

PO, PSO and CO of MS.c Zoology

PROGRAMME OUTCOMES

1. Knowledgeable persons in concerned subjects.
2. Qualified and employable candidates in careers related to teaching and research that require Post graduation.
3. Individuals with aptitude and skill in research.
4. Persons having innovative ideas and necessary training to initiate unique start-ups.
5. Young leaders who offer their service to the betterment of the community.

PROGRAMME SPECIFIC OUTCOMES

1. Individuals having in-depth knowledge in different branches of Zoology.
2. Employable candidates in careers related to teaching in Zoology, especially in schools and colleges.
3. Individuals with aptitude and skill in research in different branches of Zoology as well as related disciplines.
4. Persons having innovative ideas and necessary training to initiate unique start-ups in the realm of life science.

COURSE OUTCOMES

APZO 121: BIOCHEMISTRY

1. Learns unique properties and biological importance of water.
2. Acquires a clear understanding about pH and acid base balance and biological importance of body buffers.
3. Know the structure, classification and nomenclature of macromolecules such as carbohydrates, proteins and lipids.
4. Learns in detail the metabolism and biological importance of macromolecules such as carbohydrates, proteins and lipids.
5. Detailed understanding of enzymes, Mechanism of enzyme action, Enzyme kinetics and Enzyme regulation.
6. Studies the structure and replication of nucleic acids.
7. Acquires an in-depth knowledge on inborn errors of metabolism.
8. Studies the structure and fate of energy rich compounds and their biological significance.
9. Detoxification - oxidation, reduction, hydrolysis and conjugation
10. Learn about free radicals and antioxidants, damage produced by free radicals and Free radical scavenger systems.

11. Studies the biochemistry of aging.

APZO 122: GENETICS, QUANTITATIVE ANALYSIS AND RESEARCH METHODOLOGY

1. Acquires deep understanding of Mendelian genetics and its applications; population genetics, human genetics and microbial genetics. Learns about applied genetics and gene mapping methods.
2. Studies descriptive statistics and applies in academic and research fields.
3. Develops practical understanding of research methodology and applies in research (formulation and defining a research problem, different types of research design techniques involved, Literature survey, execution of research plan and scientific documentation)

APZO 123: BIOPHYSICS, INSTRUMENTATION, COMPUTER SCIENCE & BIOINFORMATICS

1. Students learn the concept of energy, photo and chemo bioenergetics and laws of Thermodynamics.
2. Students learn about electromagnetic spectrum and the applications of spectral components.
3. Acquires knowledge about radioactivity, radio-labelling methods, nuclear medicine, applications of radiations, safety guidelines, etc.
4. Gains basic understanding about Nanotechnology and its applications in biology.
5. Learns the principles and acquires working knowledge of different laboratory equipments and techniques such as microscopes, centrifuges, colorimeter, flame photometer, Spectrophotometer, Electrophoresis, Chromatography, X-ray diffraction and MRI, FMRI, CAT scanning.
6. Studies basics of computer science and acquires working knowledge on computers.
7. Develops functional knowledge in Bioinformatics; learns to carry out sequence alignment how to construct phylogenetic trees and computational analyses of genomes and proteomes.

APZO 221: ADVANCED PHYSIOLOGY AND FUNCTIONAL ANATOMY

1. Acquires a clear understanding of the structure and working of different human organ systems such as muscular system, skeletal system, digestive system, endocrine system, excretory system and reproductive system.
2. Gains thorough knowledge of causes, symptoms and complications of abnormal conditions of muscular system, skeletal system, Gastro-intestinal system, cardiovascular system, respiratory system, nervous system from symptoms.

3. Expands knowledge on metabolism during physical action and adaptations developed by sports persons in response to physical training.

APZO 222: SYSTEMATICS AND EVOLUTIONARY BIOLOGY

1. Develops thorough understanding of basic concepts of Systematics and Taxonomy.
2. Becomes familiar with taxonomic tools and techniques.
3. Becomes familiar with newer trends in taxonomy such as chemotaxonomy, cytotaxonomy and molecular systematics.
4. Acquires a scientific foundation about Cosmic evolution and Origin of life.
5. Develops a deeper understanding about the probable concepts of Molecular evolution, Biochemical and genomic evolution and origin of Higher categories.
6. Learns the probable course of human biological as well as cultural evolution.
7. Studies the evolution of human brain and its varied faculties.

APZO223: CELL AND MOLECULAR BIOLOGY

1. Acquire detailed knowledge about membrane structure, membrane pumps and membrane transport.
2. Develop thorough understanding on cell signalling.
3. Students learn cell cycle and its regulation in detail.
4. Learners acquire detailed information on chromatin structure, topology of nucleic acids, organization of the eukaryotic genome, DNA Replication, repair and recombination.
5. Acquire detailed knowledge on transcription and RNA processing, translation-gene expression and gene regulation mechanisms.

APZO 321 MICROBIOLOGY & BIOTECHNOLOGY

1. Thorough understanding of the general Properties, structure and chemical composition of viruses, viroids, prions and bacteria.
2. Acquire exhaustive knowledge on the culture of microbes, application of microbes in industry, environmental management, waste treatment, bioremediation and enrichment of soil fertility.
3. Understanding the prospects and challenges of microbes in medical field.
4. Learn the basic steps in gene cloning Gene cloning.
5. Learn and practise the protocol of rDNA technology.
6. Learn and practise Cell culture techniques.
7. Develops a thorough knowledge on the application of genetic engineering such as DNA barcoding, transgenic animals, gene therapy biological warfare, etc.
8. Develops a deeper understanding on the ethical, legal and social issues of biotechnology.

