

M.PHIL SYLLABUS – ZOOLOGY – 2016

PAPER-1: RESEARCH METHODOLOGY

Unit - I:

Electron Microscopy: Advances in Electron Microscopy, Fluorescence and Phase contrast Microscopy, Image Analysis and its importance in the study of normal and abnormal cells; Immunofluorescence technique. Tissue and Organ Culture: Cell – Cell hybridization; In-situ hybridization, FISH Technique, Flow cytometry, Autoradiography, Homogenisation and Cell fractionation.

Unit-II:

Types of Emission spectra, pH and Ion Selective electrodes, Atomic Absorption Spectrophotometer, Electron spin resonance, Sedimentation, Centrifugation, Types of Centrifuges, Density gradient centrifugation, Ultracentrifugation and their applications.

Unit-III:

Electrophoresis; Western Blotting, Southern and Northern Blotting, 2 D Electrophoresis, Immunoelectrophoresis, (Grabner Williams technique); Isoelectric focusing, Liquid Chromatography, TLC, HPLC, Column Chromatography, Ion Exchange Chromatography; Affinity Chromatography, Gas Chromatography. Radioimmunoassay (RIA), ELISA, Radio-receptor assay, Immunoradiometric assay (IRMA), Chemiluminescence assay.

Unit-IV:

Experimental Design; types and strain of laboratory animals for specific experiments. How to write a research paper. Contribution of Scientists to various fields of specialization. Contribution of leading Research Institution in the Country. ANOVA: Statistical Analysis of data, Computers in Biomedical Science (Basics of Computers/Bioinformatics).

PAPER-2:- MOLECULAR BIOLOGY, BIOTECHNOLOGY & IMMUNOLOGY:

Unit – I:

Immune System, Cells involved in immune responses, Immunoglobulin, T Cell antigen Receptors, Antigen recognition, Regulation of immune-responses, Immunological tolerance, adjuvant and immune-suppressants, Antigen – Antibody reaction, Hypersensitivity, Immunodeficiency, B-Cell deficiencies , T-Cell deficiencies, (SCID), Immunogenetics; AIDS, Secondary immuno-deficiency, transplantation and tissue rejection, tumor immunology.

Unit-II:

Importance of Molecular Biology and Biotechnology, Molecular Biology of Cell and its organelles, characterization of protein, Protein Configuration, Amino acids sequencing in isolated protein, Recombinant DNA technology and gene cloning, Cloning & Expression vectors, Chimeric DNA, Molecular Probes, Gene libraries, Chromosome walking, Chromosome jumping.

Unit-III:

PCR and its application, DNA polymorphism and gene tagging, DNA Finger printing, DNA isolation and synthesis of DNA, Isolation and sequencing of Genes, Molecular Maps of animal genomes, Molecular markers, RFLP, Microsatellites, Cytogenetic Maps, Human Genome project, Biotechnology and its importance; Animal Biotechnology; Transfection methods of transgenic animals, Gene pools, Gene Banks, Hybridoma technology and Monoclonal antibodies, Uses of monoclonal antibodies.

Unit-IV:

Biotechnology in medicine and Human health Industry, Prospects for gene therapy, Biotechnology in forensic sciences; Biotechnology and Environment; Biotechnology in pollution control and monitoring, Biosensors, Biotechnology for reducing impact of toxicants.

PAPER-3: ENVIRONMENTAL BIOLOGY, ENDOCRINOLOGY & TOXICOLOGY:

Unit-I:

Environmental Biology, Wetland Ecology, Natural resources and their conservation, Ecology of National Parks, Sanctuaries, Bio-sphere Reserves, Remote sensing and its application in Ecological studies, Environmental impact assessment studies, Techniques in ecological research, Wild Life Management; Evolutionary and Genetic basis of animal behavior, Behavioural patterns in animals, Behavioural equipments, Psychosomatic drugs.

Unit-II:

Radiation dosimetry, Effects of radiation at the molecular level, Radiation Hormesis, Radio-protective, Radio sensitizing and radiomimetic agents, Precaution while handling radioisotopes in medicine, Radiation diagnostic techniques; In-vitro fertilization and embryo transfer, Micromanipulation, GIFT, ZIFT, SUZI, ICSI. Artificial insemination and cryopreservation of gametes, Recent trends in fertility regulation, Infertility causes, diagnosis and management.

Unit-III:

Biosynthesis, release and action of mammalian hormones, Endocrine disorders. Receptors, Nuclear and membrane Receptors, Receptor regulation, signal transduction, Gene regulation by hormones.

Unit-IV:

Toxicology; General principles, Acute, chronic and subchronic toxicity Testing, Toxicants, Pesticides, Fertilizer, Metals, trace elements, Pollutants, Reproductive Toxicology, Teratogenicity, Neurotoxicity, Genotoxicity, Genotoxic effects on cells, alternation in DNA and repair of DNA damages.