



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

M.Sc. Zoology

2016 Syllabus 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 behavior in all walks of life and comprehending the moral dimensions of decisions and actions.

Environmental Consciousness: To discern the issues of environmental contexts and engage 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 fulfillment.

PROGRAMME SPECIFIC OUTCOMES

1. Integrate biological knowledge to allied disciplines and to inculcate interest in biodiversity, various ecosystems, its interactions, laws governing their conservation.
2. Create awareness on the internal harmony of different body systems, at the molecular level and the need for maintaining good health through appropriate lifestyle.
3. Imbibe basic skills in biological and analytical techniques, with scientific temper and ethics leading to research.
4. Intellectual competency with innovative ideas and research aptitude enhanced with specialization in microbiology can avail career opportunities in higher education, scientific projects, health care, environmental and industrial organizations.

COURSE OUTCOMES

COURSE 1-BIOSYSTEMATICS AND ANIMAL DIVERSITY (PZO1CRT01)

On completion of the course, the student should:

- Become familiar with invertebrate zoology; systems and functions.
- Acquire knowledge about the origin of animals and different hypothesis.
- Be able to interpret phylogenetic relationships and evolutionary advantages.
- Advance knowledge on vertebrate phylogeny and their diversity, status, threats and causes of extinction.
- Develop thorough understanding of the principles of systematics and taxonomy.
- Conceptualize newer trends in taxonomy such as chemotaxonomy, cytotaxonomy, molecular systematics and barcoding.
- Acquire knowledge on handling taxonomic keys and publications; and ethics to be followed in taxonomy.

COURSE 2- EVOLUTIONARY BIOLOGY AND ETHOLOGY (PZO1CRT02)

On completion of the course, the student should be able to:

- Describe the concept of relatedness and its connection to biological evolution.
- Effectively communicate the principles of evolution and its application to human biology.

- Develop a deeper understanding about the probable concepts of molecular evolution, biochemical and genomic evolution and origin of higher categories.
- Explore the basics and advances in ethology, understand the complexities of animal behavior at every level of biological hierarchy.

COURSE 3-BIOCHEMISTRY (PZO1CRT03)

On completion of the course, the student should be able to:

- Explain biochemical nature of life and life processes.
- Demonstrate an understanding of the structure and biological importance of macro molecules.
- Describe the metabolic pathways and inborn errors of metabolism.
- Explore the energy yielding pathways, key enzymes and its regulation.
- Comment on the significance of free radicals and antioxidants.

COURSE 4- BIOSTATISTICS, COMPUTER APPLICATION

AND RESEARCH METHODOLOGY (PZO1CRT04)

On completion of the course, the student should have;

- An awareness about the concepts, tools and accessories of biological research.
- An elaborate idea of formulation and design of scientific investigation.
- Acquired skills in scientific documentation & communication.
- Understanding of Information science, extension and ethics in research.
- Improved analytical and critical thinking skills through problem solving.
- Knowledge to analyse and interpret biological data using statistical software.

BIOSYSTEMATICS AND ANIMAL DIVERSITY, EVOLUTIONARY BIOLOGY AND ETHOLOGY, BIOCHEMISTRY, BIOSTATISTICS, COMPUTER APPLICATION AND RESEARCH METHODOLOGY (PZO1CRP01)

After successfully completing this course, student should:

- Become familiar with museum specimens and the tools and techniques used to study their evolutionary relationships.
- Identify larval forms.
- Identify skull of organisms, feeding habits based on their dentition etc.
- Estimate bio molecules and interpret its clinical significance.

- Statistical analysis of biological data by applying appropriate software.

COURSE 5 ECOLOGY: PRINCIPLES AND PRACTICES (PZO2CRT01)

By the end of the course the student should;

- Acquire deep understanding of the structure and basic components of the ecosystem and their interactions and inter-relationships to sustain life on earth.
- Provide knowledge on various animal adaptations to a variety of environments.
- Get an overview on the different aspects of population and its interactions.
- Conceptualize theory and practice of remote sensing for resource management.
- Be aware of both renewable and non-renewable resources and their conservation.
- Learn the concepts and dimensions of sustainable development.
- Make in-depth studies in the field of applied ecology such as sewage treatment, solid waste disposal etc. designed for the abatement of environmental pollution.
- Become well versed with the objectives, principles, concepts and practice of Environmental Impact Assessment for better management of resources and sustainable development.

