St. Albert's College (Autonomous)

An initiative of Archdiocese of Verapoly

Affiliated to Mahatma Gandhi University, Kottayam

(Accredited with "A" Grade by NAAC)

Programme Outcomes
Programme Specific Outcomes
Course Outcomes

Department of Zoology

B.Sc. Zoology

2016 Onwards

PROGRAMME OBJECTIVES

Deep Knowledge in the Discipline: To develop a thorough knowledge about the subject and its allied realms by conscious and continuous process of learning and get informed about the cutting edge research in the frontier areas of the subject.

Critical Thinking and Problem Solving Skills: To develop an informed and analytical approach to learning and demonstrate an in-depth knowledge of the subject and to give his/her opinion supported by logical reasoning and problem solving skills.

Self-Awareness and Emotional Intelligence: To develop proper idea about one's own capabilities and potentials and to nurture those attributes towards holistic personality development.

Teamwork and Effective Communication: To demonstrate proficiency in communicating competently in groups and organizations, competence in interpersonal communication and to possess skills to effectively deliver formal and informal presentations to a variety of audiences in multiple contexts.

Leadership Qualities: To build essential features of a true leader and to cultivate the character and courage to shoulder responsibilities.

Social Interaction and Ethical Standards: To foster the social skills and developing peer interaction and enabling them to make all people feel valued and to respect their differences by being responsible citizens for creating a socially inclusive society. To recognize values such as justice, trust, equity, fairness, kindness and develop a commitment to meeting and upholding standards of ethical behaviour in all walks of life and comprehending the moral dimensions of decisions and actions.

Environmental Consciousness: To discern the issues of environmental contexts and engages in promoting values and attitudes that claim coexistence and sustainable living with reduced, minimal, or no harm upon ecosystems.

Lifelong Learning: To develop a passion to be an independent lifelong learner by imbibing real-time changes in the socio-technological context, promoting continuous development and improvement of the knowledge and skills needed for employment and personal fulfilment.

PROGRAMME SPECIFIC OUTCOMES

1. Acquire basic knowledge of various disciplines of Zoology and General Biology meant both for a graduate terminal course and for higher studies.
2. Inculcate interest in nature, various ecosystems, its interactions, laws governing their conservation.
3. Understand the rich diversity of organisms and their ecological and evolutionary significance.
4. Develop a broad foundational knowledge of the faunal diversity especially local fauna, pattern of evolution, morphological features, adaptation and classification
5. Imbibe basic skills in biological techniques, experimental skills and scientific investigation leading to research.
6. Create awareness on the internal harmony of different body systems and the need for maintaining good health through appropriate lifestyle.
7. Understand the application of biological sciences in aquaculture, apiculture, vermiculture, quail farming and agricultural pest management, there by impart skill as well a source of additional income and self-employment.
8. To gather sufficient knowledge about various aspects of developmental biology, cell biology and molecular biology.
9. Explain the recent developments in genetic engineering, biotechnology, immunology, general informatics and bioinformatics for research activities.

COURSE OUTCOMES

Core Courses

Course 1- GENERAL METHODOLOGY AND PERSPECTIVES IN SCIENCE (ZOO1CRT 01)

On completion of the course, the learner will;

- Understand the basic philosophy of science, its history, concepts and scope.
- Develop proper scientific mind, culture and work habits.
- Understand the various branches and scope of Zoology.
- Be able to analyze the methods of scientific studies.
- Be capable of examining the concepts of Taxonomy.
- Understand the basic techniques of animal rearing, collection and preservation.

GENERAL METHODOLOGY AND PERSPECTIVES IN SCIENCE (ZOO1CRP 01)

By the end of the course, the learner should be able to;

- Handle the basic tools and techniques of scientific study with emphasis on biological sciences.
- Illustrate the working of microscopes.
- Create basic idea about the research methods in biology.
- Illustrate the invertebrate specimens with precision.
- Explain the concepts of microscopy.
- Describe various separation techniques.
- Describe the basic principle of spectrometry and radiography.
- Analyze the dimensions of the biological samples.

