolved solids in water
5. Visit to drinking water treatment plants
6. Visit to Forest ecosystem – Maruthamalai Forest ecosystem
7. Visit to a Pond ecosystem – Kurichi pond – Ukkadam

CONSERVATION BIOLOGY

1. Inventories/Surveys.
2. Field Techniques.
3. Identification and use of keys – Reference specimen.
4. Collection and preservation.
5. Introduction to computerized techniques – Remote sensing CAMP and GIS and their modules for conservation.
6. IUCN Red List Exercise and PVA modeling.
7. Statistical analysis/interpretation.
8. Technical writing and reporting of field studies.
9. Public presentation.
10. Field Project/ Report – Visit to Zoological parks, wildlife sanctuaries and biosphere reserves.

BIOETHICS AND BIOSAFETY

1. CPCSEA Standard operating procedures for IAEC
2. Laboratory animal Handling techniques
3. Mouse anaesthesia and blood collection
4. Collection of blood from tail vein in rat
5. Collection of blood from cardiac puncture in rat
6. Oral feeding in rat
7. Visit to Research institutes holding animal house facility.
8. Visit to pharmaceutical industry and report submission.
9. CPCSEA, GLP, IPR- Group discussion - report submission.