

Department of Zoology
Ph.D. Course Work (Pre -Ph.D.) Syllabus 2011
(Theory)

Paper – I (General Paper)

Unit – I: Taxonomy and Biodiversity

- 1.1 Principles of Taxonomy & its importance
- 1.2 Binomial nomenclature, Taxonomic hierarchy
- 1.3 Concept of Species, Taxonomic Publications
- 1.4 Newer trends in Taxonomy – Numerical, Phenetic, Cladistic and Molecular
- 1.5 Biodiversity and its uses: Conservation strategies - Hotspots of India
- 1.6 Critical review of evolutionary theories

Unit – II: Biostatistics

- 2.1 Concept of sampling, Standard Deviation, Standard Error of mean
- 2.2 Probability distributions - Binomial, Poisson and Normal
- 2.3 Test of Hypothesis – Confidence intervals, errors, levels of significance
- 2.4 Normal variate, Student’ t-test, Chi Square Test and ANOVA, Multivariate analysis
- 2.5 Correlation and Regression Analysis
- 2.6 Applications of Computers in Biological Research

Unit – III: Instrumentation

- 3.1 Principles of Microscopy – Fluorescent, Confocal and Electron
- 3.2 Principles, Types and Methods of Centrifugation, Chromatography – GLC, HPLC and Electrophoresis
- 3.3 Visible and UV spectroscopy, Autoradiography and X-ray diffraction
- 3.4 Electrophysiological methods, Voltage clamp, Patchlamp Technique
- 3.5 Imaging techniques PET, CAT, MRI, fMRI
- 3.6 Basic concepts of Genetic Engineering and Biotechnology – PCR & BLOT Techniques

Unit – IV: Physiology & Molecular Biology

- 4.1 Enzymes and Enzyme kinetics, Metabolic regulation of cellular activity
- 4.2 Immune response – humoral and cell mediated immunity, Immunoglobulins and Auto immune disorders
- 4.3 Biorhythms - molecular mechanism of circadian rhythms
- 4.4 Regulation of gene function in Prokaryotes and Eukaryotes, Genetic disorders
- 4.5 Cell signaling – receptors, signaling through G- Protein receptors, Primary and Secondary messengers
- 4.6 Principles of cell communication; Role of Adhesion molecules

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Paper – II (Specialization)

Unit – I: Research Methodology

- 1.1 Critical evaluation of area of research of the individual
- 1.2 Literature review and data mining
- 1.3 Experimental design and methodology, Methods of sampling
- 1.4 Data computation, preparation of scientific manuscript and dissertation / Thesis
- 1.5 CPCSEA, Animal Ethics, Biosafety and Good Lab practices

Unit – II: Protozoology, Helminthology & Entomology

- 2.1 Important human protozoans, pathogenicity, chemotherapy and immunology
- 2.2 Nematodes (Phytonematodes & Entomophilic nematodes) of Agricultural importance and their management
- 2.3 Important human helminth parasites, pathogenicity chemotherapy and immunology
- 2.4 Integrated Pest Management and Biological control
- 2.5 Modern trends in the use of pesticides, Biotechnological advances in Pest Management
- 2.6 Insect vectors and their management

Unit – III: Physiology, Neurobiology & Applied Biology

- 3.1 Neurodegeneration – Molecular mechanisms, neuropathy
- 3.2 Neuron, origin, diversity, cellular basis of learning & memory & LTP
- 3.3 Diabetes mechanisms, complications, cataract retinopathy
- 3.4 Cancer – oncogenes, chemical carcinogens and carcinogenesis
- 3.5 Programmed cell death, ageing & senescence
- 3.6 Stem cells, bio nanomaterials, biosensors and their applications

Unit – IV: Environmental Biology, Fisheries & Wild Life Biology

- 4.1 Environment - climatic changes and degradation sustainable development
- 4.2 Classification and Metabolism of xenobiotics'
- 4.3 Probit analysis, LC₅₀, LD₅₀, Bioremediation, Bioindicators
- 4.4 Blue revolution, Induced breeding, Reservoir Fishery management
- 4.5 Wildlife Protection Act, Protected Area network, Project Tiger, Endangered species
- 4.6 Transgenic animals – cloned and recombinant animals