APZO 322: ECOLOGY, ETHOLOGY AND BIODIVERSITY CONSERVATION

1. Acquire deep understanding of the structure and basic components of the ecosystem and their interactions and inter-relationships to sustain life on earth.
2. Develops well founded and action oriented knowledge on fundamental concepts relating to ecological energetics, biogeochemical cycles, population dynamics, Species (intra and inter) interactions, ecosystem development, etc.
3. Learns well the concepts of habitat, microhabitat, niche and guild.
4. Understand the role of nervous System, endocrine system, environment and genes in Behaviour
5. Gets a deep knowledge on different types of Learning and the mechanisms behind it.
6. Studies sociobiology of learning and its applications in real life situations.
7. Get a deep knowledge about the basic types of biodiversity, biodiversity in India (features, structure and biodiversity of important Indian ecosystems).
8. Become able to diagnose the causes of biodiversity depletion.
9. Acquire theoretical expertise in strategies for the conservation of nature and biodiversity.
10. Become well informed on international conventions & treaties for conservation of biodiversity

APZO 323: IMMUNOLOGY AND DEVELOPMENTAL BIOLOGY

1. Acquire a solid foundation on facts related to immune system - types of immunity, organs of immune system, immune cells, immunogens, factors affecting antigenicity, antibodies, antibody engineering, antigen-antibody interactions, complement system, etc.
2. Develops sound theoretical knowledge on tissue and organ transplantation and associated complications, immunosuppressive therapy, and defects in immune mechanisms.
3. Acquire advanced information on developmental biology topics like fertilization, gene action in development, Potency, induction, competence, determination (specification & commitment) and differentiation.
4. Study Development in-depth using model Systems such as *Drosophila melanogaster*, *Caenorhabditis elegans* and *Dictyostelium*.
5. Acquire detailed knowledge about medically assisted human reproductive technologies (IVF-ET, GIFT, ZIFT, TET, ICSI) and cloning in animals.

APZO421: POLLUTION BIOLOGY & ENVIRONMENTAL PHYSIOLOGY

1. Acquires clear and thorough understanding about the occurrence, sources and impacts of different types of environmental pollution such as air pollution, noise

pollution, water pollution, thermal pollution, oil pollution, industrial pollution, radioactive Pollution, heavy metal pollution, land pollution, etc.

2. Learns about pollution abatement strategies so that one can practise in real life situations.
3. Understands the impact of human action in augmenting environmental pollution.
4. Understands the role of human beings in protecting life on earth by controlling environmental pollution.
5. Develops awareness about food safety, and learns about food additives, contaminants and adulteration of food.
6. Studies the morphological and physiological adaptations of organisms to physical and chemical factors such as temperature, pressure, salt water balance, etc.
7. Acquire a thorough knowledge on various eco-physiological adaptations such as mimicry, colouration, echolocation, bioluminescence and electric organs.

APZO 422: ENVIRONMENTAL MANAGEMENT

- 1 Students become well informed about both renewable and non-renewable resources (forests, wild life, fossil fuels, minerals, water, etc. and their conservation.
- 2 Studies theory and practice of remote sensing for resource management.
- 3 Learns the impacts of over-exploitation of natural resources by human beings
- 4 Acquire deep knowledge on principle, practice of strategies developed for the scientific management and conservation of natural resources.
- 5 Becomes aware about environmental policy, environmental laws and their enforcement, and the role of Government, media and voluntary organizations in creating environmental awareness among public.
- 6 Become well versed with the objectives, principles, concepts and practice of Environmental Impact Assessment for better management of resources and sustainable development.
- 7 Learns the Concepts and dimensions of sustainable development.
- 8 Make in-depth studies on the applications of biotechnology in different strategies such as sewage treatment, solid waste disposal, soil enrichment, genetic engineering, microbial insecticides, etc. designed for the abatement of environmental pollution.

APZO 2P I

Practical I: Biochemistry, Biophysics, Instrumentation, Computer Application and Bioinformatics

1. Students become experts in Biochemistry practicals.
2. They get Hands on training in biophysics and instrumentation.
3. Students study the use of computers in Biostatistics problems.
4. Bioinformatics tools in protein structure design, drug study, phylogeny etc will be studied.
5. All these experiments can be utilized in future research.

APZO 2P II

Practical II: ADVANCED PHYSIOLOGY , FUNCTIONAL ANATOMY, SYSTEMATICS AND EVOLUTIONARY BIOLOGY, GENETICS, CELL AND MOL. BIOLOGY

Course Outcomes

1. Students become familiar with physiology practicals.
2. Students get fascinated with Taxonomy practicals.
3. Get knowledge of cell 7 mol. Biology practicals.

APZO 4P III: Microbiology, Biotechnology, Immunology & Developmental Biology, Ecology, Ethology and Biodiversity Conservation

Course Outcomes

1. Technique of isolation of Bacteria from soil and water is studied.
2. Medium preparation for microbiology and Cellculture is studied.
3. Bacterial staining practiced.
4. Cell culture and microbiology lab maintenance is studied.
5. Students get expertise in molecular biology lab.
6. They get prepared for research.
7. Concepts of immunology is studied.
8. Immune cells were observed.
9. Different ecology practicals make the students aware of environment protection and need for conservation.
10. Ethology practicals help the students to correlate behaviour with physiology

APZO 4 P IV: Pollution Biology & Environmental Physiology

1. Students become experts in water analysis.

2. Pollution analysis of streams and other water bodies done.
3. Students get expertise in mineral analysis.
4. Expertise in Flame photometer, spectro photometer.
5. Students get awareness of toxicology, LC50 estimation etc.

APZO 4PV: Environmental Management

1. Get knowledge and practical experience in soil analysis.
2. Get expertise in analysis of soil fertility.
3. Get practical experience in construction of ecological pyramid.
4. Biodiversity sampling method is studied.
5. Trasect method for biodiversity estimation is studied.