



ARUMUGAM PILLAI SEETHAI AMMAL COLLEGE
(Re-accredited with B+ Grade by NAAC)
Tirupattur - 630 211.

B. Sc. Zoology Programme

Programme Outcome (POs) :

The graduate of this programme should be able to

- Develop respect for nature
- Explain the importance of biodiversity
- Identify and list out common animals
- Understand the basic principles of evolution and adaptations in animals
- Appreciate the influence of environment on the life of organisms
- Explain various physiological & biochemical processes in our bodies
- Understand the basic genetic mechanisms in organisms
- Identify potential risk factors to health of human beings
- Use tools of information technology for the study of biology
- 10. Develop the skills to pursue advanced studies in biology

Programme Specific Outcome (PPOs):

- Demonstrated a broad understanding of animal diversity, including knowledge of the scientific classification and evolutionary relationships of major groups of animals.
- Recognized the relationships between structure and functions at different levels of biological organization (e.g., molecules, cells, organs, organisms, populations, and species) for the major groups of animals.
- Characterized the biological, chemical, and physical features of environments (e.g., terrestrial, freshwater, marine, host) that animals inhabit. Explained how animals function and interact with respect to biological, chemical and physical processes in natural and impacted environments.
- Explained how organisms function at the level of the gene, genome, cell, tissue, organ and organ-system. Drawing upon this knowledge, they are able to give specific examples of the physiological adaptations, development, reproduction and behavior of different forms of life.
- Understood the applied biological sciences or economic Zoology such as sericulture, Apiculture, aquaculture, Industrial microbiology, rDNA technology and medicine for their career opportunities.
- Used the evidences of comparative biology to explain how the theory of evolution offers the only scientific explanation for the unity and diversity of life on earth. They are able to use specific examples to explicate how descent with modification has shaped animal morphology, physiology, life history, and behavior.
- Explicated the ecological interconnectedness of life on earth by tracing energy and nutrient flows through the environment. They are able to relate the physical features of the environment to the structure of populations, communities, and ecosystems.
- Subjects such as invasive or endangered species, embryonic development in mammals and ageing in social insects. Lead to advances in medicine to prevent disease amongst both animals and human beings.



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Biodiversity of Invertebrate-I - 7BZO1C1

Course Description:

Understanding the knowledge about the evolution of animals from Phylum Protozoa to Phylum Annelida and significance of major invertebrate groups, ability to use the knowledge in future.

Course Objectives

- To know the importance, value and diversity of the invertebrates
- To understand the diversity, evolution, and relationships between major groups of invertebrates.
- To gain knowledge of concepts in animal taxonomy,; identify major phyla and classes of invertebrates.

Course Outcome (COs)

- By studying this course students are gaining knowledge about the invertebrate creatures existing in the earth and help to understand the evolution of vertebrate animals from invertebrates.
- Through this course the student could know about the endanger, extinct animals and help to conserve animal diversity.

Biodiversity of Invertebrate-II -7BZO1C2:

Course Description:

- Explanation will be given on the general characters, taxonomic position, examples and structures of representative animal from Phylum Arthropoda to Phylum Echinodermata. The important characters between the phylum will be taught to understand the invertebrate animals.

• Course Objectives

- To study the anatomy and physiology of different invertebrate groups
- To visualize structure function relationships
- To find out where different animals live and how their body designs evolved to adapt to new environments.
- To study the different reproductive strategies of invertebrates
- To learn about interesting behavior of the higher invertebrates.

Course Outcome (COs)

- This course content will bring clear cut idea regarding aquatic and terrestrial invertebrates for their identification, ecological roll and their contribution for betterment of environment. Commercial culture of invertebrate animals will have great scope in the world trade.



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7BZO2P1: BIODIVERSITY OF INVERTEBRATES I & II AND BIODIVERSITY OF CHORDATES

- Study of Euglena, Amoeba, Entamoeba, Plasmodium, Trypanosoma, Paramecium as representative of animal like protists (prepared slides).
- Study of sponges and their various body form
- Principal representatives of classes of phylum Cnidaria (Coelenterata)
- Principal representatives of classes of phylum Platyhelminthes
- Representative of phylum Rotifera, phylum Nematoda.
- Principal representative of classes of phylum Mollusca.
- Principal representative, as of classes of phylum Annelida
- Principal representatives of classes of phylum Arthropoda and Echinodermata.
- Dissection
- Earthworm – Body seta, Nervous system and Digestive system
- Shark placoid scale
- Honey bee mouth parts
- Prawn appendages

Course Objectives

To study and display the various biological system of protozoan to vertebrates.

