

Hajee Karutha Rowther Howdia College

(Autonomous)

Uthamapalayam 625 533, Theni District.



Department of Zoology

Programme Specific Outcomes (PSOs)

Programme Outcomes (POs)

Course Outcomes (COs)

B.Sc. Zoology

Programme Specific Outcomes (PSOs):

PS01: Identify the major groups of organisms with an emphasis on animals and be able to classify them within a phylogenetic framework. Students will be able to compare and contrast the characteristics of animals that differentiate them from other forms of life.

PS02: Understand the basic concepts in cell and its components which are used to generate and utilize energy besides the development of various animals.

PS03: Competence in distinguishing the anatomy of various animals and understand the physiological process.

PS04: Explicate the ecological interconnectedness of life on earth by tracing energy and nutrient flows through the environment.

PS05: Ability to apply fundamental statistical tools and physical principles (chemistry) to the analysis of relevant biological situations.

Programme Outcomes (POs):

PO1: Students gain knowledge and skill in the fundamentals of animal sciences in zoology and that of plant sciences in botany, also understands the complex interactions among various living organisms.

PO2: Analyse complex interactions among the various animals of different phyla, their distribution and their relationship with the environment

PO3: Apply the knowledge of internal structure of cell, its functions in control of various metabolic functions of organisms & complex evolutionary processes and behaviour of animals

PO4: Correlates the environmental conservation processes of Plants & physiological processes of animals organ systems.

PO5: Gain knowledge of Agro based Small Scale industries like sericulture, fish farming, butterfly farming, Agro forestry practises and vermicompost preparation.

Course Outcomes (COs):

Course Code: 20UZYC11	Course Title: Invertebrata
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Course Outcomes (COs):

CO1: Relate general characteristic features, morphology and classification of Invertebrates (Protozoa – Echinoderms)

CO2: Explain the lifecycle and adaptation of Protozoan and Porifera.

CO3: Outline the lifecycle and adaptation of Coelenterates and Helminthes.

CO4: Illustrate the lifecycle and adaptation of Annelida & Arthropoda

CO5: Identify the lifecycle and adaptation of Mollusca & Echinodermata

Course Code: 20UCHA11	Course Title: Organic, Inorganic and Physical Chemistry – I
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Course Outcomes (COs):

CO1: Recall the preparation and properties of hydrides, oxides, hardness of water and its implications.

CO2: Classify the colloidal states of matter and its applications

CO3: Demonstrate the reactions of glucose, fructose and sucrose and relate their uses

CO4: Explain the concept of enantiomers, diastereoisomers and geometrical isomers

CO5: Identify the properties, classification and functions of proteins and dyes

Course Code: 20UZYC21	Course Title: Chordata
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Course Outcomes (COs):

CO1: Learn the general characteristics, classification with common examples of chordates, Prochordates specialized characters and peculiar development

CO2: Understand the comparative external features of various vertebrates

CO3: Knowledge on morphological and anatomical features of vertebrates

CO4: Acquire knowledge on organs of communicative and sensory systems of vertebrates

CO5: Understand the structural organization of skeletal system in vertebrates

Course Code: 20UZYC2P	Course Title: Invertebrata and Chordata
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Course Outcomes (COs):

CO1: To acquire knowledge on the visceral organs in the representative animals in the selected organ systems.

CO2: To demonstrate the mounting techniques in the representative animals in the selected organ systems.

CO3: To observe the microscopic organisms to analyse their survival skills.

CO4: To notify the specific characters, identifying structures in the preserved, stuffed and dried animals.

CO5: To trace the biodiversity, habitat, environment through the field visit.

