

PAPER - II (ZOOLOGY)
CW 02: TOOLS AND TECHNIQUES

UNIT - I

Principles of Ecology and Biodiversity: Abiotic and Biotic factors in biology. Understanding diversity in field. Abundance and distribution of animals. Different sampling and field methods. Diversity of animals- genetic diversity, Species diversity, Ecosystem diversity. different indices of species structure in community. Endangered and endemic species. IUCN red list. Conservation of Biodiversity. Study of life cycles and Construction of life tables.

UNIT - II

Principles of Biological Research: Physico-chemical analysis of water, air and soil. Estimation of Primary and Secondary productivity, Estimation of Biomass and gross productivity. Collection, Preservation, Staining, Mounting and Identification of animals. Maintaining of live animals for experimentation.

UNIT - III

Biochemical techniques: Introduction and types of chromatography, paper, thin layer, gas, Gel, ion exchange, HPLC and affinity chromatography and instrumental details of each. Applications of Chromatographic techniques in Biology. Electromagnetic and molecular studies: Electromagnetic spectrum, Beer Lambert's law, UV/VIS Spectrophotometry, Infrared Spectroscopy, Atomic Absorption spectroscopy, Mass spectroscopy. Application of different Spectroscopic techniques in Biology. Paper and gel electrophoresis, Polyacrylamide gel electrophoresis, Agarose gel electrophoresis.

UNIT - IV

Cell and tissue staining techniques: Elements of microtomy- pre-microtomy processes, microtomy process, post microtomy process. In situ and histological staining techniques- Whole mount (In situ) staining techniques, microbial staining techniques. Histochemistry- General histochemistry, enzyme histochemistry, immunochemistry. Microscopy- Light microscopy, electron microscopy, three dimensional microscopy, camera lucida.

UNIT - V

Principles of Toxicology: general bioassays of toxic substances, pesticides, insecticide residue, their effect on animals. Statistics of toxicology, Median lethal dose, Behren's method, Graphical methods, Rapid approximate method by Huson, Finney method. Insect pest control - biological, microbial, chemical method

Books suggested –

1. Research Methodology- G.R. Basotia and K.K. Sharma
2. Research Methodology- C.H. Chaudhary, RBSA Publication
3. Ecology - Odum
4. Ecology and Environment – P.D. Sharma
5. Environmental Studies – Dr. Raghavendra Nambiar
6. Chemical and Biological Methods for Water Pollution Studies, R.K. Trivedi and P.K. Goyal
7. Biodiversity principles and conservation. Kumar and Asija.,Agrobios(India).
8. Biodiversity and environment - S.K.Agrawal , S.Tiwari and P.S. Dubey 1996
9. The Biology of Biodiversity, Springer - M. Kato
10. Manual of Freshwater Biota - Duttamunshi and Duttamunshi.
11. Instrumentation and Bio-analytical techniques - Alka Gupta
12. Biological Instrumentation & Methodology - Dr.P.K.Bajpai
13. Text book of physiology and functional histology - A. K. Berry
14. Cell and Molecular Biology - De Roberties and De Roberties.
15. Principles and Techniques of Biochemistry and Molecular Biology – Wilson and Walker
16. Instrumentation & Techniques by Chatwal & Chatwal.
17. Toxicology- Balaram Pani
18. A Text book of Insect Toxicology – RP Shrivastava and RC Saxsena

➤ *Any other books suggested by Course coordinator/ Course Teacher/ Supervisor concerned may be applied.*