Course 2- Biodiversity and Modern Systematics (ZOO2CRT01)

On completion of the course, the learner will;

- Be able to appreciate the diversity of life on earth.
- Understand different levels of biological diversity.
- Have a thorough understanding in the principles and practice of systematics.
- Acquire an in-depth knowledge on the diversity and relationships in the animal world.
- Familiarize with taxa level identification of animals.
- Learn biodiversity estimation techniques.
- Generate interest for the conservation of biodiversity.

Biodiversity and Modern Systematics (ZOO2CRP01)

By the end of the course, the learner should be able to perform;

- Sampling techniques and Identification using keys.
- Taxa identification.
- Planning for local biodiversity conservation efforts.

Course 3- Animal Diversity - Non Chordata (ZOO3CRT 01)

On completion of the course learner should;

- Improve the knowledge about criteria for animal classification.
- Improve the knowledge of animals about their special adaptations and evolutionary relationship
- Learn how to study their nature of habitat scientifically.
- Improve their information about morphology and anatomy of animals.
- Understand the arrangement of organism or groups of organism in distinct categories in accordance with particular and well established plan.

- Be able to explain the unity in diversity of organism.
- Study specific and scientific names to organism.
- Collect information about useful and harmful animals and understand the nature of habitat.

Animal Diversity - Non Chordata (ZOO3CRP 01)

By the end of the course the learner should be able to;

- Illustrate the invertebrate specimens with precision
- Compare the anatomy and morphology of non-chordates through transverse or longitudinal sections, dissections and mountings.
- Understand, identify and classify the various groups of non-chordates.
- Understand the evolutionary, adaptation and taxonomic significance of non-chordates

Course 4- Animal Diversity –Chordata (ZOO4CRT 01)

On completion of the course learner should;

- Develop in depth knowledge on the diversity of chordates and their systematic position
- Acquire knowledge about the distinguishing characteristics and classification of the
  Major vertebrate phyla.
- Be aware of the economic importance of some classes.
- Understand the evolutionary importance of selected chordate groups.

Animal Diversity –Chordata (ZOO4CRP 01)

By the end of the course the learner should be able to;

- Identify the local chordate diversity through observation and identification.
- Examine the anatomy, morphology and osteology of Chordates.
- Apply taxonomic keys in classification of vertebrates.

Course 5- Cell Biology and Molecular Biology (ZOO5CRT 01)

On the successful completion of the course, students will have:

- The knowledge about the prokaryotic and eukaryotic cell, its complex organization.
- Understanding of the structure and function of the cell and the fundamentals for functioning of all living organisms.
- Insights into the mechanisms involved in the synthesis and function of macromolecules such as DNA, RNA, and proteins.

- An idea of the structure, replication and modification of the genetic material.
- Awareness of different cell organelles, their structure and role in living organisms.
- Critical thinking, skill and research aptitudes in basic and applied biology.
- The capacity to explain the nature of genetic material and gene concept.
- Capability of summarizing gene expression and gene regulations.

Cell Biology and Molecular Biology (ZOO5CRP 01)

By the end of the course the learner should be able to;

- Identify cell organelles, barr body, mitotic stages, blood cells and polytene chromosome.
- Prepare whole mounts, blood smear, squash preparation of root tip
- Perform isolation of genetic material.
- Identify the macro molecules in the cell.
- Identify the stages of DNA replication.

Course 6- Environmental Biology, Toxicology and Disaster management (ZOO5CRT 02)

On completion of the course the learner should-

- Acquire basic knowledge on ecosystems and their functioning
- Learn about various types of anthropogenic pressures on ecosystem, related degradation and management measures
- Study toxicants, their impacts on human health and environment and remedial measures
- Be aware about disasters, prevention and mitigation measures

Environmental Biology, Toxicology and Disaster management (ZOO5CRP02)

By the end of the course the students should;

- Get familiarized with the procedures for the estimation of environmental parameters
- Identify fresh water and marine plankton and their enumeration
- Familiarize with extraction of soil organisms
- Identify minerals and rocks

Course 7- Evolution, Zoogeography and Ethology (ZOO5CRT 03)

On completion of the course learner should;

- Acquire knowledge about the evolutionary history of earth (living and non living)
- Learn population genetics and the influence of various factors in evolution
- Understand types of evolution, speciation etc
- Learn various tools and techniques for evolutionary studies
- Study the distribution of animals on earth, its pattern, evolution and causative

factors
- Acquire basic knowledge on animal behavioural patterns and their role

Evolution, Zoogeography and Ethology (ZOO5CRP 03)

By the end of the course the learner should be able to;

- Identify zoogeographical realms using map and spot endemic species in each realm.
- Identify different stages of horse evolution
- Understand and identify behavior of organisms and familiarize with equipments used to study behavior
- Demonstrate phototaxis and chemotaxis through experiments
- Understand evolutionary relationships.