Course Code: 20UCHA21

Course Title: Organic, Inorganic and Physical Chemistry – II

Course Outcomes (COs):

CO1: Analyze the physical concepts of photochemistry

CO2: Explain the basic terms, isomerism and theories involved in coordination compound

CO3: Apply the column, thin layer and paper chromatographic techniques to separate and identify the components present in a mixture

CO4: Recall about chemotherapy and classify the drugs as sulpha, antimalarials, antibiotics and arsenical drugs

CO5: Identify the concepts of thermodynamics and its significance

Course Code: 20UCHA2P

Course Title: Volumetric Analysis

Course Outcomes (COs):

CO1: Build basic quantitative skills in volumetric analysis with the use of burette, pipettes and standard flasks

CO2: Apply acidimetric and alkali metric method for the quantitative volumetric estimation of acids and bases

CO3: Estimate the amount of inorganic compounds permanganometrically

CO4: Demonstrate the quantitative estimation of Potassium dichromate iodometrically

CO5: Plan the laboratory hygiene and safety

Course Code: 20UZYC31

Course Title: Cell Biology

Course Outcomes (COs):

CO1: Learn the fundamentals of cell structures and organelles

CO2: Explore the role of structure and functions of plasma membrane.

CO3: Become familiar with chemical composition of enzyme system and functions.

CO4: Secure a wide knowledge on Nucleic acids, genetic code and protein synthesis.

CO5: Gather an extempore knowledge on different phases of cell cycle

Course Code: 20UZYC32

Course Title: Molecular Biology

Course Outcomes (COs):

CO1: Relate the history behind the identification of genetic material

CO2: Analyse the molecular basis of DNA replication and modes

CO3: Explain the genome organization in prokaryotic and eukaryotic organisms

CO4: Experiment with molecular mechanism behind the different stages of protein synthesis

CO5: Evaluate the mechanism of gene regulation in prokaryotes and eukaryotes

Course Code: 20UBYA11

Course Title: Thallophyta, Bryophyta, Pteridophyta, Gymnospermae, Physiology & Plant ecology (Allied Botany - I)

Course Outcomes (COs):

CO1: Illustrate the structure, life cycle of Nostoc, Sargassum and economic importance of algae.

CO2: Explain the structure, life cycle of Fungi with the reference of Saccharomyces, Agaricus and economic importance, listing the general features of Bacteria and its economic importance.

CO3: Compare and contrast the general structure and life cycle of Funaria, Selaginella and Pinus.

CO4: Discuss the physiological process and mechanism of transpiration, photosynthesis and respiration

CO5: Interpret the adaptation of hydrophytes, xerophytes and factors affecting the vegetations.

Course Code: 20UZYC41

Course Title: Embryology

Course Outcomes (COs):

CO1: Elaborates the various stages of embryonic stages.

CO2: Explain the basis of organ differentiation. Trace the sequence of events in fertilization.

CO3: Elaborates the various stages of organogenesis.

CO4: Appraise on metamorphosis, regeneration and ageing as a part of post embryonic development.

CO5: Emphasize the modern implications of developmental biology in terms of in-vitro fertilization, Illustrate the methods of assisted reproductive technology

Course Code: 20UZYC42

Course Title: Microbiology

Course Outcomes (COs):

CO1: Define the fundamental concepts, history and development of microbiology and microbial classification.

CO2: Perceive the theoretical basis and demonstrate the practical skills in the use of tools, technologies and methods involve in handling and using of microbes.

CO3: Emphasize the conceptual basis of enlisted pathogens of humans and perceive the diagnostic skills and treating methods

CO4: Summarize the different spoilage mechanisms in foods; illustrate methods to control deterioration and spoilage. Recognize and describe the characteristics of spoilage microorganisms in foods and their control.

CO5: Relate knowledge on available microbes for agricultural purpose and their practical application in agricultural field

Course Code: 20UZYC4P

Course Title: Cell Biology, Molecular Biology, Embryology & Microbiology

Course Outcomes (COs):

CO1: Visualizing and learning to work with laboratory instruments

CO2: Perform experiments to reveal cellular function and explain structural organization of various cells.

CO3: Summarize, distinguish the structural organization of different cellular organelles.

