

DEPARTMENT OF ZOOLOGY

FACULTY OF LIFE SCIENCES

A.M.U., ALIGARH

Syllabus for Ph.D Admissions Test 2022-2023 onwards

SECTION-B

Functional and structural diversity in various Animal Phyla; Micro and macro taxonomy, type concept; Ovarian follicular growth and differentiation, IVF, ZIFT, GIFT, IUCD; Types of ecosystem and energy flow in the ecosystem. Trophic level, food chain and food web; Population and community structure. Ecological niche and succession; Sericulture, apiculture, lac culture, poultry & dairy farming; Model organisms and their relevance in biological research; Status and prospects in aquaculture; General organization and function of endocrine glands; Elements of immune systems and its significance; Cell, stem cells, cell organelles, cell signalling, cell-cell interaction, cell cycle; Theories of evolution and modern approach. Human evolution; Central dogma of molecular biology. Types of nucleic acids; DNA conformations and replication. Apoptosis. Recombinant DNA technology & gene cloning; Structure and function of macromolecules.

Basis of Insect classification; Entognathous hexapods and Ectognathous insects; Characters and classification of Apterogote insects, primitive hexapods; Structural and functional organisation of insects; Insect ecology and behaviour; Polymorphic phases; Insect pests of different crops, household and stored grains; Pest of forest trees; Insects of medical and veterinary importance; Importance of insects in medico-legal investigations; Blastokinesis; Gastrulation; Embryonic and Post embryonic development in insect: moulting & metamorphosis; Types of larvae and pupae; Parthenogenesis; Major categories of insect pathogens: bacteria, fungi, viruses, protozoa and nematodes; Chemical, physical, mechanical, pathological, behavioural, cultural and biological control of insect pests; Mode of action of insecticides; Insecticide resistance; Insecticide application appliances; Integrated Pest Management (IPM); Bt crops.

Classical and modern tools of fish taxonomy; Fish food and feeding habits; Fish breeding cycle, spawning and fecundity, induced breeding and its significance; Fish migration; Age and growth determination; Fish stock identification and assessment; Feeding adaptations, digestion; Osmoregulation; Electrogenesis; Cardio-vascular system; Photo reception; Chromatophores and colour change; Dissolved gases and solids, nutrients, light conditions and temperature; Aquatic organisms, plankton, primary and secondary productivity; Culture methods of carps, catfishes, mullet, prawn and pearl; Integrated fish farming; Role of fish in human nutrition; Diversified fish products; Fish by-products; Rigor mortis, fish spoilage; Methods of fish preservation; Significance of fish nutrition and feed technology in aquaculture; Dietary nutrients, energy, feeding levels and schedules; Feed formulation, types of feed, bloodstock and larval feeds; Common fish diseases, their symptoms and control; General environmental features of Indian Ocean, EEZ, zonation of aquatic environment. Salinity, ocean mining, aquatic macrophytes, oceanic plankton, microbial loop, benthic community; World fish production, sea ranching, mariculture, corals, mangroves.

Gene organization, expression and regulation. Non-nuclear genetic material and jumping genes; Genome transmission; Chromosome transmission; X-linked and Holandric transmission; Human Genome. Human behaviour and quantitative genetics. Immunogenetics and genetics of human cancer; Genetic disorders. Genetic counselling & gene therapy; Basic methods in microbial genetics. Bacterial genetics. Phage genetics; Recent advances in developmental genetics. Differentiation.

Morphogenesis and organogenesis; Genetic variability. Genetic polymorphism. Heterozygosity. Gene frequency. Genetic equilibrium; Hardy-Weinburg Law and its application. Change in gene frequency. Mutation. Migration. Selection. Drift. Isolation. Macro evolution; Molecular mutagenesis; Radiation genetics. Genetics of drug responses. Carcinogens and radiomimetic compounds. Genotoxicity testing; Concepts and advances in genomics, proteomics and epigenomics.

Structural and functional organization of nematodes; Orders Tylenchida, Dorylaimida and Mononchida up to families, and important genera of each family. Brief account of the orders Rhabditida, Triplonchida, Aphelenchida etc; Biology and pathogenicity of plant parasitic nematodes and their diseases; Nematodes as vectors of plant virus; Soil structure and texture; moisture characteristic; Movable and immovable water; saturated and unsaturated soil, wilting point and field capacity. Influence of biotic and abiotic factors on nematodes in soil; Population structure and nematode trophic groups; food web indices; Principles and practice of cultural, chemical, physical, biological control. Integrated nematode management and resistant varieties; Behavioural responses and movement patterns. Survival strategies by senescence, quiescence and cryptobiosis; Feeding behaviour of plants parasites and predators; Reproduction, egg laying, hatching and moulting processes and stimuli. Dauer larva.

Definition and consequences of parasitism; factors influencing parasitic fauna and host-parasite relationship; Systematic, morphology, life cycle and pathogenicity of important protozoan parasites; Monogenea, Digenea, Cestoda, Acanthocephala and Nematoda of Polystoma, Schistosomes, *Fasciola*, *Chlonorchis*, *Diphyllobothrium*, *Taenia*, *Hymenolepis*, *Echinococcus*, *Ancylostoma*, *Trichinella*, *Dracunculus*, *Wuchereria*, Morphology, life cycle and disease relationship of *Phlebotomus*, *Simulium*, *Tabanus*, *Glossina*, *Anopheles*, *Culex* and *Aedes*. Ticks, mites and their disease relationship; Physiological basis of parasitism, Metabolism of carbohydrate, protein, lipid and nucleic acids. Physiology of reproduction and egg shell formation. CO₂ fixation, ultrastructure and functions of tegument; Physio-chemical properties of parasite haemoglobin. *In vitro* culture of *Entamoeba*, *Plasmodium* and *Echinococcus*: Pharmacological and immunological control measures against protozoan and helminth parasites. Immune evasion strategies. Current status of antiparasitic vaccines. Molecular characterization of parasitic protozoa, trematodes and cestodes.