Course Outcome (COs)

- Understand the Characters of class Asterozoa with help of animal Sea star.
- Understand the internal as well as external morphology of that animal.
- To study and understand the concepts-Metamorphosis, regeneration and autotomy.
- Understand the Mouthparts of insects.
- Understand the Canal system in sponges.
- Understand the Locomotion in Protozoa.
- To observe and study the Foot in Mollusca.
- The Fishes: Vertebrate Success in Water
- Evolutionary perspective: Phylogenetic relationship, survey of Agnatha and Gnathostomata
- Evolutionary Pressures: Adaptations in Locomotion Nutrition and the Digestive System, Circulation, Gas Exchange, Nervous and Sensory Functions, Excretion and Osmoregulation Reproduction and Development; Further Phylogenetic Considerations.



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(7BZOA1): GENERAL & APPLIED ZOOLOGY

Course Description

- Encourage in students an enthusiasm for biological sciences in general for whole animal science and conservation of the natural environment in particular.
- Promote students' ability to critically think about, assess and evaluate data gathered both in the field and through scientific literature.
- Develop an understanding of the ethical, economic, legal and political context of keeping captive animals, animal behaviour, ecology and conservation.
- Produce graduates with the ability to apply concepts from Zoology and communicate ideas effectively in a range of contexts and communication modes.
- Produce graduates with genuine flexibility in career choice and broadly applicable skills
- Produce graduates with the ability to become autonomous learners equipped cope with higher degree studies.
- Meet the need for an accessible part-time progression to an honours degree for suitably qualified students'.

Course Objectives

- To develop advanced knowledge and understanding relevant to Zoology
- To provide students with a broad understanding of animals and their interactions with the environment
- To introduce students to the wide range of animal groups both extant and extinct
- To demonstrate to students the wide range of solutions that animals have evolved to deal with their environment, both abiotic and biotic
- To provide students with the practical skills of conducting research in the laboratory and the field
- 6. To enable students to undertake a quantitative and qualitative approach to acquiring, analysing and interpreting data
- 7. To foster the development of students as critical, mature and independent individuals
- 8. To enhance students' employability particularly for a career in Zoology and for relevant post-graduate study.

Course Outcome (COs)

- Understand the concepts of Goatary and Lac culture.
- Understand the various Indian breeds and their distribution and characteristics of Goats.
- To aware the students about Goatary and its economical importance.
- Understand the Various concepts in Lac Cultivation.
- To know the Economical importance of lac Cultivation.
- This is a job oriented subject.
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7BZO2C1: Biodiversity of Chordates

Course Description

- Students will Understanding the probable origins of chordate and be able to identify in detail, the anatomical characteristic of organisms of classes of chordates, starting with outline classification, primitive amphioxus and progressing to the complex mammals. Student will demonstrate to understand five chordate classes.

Course Objectives

- On completion of course students are able to understand the basic concepts about chordates.
- To understand external morphology and sexual dimorphism of chordates.
- To understand various system, adaptation, parental care, osteology, metamorphosis and dentition in mammals

Course Outcome (COs)

- This course describes the origin, classification and characteristics of phylum chordates. It gives detailed information on the characteristics features of the class and four orders in the phylum chordates. It describe the interrelation ship between different classes of phylum chordata.

7BZO2C2 CELL BIOLOGY AND INSTRUMENTATION.

Course Description

- This course covers basic cell biology and instrumentation.
- Cell biology explore the cellular basis of life in both Eukaryotic and Prokaryotic organisms.
- The course deals with the basic biological concept and principle with emphasis on the structure and the function of the different cells responsible for life.

Course Objectives

- To understand the principle and working mechanism of compound and electron microscope.
- To understand the structure and purpose of basic components of prokaryotic and eukaryotic cells
- To understand the process of cell division in both somatic and germ cells.
- To familiarize the microscopic, chromatographic and centrifugation techniques.
- To understand oncogenes and tumor suppressor genes.