CO4: Explain structure and molecular functioning of biomolecules the nucleic acids

CO5: Identify the different stages of development –model organism

Course Code: 20UBYA21

Course Title: Taxonomy of Angiosperms, Cell biology, Anatomy & Embryology of Angiosperms & Biotechnology (Allied Botany - II)

Course Outcomes (COs):

CO1: Outline the classification of flowering plants with its economic importance and medicinal uses of some medicinal plants

CO2: Illustrate the ultra structure of plant cell and its organelles and solve mendelian genetics

CO3: Interpret the structure of simple and complex permanent tissues and compare the primary structure of dicot plants with monocot plants.

CO4: Explain the structure of anther, male gametophyte, female gametophyte and dicot embryo and extend the knowledge on the fertilization and types of ovules.

CO5: Build Plant Tissue Culture methods and production of biodiesel and biogas.

Course Code: 20UBYA2P

Course Title: Allied Botany Practical

Course Outcomes (COs):

CO1: Observe the morphology and anatomy of Thallophyta, Bryophyta, Pteridophyta and Gymnospermae

CO2: Define the floral characters of Angiosperm plants and find them with suitable locally available plants

CO3: Compare anatomy of dicot stem with monocot stem

CO4: Recall the structure of cell organelles, show how to solve mendelian genetics and find the tools used in Plant tissue culture

CO5: Demonstrate the Physiology setup and identify ecological adaptations of plants

M.Sc. Zoology

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PO4: Correlates the environmental conservation processes & physiological processes of animals and relationship of organ systems

PO5: Gain knowledge of Agro based Small Scale industries like sericulture, fish farming, butterfly farming and vermicompost preparation.

Course Outcomes (COs):

Course Code: 20PZYC11

Course Title: Biology of Non Chordates, Vertebrates & Palaeontology

Course Outcomes (COs):

CO1: Identify, distinguish and categorize the non chordates from chordates

CO2: Compare and explain organ systems of animals according to the hierarchy

CO3: Elaborate the organisation of alimentary canal and heart in different vertebrates

CO4: Explain how animals belonging to different habitat will respire besides comparing the excretory system and influence of accessory glands in reproduction across vertebrates

CO5: Discuss the less diverse minor phyla and estimate the time travel of organisms through time from the fossil deposits

Course Code: 20PZYC12

Course Title: Genetics

Course Outcomes (COs):

CO1: Demonstrate Mendel's laws of inheritance and recognize the deviations from them

CO2: Explain principles of genetic linkage and chromosome mapping

CO3: Comprehend the nature of various genetic disorders, their diagnosis and origin

CO4: Study and understand the genetic diseases.

CO5: Govern passage of genetic traits across generation

Course Code: 20PZYC13

Course Title: Cell and Molecular Biology

Course Outcomes (COs):

CO1: Explain the structure, functions and properties of cell membrane

CO2: Discuss the mechanisms and control of inter-cellular communication.

CO3: Discuss the events involved in transcription and post transcriptional modifications.

CO4: Demonstrate influence of cell communication, signalling and molecule transport

CO5: Analyze regulation of gene expression and regulation.

Course Code: 20PZYP11

Course Title: Biology of Nonchordates, Vertebrates, Palaeontology, Genetics, Cell and Molecular biology and Biotechnology

Course Outcomes (COs):

CO1: Develop dissection technique and Explain the functional anatomy of selected invertebrates

CO2: Compare the external Characters ,classify the affinities and adaptive features of Various vertebrates.

CO3: Identify the chromosome complement number of an individual, mutants and discuss the Principle of segregation, genotype frequency in a population

CO4: Determine the membrane composition and elaborate the structural features of component macromolecules in different cells

CO5: Evaluate the genomic organization of living organisms, Estimation of macromolecules, Blotting and amplification techniques

Course Code: 20PZYE11

Course Title: Biotechnology

Course Outcomes (COs):

CO1: Elaborate the various tools and techniques of genetic engineering.

CO2: Explain various molecular cloning methods, cloning vectors and their hosts, and how to find the right vector for molecular cloning.

CO3: Apply innovatively the techniques learnt in basic and applied fields of biological research.

CO4: Explain the principles and techniques for industrial applications.

CO5: Strategize research methodologies employing genetic engineering techniques in the field of environmental sciences.