Course 8- Biochemistry, Physiology and Endocrinology (ZOO5CRT 04)

On completion of the course learner should;

- Gain knowledge on the structure of biomolecules, classification and biological importance.
- Explain various aspects of physiological activities of animals with special reference to humans.
- Acquire a broad understanding of the hormonal regulation of physiological processes.

Biochemistry, Physiology and Endocrinology (ZOO5CRP 04)

By the end of the course the learner should;

- Carry out experiments to find out the blood constituents
- Get trained in biochemical estimations (protein, glucose, starch and lipids).
- Have a basic understanding of the experimental methods that can be used for further study and research.
- Get knowledge on the principle and uses of Kymograph, Sphygmomanometer and Stethoscope.
- Develop Knowledge about Biological/physiological sciences and health-related fields, and will contribute to the critical societal goal of a scientifically literate citizenry.

Course 9 - Reproductive and Developmental Biology (ZOO6CRT 01)

On completion of the course learner should;

- Understand reproductive organs, gametogenesis and fertilization
- Get awareness in sexual cycles of both non-primates and primates and its hormonal control
- Be aware of current events in Developmental biology.
- Differentiate the embryology of chick, frog and humans (with cell differentiation and gene action)
- Acquire an overview on experimental embryology and human welfare (like ethical issues, Infertility, IVF, GIFT, & ZIFT etc)
- Get knowledge on causes and impacts of teratology; and a brief account on congenital malformations

Reproductive and Developmental Biology (ZOO6CRP 01)

By the end of the course the learner should be able to;

- Compare blastula and gastrula of chick and frog, and identify various stages of embryonic development in chick (18 hour, 24 hour, 33 hour and 48 hour chick embryo)
- Carry out Candling method.
- Carry out dissection to understand the reproductive organs
- Study the male and female reproductive system of a teleost fish/cockroach and to examine the reproductive capacity of fish.
- Identify placenta found in animals.
- Perform Vital staining- (chick embryo) and GSI (Gonado Somatic Index)

Course 10- Genetics and Biotechnology (ZOO6CRT 02)

On completion of the course learner will be able to;

- Identify the central role that genetics and biotechnology plays in the life of all organisms.
- Understand the core principles of genetics, the historical background, genetic crosses, and basic laws governing the pattern of qualitative characters, linkage and crossing over.
- Identify the present and future applications of bio sciences.
- Understand the applications of genetics for the welfare of health and treatment of disease.
- Understand different genetic syndromes and the possible ways to reduce its occurrence.

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

Genetics and Biotechnology (ZOO6CRP 02)

By the end of the course the learner should;

- Demonstrate working knowledge in a defined skill set of biotechnology protocols, including PCR, genetic mapping, and gene isolation and cloning.
- Develop basic as well as advance knowledge about the in vitro culture, maintenance and preservation of cells, tissues and organs.
- Become familiar with the tools and techniques of genetic engineering.

Course 11- Microbiology and Immunology (ZOO6CRT 03)

On completion of the course learner should;

- Recognize the diversity of microbial world, compare their structure, reproduction and growth
- Acquire skills in aseptic techniques, culture and handling of microbes
- Comprehend the methods for isolation of bacteria in pure cultures
- Assess the microbial load of bacteria from environmental samples
- Gain knowledge about the key concepts of immune system, its role in human health & well being
- Understand antigen antibody interactions as a tool for research and diagnosis
- Get an overview of infectious diseases and the role of vaccines in prophylaxis.

Microbiology and Immunology (ZOO6CRP 03)

By the end of the course the learner should be able to;

- Carry out microbial culture in sterilized conditions
- Identify microorganisms using stains
- Observe motility of bacteria and understand antibiotic sensitivity

Course 12- General informatics, Bioinformatics and Biostatistics (ZOO6CRT 04)

On completion of the course learner should be able to;

- Develop systematic approach in analyzing biological information using computer aided tools.
- To use computers in data acquisition and processing and use available software as a tool in data analysis.
- Expand basic informatics skills and attitudes relevant to the emerging knowledge of society.
- Effectively utilize the digital knowledge resources in learning.

