

PROGRAMME OUTCOME

Programme Outcomes- B.Sc. Zoology

Under graduate students at the time of graduation are expected to achieve:

PO1.	Self- directed and Life-long Learning: Broaden their outlook and sensibility and acquaint them with cultural diversity and divergence in perspectives.
PO2.	Effective Communication Skills: Provide the students with an ability to build and enrich their communication skills and make meaning of the world by connecting people, ideas, books, media and technology.
PO3.	Effective Social Interaction: Enhance the level of literary and aesthetic experience of students and to help them respond creatively.
PO4.	Critical Thinking: Attain life readiness through problem-solving skills and competencies, develop scientific attitude, keep scientific temper and to develop a research culture.
PO5.	Ideal Citizenship: Imbibe human values, inclusiveness attitude, socio-cultural sensitivity and develop knowledge of theories, concepts.
PO6.	Ethics: Recognize different value systems including one's own, understand the moral dimensions of one's decisions, and accept responsibility for them.
PO7.	Environment and Sustainability: Understand the issues of environmental contexts and sustainable development.
PO8.	Digital Knowledge System: Adequate technical training in the application of digital knowledge in higher education and workplace.
PO9.	Project Work and Oral Examination: Equip students to demonstrate their own work and to investigate their awareness in relation to the wider research field.

Programme Outcomes- M.Sc. Zoology

Post graduate students at the time of graduation are expected to achieve:

PO1.	Framing Masters of Knowledge in Specific Subjects: Provide the students with an in depth understanding in specific subjects so as to enable them to choose research areas as per their own interest.
PO2.	Technological Excellence: Possess an enhanced breadth of technical knowledge, combined with deep knowledge in critical core areas of Technology Enhanced Learning (TEL).
PO3.	Pathfinders in Scientific Exploration: Demonstrate acumen in organizational leadership through effective collaboration, consultation, and decision- making.
PO4.	Practicing Green Philosophy: Understand the issues of environmental contexts and sustainable development.
PO5.	Research Activity: Produce and defend an original significant contribution to knowledge and methodologies to design, analyze and interpretation of data and find the solutions for complex problems by applying right tools.
PO6.	Employability: Postgraduate study boosts the career progress and chart out the career paths. It demonstrates the ability to tackle complex and challenging assessment tasks.
PO7.	Dissertation and Viva Voce: To enable the students to present their arguments in comprehensible and scholarly manner and to enkindle the spirit of research in their minds.

Programme Outcomes- Ph.D. Zoology

Doctor of Philosophy Program students at the time of graduation are expected to achieve:

PO1.	The Doctor of Philosophy program is designed to prepare each student to actively participate in research in the field of Zoology along with other fields of Life Sciences.
PO2.	Students are exposed to advanced experimental and theoretical techniques, encouraged to attend National and International conferences as well as workshops during the program.
PO3.	Students in this programme acquire knowledge, critical thinking skills, and experience in conducting cutting-edge research. Students would gain proficiency in research methodology and assessment techniques in animal science.
PO4.	Demonstrate the ability to communicate the results of their research work in a clear and effective manner.
PO5.	Earning this advanced degree may result in employment at the highest levels in the fields of zoological and biological science. Students with a Ph.D. degree either pursue a post-doctoral position aiming for an academic career or find employment in industrial R&D laboratories.
PO6.	Receiving a Ph.D. allows the holder to conduct independent research.

COURSE OUTCOME

B.Sc. Zoology

First Degree Programme under CBCSS

Core Course Outcome

Semester I

ZO1141 Animal Diversity I

- CO1. To learn the basics of systematic and understand the hierarchy of different categories.
- CO2. To learn the diagnostic characters of different phyla through brief studies of examples.
- CO3. To obtain an overview of economically important invertebrate fauna.

Semester II

ZO1241 Animal Diversity II

- CO1. To learn the general characteristics and classification of different classes of vertebrates.
- CO2. To understand the vertebrate evolutionary tree.
- CO3. To understand general aspects of applied interest in relation to vertebrates.

Semester III

ZO1341 Experimental Zoology, Instrumentation, Biostatistics and Bioinformatics

- CO1. To learn the fundamental characteristics of science as a human enterprise.
- CO2. To understand how science works.
- CO3. To study to apply scientific methods independently.

