M.Sc. ZOOLOGY

Programme Outcome

- This program is one of the most fundamental unit of basic sciencesstudied at Postgraduate level.
- The program helps to develop scientifictempers and attitudes, which in turn can prove to be beneficial for thesociety since the scientific developments can make a nation or societyto grow at a rapid pace.
- After studying this program, students will bemore equipped to learn and know about different biological systems,their coordination and control as well as evolution, behavior andbiological roles of the animals in the ecosystem.
- Acquired skills in diagnostic testing, haematology, histopathology, staining procedures etc. used in clinical and research laboratories will provide them opportunity to work in diagnostic or research laboratory.
- Moreover, they will beable to qualitatively and quantitatively analyse evolutionary parametersusing various bioinformatics and computational tools used in modernsciences.
- This will provide them ample opportunities to exploredifferent career avenues.
- The program will also provide a platform forclassical genetics in order to understand distribution or inheritance ofdifferent traits and diseases among populations, their ethnicity andcorrelate with contemporary and modern techniques like genomics,and molecular diagnostic tools.
- Science Post graduates can go toserve in industries or may opt for establishing their own industrial unit.
- Practical and theoretical skills gained in this program will be helpful indesigning different public health strategies for social welfare.
- Theprogram has been designed to provide in-depth knowledge of applied
- subjects ensuring the inculcation of employment skills so that studentscan make a career and become an entrepreneur in diverse fields.

- Candidates find opportunities in government departments, environmental agencies, universities, colleges, biotechnological, pharmaceutical, environmental/ecological fields.
- After higher studies, students can join as Scientist or Assistant Professor or Assistant Teacher, Conservationist, Wildlife Biologist, Zoo Curator, Wildlife Educator, Zoology faculty, Lab technicians, District malaria officer, Veterinarians, Research Associate, Wildlife Conservationist, Wildlife Campaign Officer, Field Officer, Wildlife Project Officer and can even look for professional job oriented courses, such as Indian Civil Services, Indian Forest Service, Indian Police Services etc.

Course Outcome

M.Sc. I Semester I	
HCT1.1 Biosystematics & HCP 1.1 Biosystematics	• Develop understanding on the diversity of life with regard to protists, non-chordates and chordates. • Group animals on the basis of their morphological characteristics/ structures. • Develop critical understanding how animals changed from a primitive cell to a collection of simple cells to form a complex body plan. • Examine the diversity and evolutionary history of a taxon through the construction of a basic phylogenetic/ cladistics tree. • Understand how morphological change due to change in environment helps drive evolution over a long period of time.
HCT 1.2 Tools and techniques in Biology & HCP 1.2 Tools and techniques in Biology	• Understand the purpose of the technique, its proper use and possible modifications/improvement. • Learn the theoretical basis of technique, its principle of working and its correct application. • Learn the construction repair and adjustment of any equipment required for a technique. • Learn the accuracy of technique. • Learn the maintenance laboratory equipments/ tools, safety hazards and precautions. • Understand the technique of cell and tissue culture. Learn the preparation of solution of givenpercentage and molarity.

	• Understand the process of preparation of buffer. Learn the techniques of separation of aminoacids, proteins and nucleic acids.
HCT 1.3 Cell and Molecular Biology & HCP 1.3 Cell and Molecular Biology	• Understand the functioning of nucleus and extra nuclear organelles and understand the intricatecellular mechanisms involved. • Acquire the detailed knowledge of different pathways related to cell signaling and apoptosisthus enabling them to understand the anomalies in cancer • Develop an understanding how cells work in healthy and diseased states and to give a 'healthforecast' by analyzing the genetic database and cell information. • Understand how tissues are produced from cells in a normal course and about anymalfunctioning which may lead to benign or malignant tumorDevelop an understanding ofconcepts, mechanisms and evolutionary significance and relevance of molecular biology in thecurrent scenario. • Apply their knowledge in problem solving and future course of their career development inhigher education and research. • Get new avenues of joining research in related areas such as therapeutic strategies or relatedopportunities in industry.
SCT 1.1 Population Genetics and Evolution & SCP 1.1 Population Genetics and Evolution	• Acquire an in-depth knowledge on the diversity and relationships in animal world. • Develop a holistic appreciation on the phylogeny and adaptations in animals. • Enable the students to understand the evolution of universe and life. • Understanding on the process and theories in evolutionary biology. • Develop an interest in the debates and discussion taking place in the field of evolutionarybiology. Understand the uses and limitations of phylogenetic trees. • Appreciate the complexities and difficulties of various species concepts.
SCT 1.2 Protozoology & SCP 1.2 Protozoology	• Students learn protozoan paratitesinfestation . • Assess the importance of incidence, prevalence and epidemiology • Know how resistance development and resistance Identify parasitism, parasites and their examples. • Describe parasitic diseases and modes of diagnosis. • Trace control of parasitic infections.