- Use fundamental statistical concepts and some of their basic applications in science and society.

General informatics, Bioinformatics and Biostatistics (ZOO6CRP 04)

By the end of the course the learner should;

- Equip themselves with the knowledge of modern developments and recent trends in biological sciences.
- Obtain and analyse information and data relating to specific genes using a number of specific databases, bioinformatics principles and tools.
- Recognize and understand the fundamentals of molecular visualization tools.
- Identify sequence similarities using molecular tools.
- Know how to organize, manage, and present data using statistical tools.

Course 13- Elective: Nutrition, Community Health, and Sanitation (ZOO6CRT 05)

On completion of the course learner should;

- Recognize the improved living standards in the long run.
- Provide the essential basis for improving health.
- Be aware of the real sense of health.
- Understand the role of balanced diet in maintaining health.
- Practice yoga and meditation in day-to-day life.

PROJECT: ZOO6CPR01

- Inculcate proficiency to identify appropriate research topic and presentation.
- Help students learn from nature.
- Learn fieldwork modalities.
- Learn to construct tools of data collection.
- Develop an aptitude for research in Zoology.

Open Course

HUMAN GENETICS, NUTRITION, COMMUNITY HEALTH AND SANITATION (ZOO5COT 05)

On completion of the course, the learner should:

- Gain a general awareness regarding the real sense of health.
- Understand the role of balanced diet in maintaining health.
- Practice yoga and meditation in their day-to-day life.
- Gain an insight into life style diseases and their prevention.

Complementary Courses

Course 1-Animal Diversity – Non Chordata (ZOO1CMT01)

On completion of the course, the learner should:

- Understand the basis of scientific classification of invertebrate fauna.
- Gain knowledge of the physiological and anatomical peculiarities of some invertebrate phyla through type study.
- Achieve awareness of, unity of life in diversity & evolutionary significance of certain invertebrate fauna.
- Understand the significance of the biota around them and the need to conserve them.

Animal Diversity – Non Chordata (ZOO1CMP01)

By the end of the course, the learner should be able to;

- Identify organisms in different Phyla.
- Use scientific drawing technique.
- Carry out dissections.
- Perform temporary mounting of parts.
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Course 2- Animal Diversity – Chordata (ZOO2CMT01)

On completion of the course, the learner should:

- Understand the basis of scientific classification of Vertebrate fauna.
- Gain knowledge of the physiological and anatomical peculiarities of some Vertebrate phyla through type study.
- Achieve awareness of, unity of life in diversity & the evolutionary significance of certain Vertebrate fauna.
- Understand the significance of the biota around them and the need to conserve them

Animal Diversity – Chordata (ZOO2CMP01)

By the end of the course the learner should be able to;

- Examine the anatomy, morphology and osteology of vertebrates.
- Identify snakes using taxonomic key.
- Identify diverse and evolutionary significant chordates

Course 3 Human Physiology and Immunology (ZOO3CMT01)

On completion of the course, the learner should:

- Gain knowledge of the co-relation between the structure and function of an organism.
- Become aware of the health related problems, their origin and treatment.
- Understand how efficiently our immune system works.
- Acquire knowledge about preventing common diseases rather than curing.

Human Physiology and Immunology (ZOO3CMP01)

By the end of the course the learner should be able to:

- Prepare blood smear for identification of white blood cells.
- Identify blood group.
- Analyze biomolecules qualitatively.
- Acquaint with various diagnostic instruments associated with physiological functions.

Course 4- Applied Zoology (ZOO4CMT01)

On completion of the course the learner should:

- Acquire basic knowledge and skills in the different applied branches of zoology.
- Understand the technology for utilising ecofriendly organisms around them for beneficial purposes.

Applied Zoology (ZOO4CMP01)

By the end of the course the learner should be able to:

- Identify the different types of cultural fishes, bee species, and earthworm species,
- Identify fish parasites,
- Identify and characterize casts of honeybee, bee parasites, apiculture tools, equipment and by-products.
- Identify stages in silkworm life cycle and its by-product.