Semester IV

ZO1441 Ecology, Habitat Destruction & Disaster Management

- CO1. Students get basic knowledge on ecosystem, food chain, food web and energy flow.
- CO2. Students acquire general awareness on pollution and their impacts.
- CO3. Imparts basic knowledge on ecosystems and their functioning.
- CO4. Students learn about various types of anthropogenic pressures on ecosystem, related degradation and management measures.
- CO5. Students get awareness of toxicants, their impacts on human health and environment and remedial measures.
- CO6. Create awareness about disasters, prevention and mitigation measures.

Practical I - ZO1442 Instrumentation, Animal Diversity I and Animal Diversity II

CO1. Students learn anatomy by dipping through simple dissections and mountings on permitted species.

CO2. Students get familiarized with various organ systems by examining approved animals.

CO3. Emphasize the adage that 'seeing is believing' by observing typical examples and economically important specimens.

CO4. Students learn the working principle of different scientific instruments.

CO5. Students become familiar with economically important species.

CO5. Strengthen what students studied in theory by giving them an opportunity to have first-hand experience in lab as well as outside.

Semester V

ZO1541 Cell Biology and Molecular Biology

CO1. Students acquire sufficient knowledge on the fundamental structure, function and biochemistry of the cell.

CO2. They understand the principles of molecular biology and gene manipulation.

CO3. Students learn ultra-structure of prokaryotic and eukaryotic cells.

CO4. Students understand the fundamental differences between prokaryotic and eukaryotic cells.

CO5. Students learn the structure, replication and modification of the genetic material of eukaryotes.

CO6. Students understand the mechanism of gene expression and gene regulation.

CO7. Gets an awareness of bacterial recombination.

CO8. Students acquire scientific knowledge on cancer and ageing.

ZO1542 Genetics and Biotechnology

CO1. Structure of gene is to be learned.

CO2. Students get educated on the underlying genetic mechanism operating in human and state of the art of bio-techniques

CO3. Students develop a proper understanding on the relation between heredity and variation.

CO4. Learn the mechanism of crossing over and inheritance patterns in human.

CO5. Students become aware of different genetic syndromes and the possible ways to reduce its occurrence.

CO6. Students understand the principles and techniques involved in DNA technology and get an overview of modern techniques like PCR, Hybridoma technology, gene therapy and human cloning.

ZO1543 Immunology and Microbiology

CO1. Students understand the scope and importance of clinical immunology.

CO2. Students understand the principles and mechanisms of immunology.

CO3. Learn the malfunctioning and disorders of the immune system

CO4. Students acquire knowledge on immunodeficiency diseases.

CO5. Transplantation and mechanism of Graft retention and rejection are learned.

CO6. Students get a brief history of microbiology.

CO7. Students develop a broad understanding of the positive as well as negative aspects of microbes.

CO8. Economic importance (applied aspects) of microbes in industry can be studied.

Semester VI

ZO1641 Physiology and Biochemistry

CO1. Students develop a clear understanding of the correlation and coordination between the structure and function of different organs and organ systems of the body.

CO2. Proper study on the physiology help students understands the physiology of different organ systems of the body.

CO3. Students learn the correlation between diseases and the abnormal structure or improper functions of organs.

CO4. Students understand the possible causes of abnormal physiology and the resultant diseases.

CO5. Students understand the structure and functions of bio-molecules and their role in metabolism.

CO6. This course opens new areas of research to students.

ZO1642 Developmental Biology and Experimental Embryology

CO1. Students get a brief idea about the history of developmental biology.

- CO2. Provide the students a bird's eye view of sophisticated embryological techniques
- CO3. Study the various stages involved in the development of organisms.
- CO4. Study the initial developmental procedures involved in Amphioxus, Frog and chick
- CO5. Procure information on state- of- the art experimental procedures in embryology.
- CO6. Different control mechanisms of development including gene action are studied.

ZO1643 Ethology, Evolution and Zoogeography

- CO1. To enhance the student's concept on organic evolution and appreciate the different modes of energy efficient communication systems existing in the animal world.
- CO2. To study the physiological basis of behaviour.
- CO3. Study the different types of communication system among animals.
- CO4. To get a concept on organic evolution.
- CO5. To get knowledge on the distribution of animals in the biosphere.