	• Understand host-parasite relationship
M.Sc. SEMISTER – II	
HCT 2.1 Developmental Biology & HCP 2.1 Developmental Biology	• Develop critical understanding how a single-celled fertilized egg becomes an embryo and then • a fully formed adult by going through three important processes of cell division, cell • differentiation and morphogenesis. • Understand how developmental processes and gene functions within a particular tissue or • organism can provide insight into functions of other tissues and organisms. • Realize that very similar mechanisms are used in very diverse organisms; and development is • controlled through molecular changes resulting in variation in the expression and function ofgene networks. • Understand how the field of developmental biology has changed since the beginning of the19th century with different phases of developmental research predominating at different times. • Examine the evolutionary history of the taxa based on developmental affinities. • Understand the relevance of developmental biology in medicine or its role in development ofdiseases
HCT 2.2 General and Comparative endocrinology & HCP 2.2 General and Comparative endocrinology	• Understand neurohormones and neurosecretions. • Learn about hypothalamo and hypapophysial axis. • Understand about different endocrine glands and their disorders. • Understand the mechanism of hormone action.
SCT 2.1 Environmental Physiology & SCP 2.1 Environmental Physiology	• Realize that very similar physiological mechanisms are used in very diverse organisms. • Get a flavor of research by working on project besides improving their writing skills. It will • further enable the students to think and interpret individually. • Undertake research in any aspect of environmental biology and physiology in future. • Understand what makes the scientific study of animal ecology a crucial and excitingendeavour. • Engage in field-based research activities to understand well the theoretical aspects taught • besides learning techniques for gathering data in the field. • Analyse a biological problem, derive testable

	hypotheses and then design experiments and putthe tests into practice. • Solve the environmental problems involving interaction of humans and natural systems at localor global level.
SCT 2.2 Helminthology & SCP 2.2 Helminthology	• Understand the life cycle and parasitological perspective of infection and treatment. • The relationship of this infection to symptoms, relapse and the accompanying pathology. • Practical skills in fundamental parasitological techniques.
OET 2.1 Computational Biology & OEP 2.1 Computational Biology	• Analyze the data statistically and interpret the results. • Tests simple hypothesis • Gain research skills that allow them to apply their academic training to real-world problems.
OET 2.2 Research Methodology and Intellectual Property Right & OEP 2.2 Research Methodology and Intellectual Property Right	• Understand the research methology and inculcate research attitude among themselves. • Formulate a research problem for a given engineering domain. • Analyse the available literature for given research problem. • Develop technical writing and presentation skills. • Comprehend concepts related to patents, trademark and copyright
M.Sc. II Semester III	
HCT 3.1 Molecular Cytogenetics & HCP 3.1 Molecular Cytogenetics	• Understand how DNA encodes genetic information and the function of mRNA • Apply the principles of Mendelian inheritance. • Understand the cause and effect of alterations in chromosome number and structure. • Relate the conventional and molecular methods for gene manipulation • Discuss and analyse the epigenetic modifications and imprinting .
HCT 3.2 Biochemistry & HCP 3.2 Biochemistry	• Understand the physiology at cellular and system levels. • Understand the mechanism and regulation of breathing, oxygen consumption and determination of respiratory quotient. • Understand how mammalian body gets nutrition from different biomolecules. • Understand the process of digestion and excretion. • Understand the organization of nervous system and process of nerve conduction • Understand the process of vision and hearing. •

	Understand the process of muscle contraction • Learn the determination of hemoglobin content, blood groups and blood pressure.
SCT 3.2 Economic Entomology & **SCP 3.2 Economic Entomology**	• Understand the diversity of insects. • Understand the mechanism and regulation of pests and parasites • Understand how morphology changes in animals due to change in environment. • Understand the process of feeding in insects.
OET 3.1 Wild life and Conservation Biology & OEP 3.1 Wild life and Conservation Biology	• Develop an understanding of how animals interact with each other and their naturalenvironment • Develop the ability to use the fundamental principles of wildlife ecology to solve • local, regional and national conservation and management issues • Develop the ability to work collaboratively on team-based projects • Demonstrate proficiency in the writing, speaking, and critical thinking skills neededto become a wildlife technician • Gain an appreciation for the modern scope of scientific inquiry in the field of wildlifeconservation management • Develop an ability to analyze, present and interpret wildlife conservation managementinformation.
OET 3.2 Ecology and Ethology & OEP 3.2 Ecology and Ethology	• Students will be able to understand ecology and ethology, physical and chemical properties of Ecosystem. • Also students get knowledge about soil forming rocks and minerals, their weathering and soil forming processes and climatic factors affect them. • Along with this students gain knowledge about Population ecology and ethology
HCT 4.1 Animal Biotechnology & HCP 4.1 Animal Biotechnology	• Develop an understanding of the fundamental molecular tools and their applications of DNA modification and cloning. • Develop future course of their career development in higher education and research with a sound base. • Apply their knowledge with problem solving approach to recommend strategies of genetic engineering for possible applications in Biotechnology and allied industry.
HCT 4.2 Applied Zoology & HCP 4.2 Applied Zoology	• Students able to understand and explain the concepts of innate and adaptive immune response and techniques for clinical diagnosis including immune-technology, applications and limitations.

	• Students were able to apply learned knowledge to their future research
HCT 4.3 Environmental biology and toxicology & HCP 4.3 Environmental biology and toxicology	• Understand different causes of environmental pollution and their remedies • Analyze microbiology of waste water and its implications • Reflect upon various sustainable environmental protection strategies • Evaluate the implications of international legislations, policies for environmental protection
SCT4.1 Zoo keeping and Animal house management	• On the completion of the course, the students shall be able to Understand Animal behaviour in captivity • Learn Zoo architecture and Zoonotic Diseases • Students will be able to identify species, characteristics, habitat requirements and life cycles of Reptiles, birds and mammalian wildlife species and taxidermy procedures. • Students will be able to apply knowledge to solve problems related to wildlife conservation and management. • Students will be able to apply knowledge to solve problems related to wildlife conservation and management.