

Semester-I

Paper I: Systems biology is the computational and mathematical analysis and modelling of complex biological systems. It is a biology-based interdisciplinary field of study that focuses on complex interactions within biological systems, using a holistic approach (holism instead of the more traditional reductionism) to biological research.

Paper II: Environment and conservation Biology : An Environment is everything that is around us, which includes both living and non-living things such as soil, water, animals and plants, which adapt themselves to their surroundings. It is nature's gift that helps in nourishing life on Earth. Environmental and conservation biology will provide the working mechanism of sustainably manage or restore ecosystems, develop and implement environmental policies, or conduct research on how ecological processes affect biological diversity.

Paper-III: Immunology: Immunology is the study of the immune system and is a very important branch of the medical and biological sciences. The immune system protects us from infection through various lines of defence. Immunology is a diverse and growing discipline that can be defined as the study of the tissues, cells and molecules involved in host defence mechanisms. Immunologists attempt to understand how the immune system develops, how the body defends itself against disease, and what happens when it all goes wrong. Immunology is also fundamental to the life sciences industry; the discipline is core to the development of modern antibody therapies, cellular therapies, small molecule drugs, vaccines and 'biologics' (therapeutic biomolecules).

Paper -IV: Taxonomy, systematics and functional anatomy of invertebrates:

it helps us categorize organisms so we can more easily communicate biological information. Taxonomy uses hierarchical classification as a way to help scientists understand and organize the diversity of life on our planet. Invertebrates serve as food for humans; are key elements in food chains that support birds, fish, and many other vertebrate species; and play important roles in plant pollination. Despite providing important environmental services, invertebrates are often ancillary in wildlife research and conservation, with priority given instead to studies that focus on large vertebrates. In addition, several invertebrate groups (including many types of insects and worms) are viewed solely as pests, and by the early 21st century the heavy use of pesticides worldwide had caused substantial population declines among bees, wasps, and other terrestrial insects.

Semester- II

Paper-I: Tools, techniques and Biostats: Statistical tools manage the large data. Many biological studies use large data to analyze the trends and patterns in studies. Therefore, using statistical tools becomes essential, as they manage the large data sets, making data processing more convenient. Statistics allows educators to understand student performance using descriptive statistics. Statistics allows educators to spot trends in student performance using data visualizations, Statistics allows educators to compare different teaching methods using hypothesis tests.

Paper-II: Animal physiology : Animal physiology is the study of how animals work, and investigates the biological processes that occur for animal life to exist. These processes can be studied at various levels of organization from membranes through to organelles, cells, organs, organ systems, and to the whole animal. Animal physiology examines how biological processes function, how they operate under various environmental conditions, and how these processes are regulated and integrated. The study of animal physiology is closely linked with anatomy (i.e., the relationship of function with structure) and with the basic physical and chemical laws that constrain living as well as nonliving systems. Although all animals must function within basic physical and chemical constraints, there is a diversity of mechanisms and processes by which different animals work.

Paper-III: Molecular Genetics and Development Biology : Molecular genetics is an important tool as it helps link mutations to genetic conditions, which will, in turn, help to search for targeted treatments and cures for various genetic conditions. Molecular genetics is a sub-speciality of biology that marks how variation in the structures or expression of DNA molecules indication as variation among organisms. By using mutagenesis screen molecular genetics frequently applies an "investigative approach" to determine the structure or function of genes in an organism's genome. The field of study is based on the consolidation of several sub-fields in biology: classical Mendelian inheritance, cellular biology, molecular biology, biochemistry, and biotechnology. Molecular genetics is a robust methodology for linking mutations to genetic conditions that may support the search for treatments/cures for various genetics diseases.

Paper-IV: Evolution and Functional Anatomy of Vertebrates; An understanding of evolution has been essential in finding and using natural resources, such as fossil fuels, and it will be indispensable as human societies strive to establish sustainable relationships with the natural environment. Such examples can be multiplied many times. evolutionary biology is the study of how evolution occurs. Biological populations evolve through genetic changes that correspond to changes in the organisms' observable traits.

Semester-III

Paper: I: Endocrinology: Endocrinology is the study of hormones. Hormones are essential for our every-day survival. They control our temperature, sleep, mood, stress, growth and more. An endocrinologist is a doctor that treats diseases related to problems with hormones. A hormone is a chemical messenger that travels from one cell to another.

Paper: II: Applied Zoology: Applied Zoology is a discipline that is used to apply existing scientific knowledge to develop more practical applications. As a biological discipline- Zoology has one of the longest histories. It is a branch of biology that deals with animals and animal life, including the study of the structure, physiology, development, and classification of animals. This program focuses to deliver skilled professional animal scientists well equipped to tackle problems related to sustainable livestock development and to the management of companion animals, wild animals and zoo animals. This specialization is meant for students with a strong interest in areas such as the relationship between structure and function of organ systems in animals or the endocrine control of physiological processes. Students have the opportunity to major in fields such as experimental zoology, cell biology, and immunology, or human and animal physiology.

Paper-III: Comparative Animal Physiology-I; Comparative physiology, like comparative anatomy, attempts to uncover evolutionary relationships between organisms or groups of organisms. Comparative physiology seeks to explain the evolution of biological functions by likening physiological characteristics between and among organisms (usually animals.) Therefore, the proper studying of animal physiology is crucial for understanding and evaluating underlying biological processes, behavioral states and animal response to different biological, social and environmental stimuli.

Paper-IV: Agricultural Entomology -I : The study of insects serves as the basis for developments in biological and chemical pest control, food and fiber production and storage, pharmaceuticals epidemiology, biological diversity, and a variety of other fields of science. Much of our knowledge on arthropod population dynamics has its roots in agricultural entomology and specifically the need to control insect pests. Large numbers of specialist herbivore species may congregate in cropping systems because they represent a large concentration of resources.

Semester IV

Paper-I: Animal Biotechnology: Animal Biotechnology in general terms is the science and engineering to alter the living organisms. Animal impact on the environment and the reasons of their diseases can be known and can be altered for better purposes of mankind. Animal Biotechnology comprises of combined implementation of engineering and scientific principles to the treatment or manufacturing of animal products by either fish or any animal to offer economic supplies and services.

Paper-II: Fish Biology: Fish have great significance in the life of mankind, being an important natural source of protein and providing certain other useful products as well as economic sustenance to many nations. A thorough knowledge of fish diversity, distributions, habitat requirements and life histories is **essential to the management of fisheries, and conservation of species and the aquatic environment.**

Paper-III: Comparative Animal Physiology-II; A comparative approach to animal physiology highlights underlying principles, and reveals diverse solutions to various environmental challenges. It can reveal similar solutions to a common problem, or modifications of a particular physiological system to function under diverse conditions.

Paper-IV: Agricultural Entomology -I : The study of insects serves as the basis for developments in biological and chemical pest control, food and fiber production and storage, pharmaceuticals epidemiology, biological diversity, and a variety of other fields of science. Much of our knowledge on arthropod population dynamics has its roots in agricultural entomology and specifically the need to control insect pests. Large numbers of specialist herbivore species may congregate in cropping systems because they represent a large concentration of resources.