Practical II - ZO1644 Cell Biology, Genetics, Bioinformatics, Biotechnology, Immunology and Microbiology

- CO1. To expertise the student to carry out routine haematological and microbiological techniques.
- CO2. To prepare and observe chromosomal arrangements during cell division.
- CO3. To study chromosomal aberrations in man.
- CO4. To gain of broad knowledge of conventional biotechnological procedures.
- CO5. To perform routine blood analysis.

Practical III - ZO1645 Physiology and Biological Chemistry, Molecular Biology and Biostatistics.

- CO1. To demonstrate basic principle in physiology.
- CO2. To learn clinical procedures for blood & urine analysis.
- CO3. To make the student skillful in simple biochemical laboratory procedures.

Practical IV - ZO1646 Developmental Biology, Ecology, Ethology, Evolution and Zoogeography

CO1. To introduce the nature and scope of various aspects of Immunology and Developmental biology.

CO2. Integration and consolidation of knowledge in immunology such as nature of resistance, mode of development and growth, various aspects of development.

CO3. To introduce the nature and scope of various aspects of classification practiced in biological science with special reference to Animal Science.

ZOI647 Zoology Project and Field study

CO1. To develop an aptitude for research in Zoology.

CO2. To inculcate proficiency to identify appropriate research topic and presentation.

Open Course

Semester V

ZO1551.1 Public Health and Hygiene (Zoology Open Course I)

CO1. To make the student aware of the essentials of public health and sanitation thereby warding off diseases and uplifting the living standards of the community

CO2. To learn the principles of nutrition and dietetics.

CO3. To understand the ill effects of modern lifestyle.

CO4. To study the advantages of being hygienic and sanitation.

Semester VI

ZO1651.1 Economic Zoology - Vermiculture and Apiculture (Zoology Open Course II)

CO1. To promote self employment and self reliance among educated youth.

CO2. To learn the basic procedure and methodology of vermiculture.

CO2. To learn the scope and methodology of apiculture.

First Degree Programme in Zoology
Choice Based Credit and Semester System
Zoology Complementary Course

Semester I

ZO1131 Animal Diversity I

CO1. To inculcate in the student a love and understanding of the fascinating world of Invertebrates.

CO2. Impart to the student a concrete idea of the evolution, hierarchy and classification of invertebrate phyla.

CO3. Understanding the basics of systematics by learning the diagnostic and general characters of various groups.

CO4. Getting an overview of typical examples in each phyla.

CO5. To study the economic importance of invertebrates with the special reference to insect pests.

Semester II

ZO1231 Animal Diversity II

CO1. To inculcate in the student a fascination for nature and learn the bionomics of vertebrates.

CO2. Learn the evolution, hierarchy and classification of different classes of chordates

CO3. To get an overview of the morphology and physiology of typical examples.

CO4. To study the adaptations and economic importance of specific vertebrates.

Semester III

ZO1331 Functional Zoology

CO1. To familiarize students on the physiology of their own body and urge them to take precautionary measures to safeguard their health.

CO2. To study the structure and function of each system in the human body.

CO3. To study the etiology of common physiological disorders, syndromes and diseases.

Semester IV

ZO1431 Applied Zoology

CO1. To introduce the methodology and perspectives of applied branches of zoology with a view of educating youngsters on the possibilities of self employment.

CO2. To learn the basic principles involved in the culture and breeding of common edible and ornamental fishes of Kerala and the art of aquarium keeping.

CO3. To get a basic understanding of human genomics and reproductive biology including stem cell research and prenatal diagnostic techniques.

Practical I - ZO1432 Animal Diversity I &II, Functional Zoology and Applied Zoology

CO1. To provide hands on training experience in anatomy through simple dissections and Mountings.

CO2. To familiarize students with conventional organ system in common, easily available animals.

CO3. To emphasize the adage that 'seeing is believing' typical examples and economically important specimen (preserved) to be studied.

CO4. To study and carry out routine clinical analysis of blood and urine.

COURSE OUTCOME

M.Sc. Zoology

Semester I

ZO 211 Systematics and Evolutionary Biology

CO1. To introduce the nature and scope of various aspects of Systematics, Animal taxonomy and Classification practiced in biological science with special reference to Animal Science.