Course Code: 20PZYE12

Course Title: Stem Cell Biology

Course Outcomes (COs):

CO1: Define the concepts of stem cells and its niches

CO2: Differentiate theoretically the adult and embryonic stem cells

CO3: Outline the procedure for stem cell isolation, differentiation and maintenance

CO4: Explain about cell aging

CO5: Analyse the case studies associated with stem cell therapy

Course Code: 20PZYC21

Course Title: Microbiology & Immunology

Course Outcomes (COs):

CO1: Acquire knowledge on microbial world in connection with pathogenicity and immunology

CO2: Emphasize the conceptual basis of enlisted pathogens of humans and perceive the diagnostic skills and treating methods

CO3: Spell about the various organs of immune system and types of antigens and immunoglobulins and its production

CO4: Understand regulatory system involve in immune response and the technical application of knowledge as technique

CO5: Analyse the role of immune system in diseased conditions

Course Code: 20PZYC22

Course Title: Animal Physiology

Course Outcomes (COs):

CO1: Explain the feedback system and classify adaptive mechanisms of the animal body

CO2: Examine the removal of metabolic wastes and toxins from animal body and the mechanism in which body controls urine output.

CO3: List out the types of stimuli to which receptors respond

CO4: Determine the functioning of life, organization and coordination of behavior

CO5: Discuss on Excitability and transmission of impulse in nerve cells and electrical organs in animals

Course Code: 20PZYC23

Course Title: Ecology & Biodiversity

Course Outcomes (COs):

CO1: Compare the biotic and abiotic interactions, theory and principles of ecosystem, ecology and Community Ecology

CO2: Demonstrate an understanding of key ecological interactions and processes: Community Ecology

CO3: Illustrate an compare of key ecological interactions and processes: Population Ecology – Characterization, growth curves

CO4: Classify scales and patterns and threats in biological diversity

CO5: Assess the sustainable management aiming at the conservation of species and habitats

Course Code: 20PZYP21

Course Title: Microbiology & Immunology, Animal Physiology, Ecology Biodiversity, Ethology & Vermitechnology.

Course Outcomes (COs):

CO1: Perform basic laboratory techniques in microbiology and explain the importance of immunology, types of immune system, lymphoid organs and development of the immune cells

CO2: Appraise the significance of quantitative estimation of amylase activity, Ammonia and Urea.

CO3: Evaluate the importance of ecological collections in different habitats.

CO4: Gather an extempore knowledge on prepare an ethogram of animal behavior

CO5: Create the knowledge to preparation of Vermibed, Identification of earthworm species.

Course Code: 20PZYE21

Course Title: Animal Behaviour

Course Outcomes (COs):

CO1: Develop basic concepts and importance of studying animal Behaviour

CO2: Justify the Classical theory and phases of instinct behavior

CO3: Evaluate the social and foraging behaviour among the animals

CO4: Classify play and reproductive behaviour of animals, explain parental care in animals

CO5: Examine the purpose and importance of animal communication

Course Code: 20PZYE22

Course Title: Vermi Technology

Course Outcomes (COs):

CO1: To select and preparing biocompost, vermicomposting and vermiculture and get employment accordingly.

CO2: To provide technical awareness of vermiculture, vermicomposting technique

CO3: To teach students to become life-long recyclers

CO4: To Identify the different species of earth worms

CO5: To practice of vermicomposting and vermiculture

Course Code: 20PZYC31

Course Title: Developmental Biology

Course Outcomes (COs):

CO1: Explain how gametes are being formed inside their own body

CO2: Determine the fusion of gametes and its progression into germ layers

CO3: Elaborate and compile the organs forming from each germinal layer

CO4: Explain the striking morphological changes adapted by the larva of various organisms to become adult

CO5: Analyze various reproductive technologies and methods being followed by fertility centers in recent times

Course Code: 20PZYC32

Course Title: Biological Chemistry and Biophysics

Course Outcomes (COs):

CO1: Summarize the basics of formation of biological compounds and their metabolism.

CO2: Explain and analyze the biosynthesis pathways and structural conformations of nucleic acids and proteins.

CO3: Interpret fat metabolism and their importance.