Course Outcome (COs)

- To understand the cell structure because cell is the basic unit of life
- To understand the difference between plant and animal cell
- To understand cell organelles and their functions
- To understand the various cell cycle in the body of organisms
- To understand various type of tumor.
- To become expertise about the basic instrument to study the cell structure.



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7BES2: ENVIRONMENTAL STUDIES

Course Description

Environmental Studies as an academic field is the product of efforts to understand and respond to the variety of changes humans have wrought in our world. Students in Environmental Studies are motivated by concern for welfare of the many human and non-human communities that shape this planet. The Environmental Studies Program actively cultivates in our students both engagement with and informed reflection about those communities. To this end, the curriculum includes an *interdisciplinary core* that encourages students to explore the social, aesthetic, ethical, scientific, and technical aspects of environmental questions; *concentrations* that allow students to approach these questions with more focused knowledge and methodological tools; a *community-engaged research course*; and an *internship* with an environmentally focused organization or business.

Course Objectives

- An interdisciplinary approach to complex environmental problems using basic tools of the natural and social sciences including geosystems, biology, chemistry, economics, political science and international processes.
- The ability to work effectively as a member of an interdisciplinary team on complex problems involving multiple competing stakeholders and agendas;
- The ability to work and learn effectively and constructively as a member of a team at field stations or in remote environmental sites on land or at sea;
- The ability to critically evaluate the science and policy ramifications of diverse energy portfolios on air and water quality, climate, weapons proliferation and societal stability;
- An experience-based understanding of the human and natural environment of southern California including water and energy needs, air quality, marine and coastal issues, and the California Channel Islands, especially Catalina;
- The ability to write effectively about complex environmental problems and do so for both specialist and general audiences with equal facility; and
- Ability to apply quantitative reasoning skills to environmental problems including basic calculations related to energy, water, and air issues and the use of statistical methods in data analysis and argumentation.

Course Outcome (COs)

- Understand key concepts from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions.
- Appreciate concepts and methods from ecological and physical sciences and their application in environmental problem solving.
- Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.
- Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.



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(7BZOA2): CONCEPTUAL ZOOLOGY

Course Description

- To understand the behaviour, structure and evolution of animals.
- Zoologists use a wide range of approaches to do this, from genetics to molecular and cellular biology, as well as physiological processes and anatomy, whole animals, populations, and their ecology.
- As such, it will study fundamental concepts from a range of disciplines.

Course Objectives

- To understand the principle and working mechanism of compound and electron microscope.
- To understand the structure and purpose of basic components of prokaryotic and eukaryotic cells
- To understand the process of cell division in both somatic and germ cells.
- To understand the terms Gametogenesis, fertilization and early development.
- To understand morphogenesis and organogenesis in animal
- To understand metamorphosis, regeneration and placenta in mammals.
- To understand Mendelian genetics
- To understand gene interaction
- To understand polygenetic inheritance and multiple alleles
- To understand the metabolic activities in mammalian body
- To explain the role of various bio-molecules in human body
- To understand the process of respiration and excretion
- To enlighten the various process of circulation, osmoregulation and nervous system.

Course Outcome (COs)

- Understand the Scope of cell biology, because cell is the basic unit of life.
- Understand the Main distinguishing characters between plant cell and animal cell.
- Understand the terms: Gametogenesis, Fertilization and early development.
- Understand the Morphogenesis and Organogenesis in animals.
- Understand the Aging, Apoptosis and Senescence.
 - Enumerate the principles of Genetics and the statistical methods.
 - Explain the basic structure and transmission of DNA and chromosomes
 - Discuss about the hereditary diseases and their potential applications in medical science.
 - Understand the Importance of physiology and branches of it.
 - Understand the terms-Osmosis, diffusion, pH and Buffer.
- Understand the Digestion and Excretion process, by studying the Organs of it.
- Explain the basic concepts and scope of biotechnology.
- Enumerate the role of biotechnological processes in improving the lifestyle of mankind.



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(7BZO3C1): Developmental biology and Evolution.