CO2. To impart knowledge on the basic aspects on Animal taxonomy and classification and demonstrate knowledge and understanding the naming of the species and get the idea about the phylogeny and evolutionary history.

ZO 212 Biochemistry

CO1. To introduce the nature and scope of various aspects of Biochemistry.

CO2. To impart knowledge on various biochemical molecules and path ways in life processes.

CO3. To demonstrate knowledge and understanding of the molecular machinery of living cells, the principles that govern the structures of macromolecules and their participation in molecular recognition, and understanding of the principles and basic mechanisms of metabolic control and molecular signalling.

ZO 213 Biophysics, Instrumentation and Computer Science

CO1. To introduce the principle behind the functioning of various instruments, their functioning and application of various computer programmes in biological laboratories.

CO2. To get knowledge and understanding of the application of instruments in biological laboratory and the application of various computer programmes and packages in research.

Semester II

ZO221 Advanced Physiology and Functional Anatomy

CO1. To introduce the nature and scope of various aspects of anatomy and physiology in general and human anatomy and physiology in particular.

CO2. To impart deep knowledge on the structure and functioning of different systems in organisms from molecular level to organ systems and to the physiological attributes of whole organism.

ZO222 Genetics, Quantitative Analysis and Research Methodology

CO1. To introduce the nature and scope of various aspects of Genetics, Biotechnology and signal transduction processes related with zoological science.

CO2. To introduce students to the science of heredity, from its basic principles to the most recent advances in the field.

CO3. To impart knowledge of classical and molecular genetics.

CO4. Expose the learners to the emerging field of research and equip them the various research methodologies.

ZO223 Cell Biology, Molecular Biology and Bioinformatics

CO1. To introduces the nature and scope of various aspects of cell structure and molecular biological aspects in cell biology.

CO2. The students will be introduced on the various aspects of cell function, cell replication, cell communication, protein synthesis, cell dynamics etc.

CO3. Expose the learners to the emerging field of research in Molecular Biology and Bioinformatics..

ZO214 Practical I Systematics and Evolutionary Biology, Biochemistry, Biophysics, Instrumentation and Computer Science

CO1. Study of preservation media and tools and materials for taxidermy.

CO2. To learn clinical procedures for blood & urine analysis.

CO3. To make the student skillful in simple biochemical laboratory procedures.

Practical II ZO 224 Advanced Physiology and Functional Anatomy

CO1. To demonstrate basic principle in physiology.

CO2. To learn clinical procedures for blood & urine analysis.

CO3. To make the student skillful in simple biochemical laboratory procedures

Semester III

ZO231 Microbiology and Biotechnology

CO1. Over view of the microbial world, its structure and function.

CO2. Familiarize the learner with the applied aspects of microbiology.

CO3. Intensive and in-depth learning in the field of biotechnology.

CO4. Understand the modern biotechnology practices and approaches with an emphasis in technology application, medical, industrial, environmental and agricultural areas.

CO5. Familiarize the students with public policy, biosafety, and intellectual property rights issues related to biotechnology.

ZO232 Ecology, Ethology and Biodiversity Conservation

CO1. To introduce the nature and scope of various aspects of Ecology and Environmental Biology in general and human environment in particular.

CO2. Imparting basic knowledge about the environment and its allied problems.

CO3. Developing an attitude of concern for the environment.

CO4. Make one striving to attain harmony with Nature, acquiring skills to help the concerned individuals in identifying and solving environmental problems.

CO5. Generate an interest in Ethology in order to understand the complexities of both animal and human behavior.

ZO233 Immunology and Developmental Biology

CO1. Provide an intensive and in-depth knowledge to the students in various aspects of Immunology and Developmental biology.

CO2. Expose to concepts and process in developmental biology.

CO3. Understand and appreciate the genetic mechanisms and the unfolding of the same during development.13

CO4. Expose the learner to the new developments in embryology and its relevance to man.

Practical III- ZO234 Microbiology, Biotechnology, Ecology, Immunology and Developmental Biology

CO1. Integration and consolidation of knowledge in various aspects of Microbiology, Biotechnology, Immunology and Developmental biology.

CO2. To introduce the nature and scope of various aspects of ecology practiced in biological science with special reference to Animal Science.

Semester IV

Special Subject

ZO241 Pollution Biology & Environmental Physiology

CO1. To introduce the nature and scope of various aspects of Environmental pollution and its management in micro and macro levels.