CO4: Categorize vitamins, Discuss the structure & function of vitamins and enzyme kinetics

CO5: Perceive a holistic knowledge on reactions involved in cellular energy synthesis and their application of thermodynamic laws

Course Code: 20PZYP31

Course Title: Developmental Biology, Biological Chemistry, Biostatistics & Bioinformatics

Course Outcomes (COs):

CO1: Develop dissection technique and Explain the functional anatomy of selected invertebrates

CO2: Compare the external Characters, classify the affinities and adaptive features of Various vertebrates.

CO3: Identify the chromosome complement number of an individual, mutants and discuss the Principle of segregation, genotype frequency in a population

CO4: Determine the membrane composition and elaborate the structural features of component macromolecules in different cells

CO5: Evaluate the genomic organization of living organisms, Estimation of macromolecules, Blotting and amplification techniques

Course Code: 20PZYE31

Course Title: Biostatistics & Bioinformatics

CO1: Explain the type of variables, summarize the data and construct graphical and diagrammatic representation of data.

CO2: Apply probability principles for setting significance levels and testing hypothesis using statistical tests

CO3: Evaluate results of statistical test and interpret experimental conclusion

CO4: Design with network concepts, in silico approaches, biological databases available

CO5: Make use of information from large databases and to use this information in computer modeling

Course Code: 20PZYE32	Course Title: Cancer Biology
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Course Outcomes (COs):

- CO1:** Explain the characteristics, morphological and ultrastructural properties of cancer cells
- CO2:** Mark the role of tumor markers, growth factor and transcription factors
- CO3:** Determine the Initiation, promotion and progression of cancer cells
- CO4:** Discuss the types genes which regulate the cell cycle
- CO5:** Evaluate the Strategies of Anticancer drug therapy

Course Code: 20PZYC41	Course Title: General and Applied Entomology
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Course Outcomes (COs):

- CO1:** Determine the taxonomy and morphological characters of insects
- CO2:** Elaborate the reproductive physiology and hormonal control of molting in insects
- CO3:** Compile the various beneficial and harmful insects with special reference to agricultural entomology
- CO4:** Explain the biology of insect vectors causing diseases irrespective of man
- CO5:** Identify and develop policies pertaining to insect pest control measures

Course Code: 20PZYC42	Course Title: Parasitology
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Course Outcomes (COs):

- CO1:** Explain the relationship between a parasite and the host and their effects
- CO2:** Discuss in detail the clasification of medically important parasites and prevention of transmission
- CO3:** Explain the difference between the cestodes, Nematodes,Trematodes and Protozoan parasites and prevention.
- CO4:** To provide students with adequate knowledge about endemic parasite,national parasitic problems and common parasities world wide
- CO5:** To provide students with knowledge about laboratory examination and identification of parasitic infection in samples.

Course Code: 20PZYP41	Course Title: General and Applied Entomology
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Course Outcomes (COs):

- CO1:** Compare the external morphological features of insects.
- CO2:** Identify the different orders of insects with taxonomy.
- CO3:** Outline the organ systems in insects.
- CO4:** Discuss the beneficial and harmful aspects of insects and insecticides.
- CO5:** Assess integrated pest management and use of insecticides.

Course Code: 20PZYE41

Course Title: Wild Life Management

Course Outcomes (COs):

CO1: Scope of wild life biology.

CO2: Study of aquatic, terrestrial, forest and mountain ecosystems. Food chain and food web.

CO3: Outline of the Wildlife protection Act.

CO4: Discuss the Role of preservation and conservation management of wild life management.

CO5: Indian forestry, wildlife and to equip him/her to undertake minor projects in this area.

Course Code: 20PZYE42

Course Title: Aquaculture and Farm Management

Course Outcomes (COs):

CO1: Design and layout, structure and construction of aquaculture.

CO2: Discuss about the economical importance of aquaculture and farm management

CO3: Control of parasites, predators, weeds and diseases in culture ponds.

CO4: Discuss about the water quality management.

CO5: Promote provision of quality aquaculture input including high quality fish seeds and fish feeds