Course Description

- Create an interest to know about embryogenesis of animals with special reference to humans
- The students will wonder about the gods creation. In contrast the students will be taught
- about the origin of evolution from unicellular organism to highly evolved human beings.
- Theories of evaluation hinder the students to think wisely

Course Objectives

- To understand the terms Gametogenesis, fertilization and early development.
- To understand morphogenesis and organogenesis in animal
- To understand metamorphosis, regeneration and placenta in mammals.

Course Outcome (COs)

- Be familiar with the events that lead upto fertilization.
- Be able to describe the stages and cellular mechanisms for gastrulation.
- Student are able to understand metamorphosis, hormonal control and regeneration
- Students are able to understand the concept of lamarkism and neolamarkism
- Able to describe the evolutionary history of man
- Know the fact about origin of species on earth.

7BZO3P1 : CELL BIOLOGY & DEVELOPMENTAL BIOLOGY

Course Description

- They will learn how developmental biology is having a significant impact on our understanding of evolution and modern medicine, including the treatment of birth defects, infertility and cancer in humans.
- Particular interest is the use of stem cells to engineer replacement tissues and organs, which could revolutionise medicine.

Course Objectives

- To observe microscopical structure of cell organelles
- To observe the various blood groups of human beings
- To find out the mitotic stage of Onion root tip.
- To find out the various developmental stages of chick embryos

Course Outcome (COs)

- Understand and study of different cell organelles with respect to their structure and function.
- Understand the process of Vital Staining by using Janus Green-B stain.
- Understand the Hierarchic classification of Non-chordates.
- Understand the evidences from evolution.
- Understand the Geological time scale.
- Understand the Study of Fossils of different animals
- Understand the structure and function of the cell and its organelles.
- Understand the various processes like cell cycle and cell signalling.
- Understand the terms: Gametogenesis, Fertilization and early development.



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(7NME3C): EFFECTIVE EMPLOYABILITY SKILLS

Course Description

- Provide an opportunity to get an employment
- Enlighten the students how to attend an interview
- Teach different types of communication
- Practice the student to participate in group discussion

Course Objectives

- To create an carrier opening by making skills of the students
- To built the team work and leadership capability to the students
- To develop managerial skills among the students

Course Outcome (COs)

- Students can able to attend an interview effectively
- Students are able to participate in any type of competitive examinations
- Students can develop leadership quality and managerial skills

(7SBS3A1) COMPETITIVE EXAMINATION SKILLS

Course Description

- Enlighten the students how to attend competitive exams
- Teach numerical ability, special and perceptual ability and situation reaction test
- Provide an opportunity to get an employment.

Course Objectives

- To build a sense of awareness among students through proper guidance about various competitive examinations in order to motivate students for prospective career in government and corporate sector.

Course Outcome (COs)

- Students can able to attend an competitive examinations effectively
- Students con able to solve reasoning logical reasoning coding and decoding.

7SBS3A2: EXECUTIVE SKILLS

Course Description

- Teach different kind of professional approach
- Develop self-competence and self confidence
- Enlighten the students how to dressing in different occasions, body language
- Provide an opportunities to develop house keeping skills.

Course Objectives

- To understanding good leadership behaviors
- To prepare themselves for training after reviewing administrative matters and making introduction
- To understand qualities and strengths
- To understand housekeeping and documentation skill

Course Outcome (COs)

- Students can able to develop self competence and self confidence
- Students can develop front office skills and house keeping skills
- Students can understand professionalism and corporate etiquette.



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7SBS3A3 : DISASTER MANAGEMENT

Course Description

- To equip the Organisation to handle all aspects of disasters in Ghana.
- To create awareness on disasters through intensive public education.
- To ensure disaster prevention, risk and vulnerability reduction, as a means of reducing the impact of disasters on society.
- To be in a position to provide the first line response in times of disaster.
- To assist in post-emergency rehabilitation and reconstruction effort.

7BEA3: EXTENSION ACTIVITY

Course Objectives:

- To enrich the students to handle the social relation to the public and government higher secondary students.
- To acquire the knowledge to eradicate the environmental issues.
- To able to handle the classes for higher secondary students both theory and practical.
- To create the pleasant environment to our surroundings.
- To create the awareness to eradicate the plastics and planted the seed saplings to our environment.
- To make the interest to the students to grow saplings for their birthday occasion.