COURSE 6 GENETICS AND BIO INFORMATICS (PZO2CRT02)

On completion of the course the student should;

- Apply the principles of Mendelian genetics and mechanism of inheritance.
- Understand the fine structure of genetic material and molecular basis of heredity.
- Be informed about the concepts of linkage, recombination, crossing over etc.
- Gain knowledge on various types and effects of mutation.
- Learn DNA replication, damage and repair.
- Understand the significance of inheritance of traits and gene mapping techniques in humans.
- Understand the role of genetics in evolution.
- Explore the emerging field of bio informatics and analyse biological data.

COURSE 7 DEVELOPMENTAL BIOLOGY (PZO2CRT03)

On completion of the course the students should;

- Develop familiarity in the basic Concepts of development including the processes involved in it.
- Understand and appreciate the unfolding genetic mechanisms during development.
- Get exposed to the latest trends in embryology and its relevance to human welfare.
- Reveal the learner on the biochemical and molecular aspects of fertilization and early developmental stages.
- Give an in depth knowledge on the development and axis formation of model organisms like drosophila and C. elegans; Axis and Pattern Formation in amphibians.
- Introduce the concepts in cellular interactions and pathways in development.
- Acquire knowledge on processes like metamorphosis of amphibians & insects and regeneration.

COURSE 8-BIOPHYSICS, INSTRUMENTATION AND BIOLOGICAL (PZO2CRTO4)

On completion of the course, the student will be able to;

- Explain biophysical principles maintaining life processes.
- Demonstrate the instruments and techniques available for studying biophysical nature of life.
- Illustrate the principles and applications of biochemical and histological techniques.
- Explain the recent trends in nano biotechnology.

PRACTICAL -2 PZO2CRP02 ECOLOGY, GENETICS AND BIO-INFORMATICS, DEVELOPMENTAL BIOLOGY, BIOPHYSICS, INSTRUMENTATION AND BIOLOGICAL TECHNIQUES.

By the end of the course, the student should;

- Imbibe the characteristics of various ecosystems, procedures to estimate different parameters in ecosystem and their effects.
- Identify marine and fresh water plankton.
- Maintain drosophila culture and interpret its life cycle.

- Use online tools for sequence alignment, database search and retrieval, phylogenetic studies and structure analysis.
- Demonstrate the development of chick embryo.
- Explain the morphological and histological details of placenta.
- Analyse and record the findings of local fauna and environmental parameters based on their observation during field trips to various ecosystems.
- Gain expertise in micrometry, camera lucida and become familiar with equipments commonly used in laboratory.

COURSE 9 PZO3CRT01 ANIMAL PHYSIOLOGY

On completion of the course the student will be able to;

- Acquire a clear understanding of the structure and working of different organ systems in humans.
- Acquire knowledge on the comparative anatomy of heart in different animals
- Familiarize the anatomy of respiratory organs and mechanism of respiration in invertebrates and vertebrates.
- Give an in-depth knowledge on the somatic senses and the physiology involved in each.
- Acquire detailed knowledge on the hormonal control of urine formation and the role of kidney in maintaining homeostasis
- Introduce the concepts of thermoregulation in homeotherms and poikilotherms.

COURSE 10 CELL AND MOLECULAR BIOLOGY (PZO3CRT02)

By the end of the course the student should;

- Gain knowledge on the structural and functional details of cells at the molecular level.
- Be aware of the new developments in molecular biology and its implications in human welfare.
- Develop thorough understanding of cell cycle and its regulation and cell signalling.
- Acquire detailed information on chromatin structure, topology of nucleic acids, organization of the eukaryotic genome, DNA replication, repair and recombination.
- Acquire detailed knowledge on transcription and RNA processing, translation-gene expression and gene regulation mechanisms.

COURSE 11 MICROBIOLOGY AND BIOTECHNOLOGY (PZO2CRTO3)

On completion of the course, the student will be able to;

- Appreciate the microbial world, its structure and function.
- Familiarize the applied aspects of microbiology.
- Acquire intensive and in-depth learning in the field of biotechnology.
- Understand the modern biotechnology practices and approaches.
- Emphasize the application of biotechnology in various fields.
- Get acquainted with public policy, biosafety, and intellectual property rights.