CO2. Imparting basic knowledge about the environmental pollution, toxicology and its allied problems.

CO3. Make one striving to attain knowledge on the pollution problems and toxicological effects and toxicological procedures in experiments and analysis.

ZO 242 Environmental Management

CO1. Broad and deep understanding on environment and influence of man on environment.

CO2. To acquire knowledge and understanding of environmental management including the conservation practices, laws and regulations.

Practical IV -ZO 243 Pollution Biology & Environmental Physiology

CO1. To get Hands-On Real-World Testing of different aspects of pollution.

CO2. To develop knowledge and understanding of how the environment can influence organisms physiology.

CO3. To build knowledge of basic physiological principles and study the physiology of organs.

Practical V -ZO 244 Environmental Management

CO1. To acquire knowledge on the use and conservation of natural resources, protection of habitats, and control of hazards.

CO2. To equip students with the skills needed to tackle the important environmental issue.

CO3. Develop scientific attitude and Problem solving ability.

ZO 201 Project

CO1. To develop an aptitude for research in Zoology.

CO2. To inculcate proficiency to identify appropriate research topic and presentation.

COURSE OUTCOME

Course Outcome Ph.D.

Research Methodology

CO1. Scholars should be able to identify the overall process of designing a research study from its inception to its report.

CO2. Scholars should know the primary characteristics of quantitative research and qualitative research.

CO3. Scholars should be able to identify a research problem stated in a study.

CO4. Scholars should be familiar with ethical issues in educational research, including those issues that arise in using quantitative and qualitative research.

Special Paper 1. - Biological oceanography

CO1. To acquire knowledge on the diversity of coastal and marine fauna and flora.

CO2. Scholars should be familiar with bioresource utilization, threats to marine biodiversity and its management for sustainable utilization.

Special Paper 2. - Marine Toxicology

CO1. To acquire knowledge on the diversity of coastal and marine fauna and flora.

CO2. Scholars should acquire skill development in Marine Toxicology.

CO3. Scholars should be familiar with adverse effects of chemical substances on living organisms in the marine environment.

CO4. To equip Scholars with assessing the effects of toxic pollutants on the environment and in the food chain.

Special Paper 3- Freshwater Ecology

CO1. Scholars should be able to learn the principles, applications and management of Freshwater Ecology.

CO2. To build knowledge of interactions between energy, water and food and the how their sustainability will safeguard the future of humans and the ecosystem on the planet.

CO3. To learn the variety of technologies currently employed and under development for production of bioenergy and byproducts.

Special Paper 4- Benthic Ecology

CO1. Scholars should be able to learn the principles, applications and management of Benthic Ecology.

CO2. Scholars should be able to determine environmental health and conduct environmental impact studies.

CO3. Scholars should be able to know how the diversity of aquatic benthic species and their traits i.e. functional diversity, influence different ecosystem process.

Special Paper 5- Ecology of Benthic Macro-Invertebrates

CO1. Scholars should be able to learn the principles, applications and management of Benthic Ecology.

CO2. Scholars should be able to develop species database on Benthic Macro-Invertebrates.

Special Paper 6- Taxonomy and Ant Ecology

CO1. Scholars should be able to develop knowledge on beneficial and non-beneficial insects.

CO2. To acquire knowledge on how Ants interact with their environment, other species and humans.

CO3. Scholars should be able to develop species database on Ants.

CO4. To learn the advances in taxonomy, distribution, special organs in Ants, offensive and defensive behavior, entomological industries, biological values.

Special Paper 7- Environmental Toxicology

CO1. Scholars should be able to develop knowledge on the sources, links and biological effects of major classes of pollutants in the environment.

CO2. Scholars should be able to attain careers in academic programs, research centers and consulting firms by providing them with an in-depth understanding of causes, consequences and methods of assessment of environmental pollution.

Special Paper 8- Zoogeography and Molecular Phylogeny

CO1. Scholars should understand the science of animal behaviour.

CO2. Scholars trained in the study of phylogenetic inference and will be able to reconstruct phylogenetic trees based on several molecular markers, applying the State-of-the-Art bioinformatics tools in the field.

CO3. To inculcate proficiency to identify the basics of phylogenomics and will analyze case studies in phylogenetics and phylogenomics.

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