COURSE 12 IMMUNOLOGY (PZO2CRT04)

On completion of the course, the student will be able to;

- Provide an overview of immune system, compare and contrast innate and acquired immunity.
- Describe the mechanism of immune response and its adverse effects.
- Illustrate antigen antibody interactions and its biological significance.
- Comprehend the role of immunology in human health and well-being.
- Illustrate immunological response in transplantation.
- Justify the role of vaccines in immunoprophylaxis.

PZO3CRP01: PRACTICAL 3-CELL AND MOLECULAR BIOLOGY, MICROBIOLOGY AND BIOTECHNOLOGY

By the end of the course the student should;

- Get expertise in molecular and histological techniques (staining of carbohydrates; Protein; lipids; and DNA)
- Perform squash preparation and identify the stages of cell division
- Determine the effect of drugs on cell division
- Demonstrate aseptic techniques in microbial culture, staining etc.
- Perform and interpret bacteriological analysis of milk samples.
- Assess microbial load of environmental samples
- Identify symbiotic bacteria from root nodules

PZO3CRP02 PRACTICAL - 4: ANIMAL PHYSIOLOGY AND IMMUNOLOGY

By the end of the course the learner will be able to

- Estimate the differential count of white blood corpuscles
- Demonstrate immunological & serological reactions
- Familiarize physiology practical's following green protocol (Oxygen Consumption, tonicity, Haematocrit and ESR of Human blood etc)
- Get hands on training in biophysics (micrometry, camera lucida, TLC etc); instrumentation (principles and procedures) and virtual practicals (PhysioEx)

COURSE 13: GENERAL MICROBIOLOGY AND PARASITOLOGY (PZO4CRT01)

On completion of the course the learner will be able to;

- Explain microbial diversity in different ecosystems.
- Classify and identify bacteria based on biochemical, serological and molecular techniques.
- Acquire knowledge in sterilization techniques and antimicrobial agents.
- Comment on microbial growth and reproduction.
- Describe the life cycle, pathogenesis, lab diagnosis and treatment of protozoan and helminthic infections
- Detect microbial contamination of environmental samples.
- Identify the insect vectors transmitting infectious diseases.

COURSE 14 BACTERIOLOGY, VIROLOGY AND MYCOLOGY (PZO4CRT02)

On completion of the course, student will be able to;

- Understand the mechanism of pathogenesis; sources of infections, mode of transmission of infections and prophylaxis of communicable diseases.
- Familiarize systemic bacterial and viral infections of human body
- Conceptualize the pathogenesis, immunological and non-immunological response of viral infections.
- Understand the structure, general principles of phage bacterium interaction.
- Explain mycoses, lab diagnosis of fungal pathogens, antifungal agents etc.
- Discuss emerging and reemerging infectious diseases.

COURSE 15 CLINICAL MICROBIOLOGY (PZO4CRT03)

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

- Gain knowledge about safety in clinical microbiology laboratory and good lab practices
- Understand the aseptic techniques for sample collection, transport and processing
- Discuss the pathogenesis, laboratory diagnosis & treatment of bacterial, viral, parasitic and fungal infections.
- Have an awareness on care, management and legal requirements of handling laboratory animals

PRACTICAL 5

PZO4CRP01 GENERAL MICROBIOLOGY & PARASITOLOGY & MYCOLOGY

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

- Demonstrate various sterilization and aseptic techniques in handling microbes
- Understand the basic principles and procedures of bacterial staining and culture
- Perform antibiotic sensitivity test and interpret the result
- Quantitatively analyse the potability of drinking water
- Estimate the microbiological quality of food & environmental samples.
- Identify parasitic eggs & cysts by concentration & microscopic techniques
- Perform slide culture and identify pathogenic fungi

PRACTICAL 6

PZO4CRP02 BACTERIOLOGY, VIROLOGY AND CLINICAL MICROBIOLOGY

On completion of the course, the learner will be able to;

- Isolate and identify pathogenic bacteria based on biochemical and cultural characteristics
- Perform and interpret various diagnostic tests
- Familiarize and determine titre value of viral haemagglutination tests
- Acquire skills and competency in the field of clinical microbiology
- Acquaint with real-life working environments of the professional microbiologists during field study with a view to broaden their perspective of Microbiology

PZO4CPR01 Project

On completion of the course, the learner will be able to;

- Develop and execute a project based on biological concepts
- Think critically, articulate conclusions and implications of research
- Improve oral and writing skills for effective communication of experimental results to a wide range of audience.