Course Outcome

- Able to handle the social relation between the publics and students.
- Familiarize the students to handle the environmental issues.
- According to the need for higher secondary students, educate the school students' both theory and practical.
- Eradicate the plastics in and around the school and college.
- Ability to plant the saplings in and around the school and college ground.

7BZO4C1: GENETICS AND MOLECULAR BIOLOGY.

Course Description

- The principal aim of this course is to introduce the students to classical and model concepts in genetics and molecular biology.
- To aware the students about hereditary diseases, early diagnosis and counselling.

Course Objectives

- To understand Mendelian genetics
- To understand gene interaction
- To understand polygenetic inheritance and multiple alleles
- To understand functional and applied genetics

Course Outcome (COs)

- The ability to understand the results of genetic experimentation in animals
- In comprehensive and detail understanding of the chemical basis of heredity



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7BZO4P1: EVOLUTION, GENETICS & MOLECULAR BIOLOGY

Course Description

- Describe about the mendelian law
- Find out the simple mendelian characters
- Study about the extraction of DNA
- Explain mimicry, Darwin finches, fossils, adaptic colouration

Course Objectives

- To find out the blood group of unknown individual
- To find out the trait type of mendelian traits in man
- To identify and find out on the living fossils

Course Outcome (COs)

- After the course, the student should be able to:
- Understand the blood groups
- The students can able to understand the different mimicry and colouration
- They can compare and analysis of Mendelian characters, pedigree chart
- Student can able to extract DNA from onion

7SBS4B1: ACCOUNTING SKILLS

Course Description

- Provide an opportunity for the science students to develop accounting skills
- Teach accounting process, difference between journal and ledger
- Teach the students about trial balance financial accounts and introduction to accounting package.

Course Objectives

- To introduce basic Accounting principles, ethics in accounting and preparation of financial statements.
- To analyze the business problem by incorporating diverse perspective of accounting techniques and to develop competent decision skills in the areas of accounting

Course Outcome (COs)

- Students can understand basic accounting
- Gained knowledge about trial balance financial account and accounting package.



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7SBS4B2: EMERGENCY AND MEDICAL LAB SKILLS

Course Description

- Practice students about first aid for emerging medical care
- Enlighten the students about traffic rules
- Practice students about basic clinical lab test

Course Objectives

- To recognize the nature and seriousness of the patient's condition or extent of injuries to assess requirements for emergency medical care
- Administer appropriate emergency medical care based on assessment findings of the patient's condition
- To Perform safely and effectively the expectations of the job

Course Outcome (COs)

- Students can aware about traffic rules and how the road accidents were happen
- Students can learn the procedure for the basic clinical test.

7SBS4B3: YOUTH RED CROSS

Course Objectives:

- To make the students to know about the birth, organizational set up, principles,
- emblem and activities of Red Cross society and to develop leadership traits.
- To able to overcome the disaster management.
- To acquire the leadership quality among the students.
- To be able to conduct the camp.

Course outcome

- Familiarization of organizational setup, birth and Red Cross society.
- Practice to console the disaster management.

7BVE4: VALUE EDUCATION

Course Description

- The students are really practiced to become a good citizen and will give external value of all actions

Course Objectives

- It will give definition to value education and literature idea about various religious.
- This course includes Hindu Dynasties, Social reformers and their role in value education.
- It will discuss problems on transition from School to college, ways of inculcating in teaching equity and extracurricular activities.

Course Outcomes

- The course will create awareness to values among learners to help them in their life.



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7BMY4: MANAVALAKALAI YOGA

- To train and develop the physical body for leading a healthy life.
- To rejuvenate the life energy, to retard the ageing process and to achieve spiritual development
- To offer meditation practices and introspection so as to strengthen the mind, increase its will power, concentration, creativity and receptivity and ultimately to transform the mind to achieve self realization

7BWS4: WOMEN STUDIES

Course Description

- This course offers an introduction to Women's and Gender Studies that explores the meaning of gender in society.
- The primary goal of this course is to familiarize students with key issues, questions and Women's and Gender Studies scholarship, both historical and contemporary.
- Gender scholarship critically analyzes themes of gendered performance and power in a range of social spheres, such as law, culture, education,
- work, medicine, social policy and the family.

Course Objectives

- To gain knowledge on gender ideology
- To understand the concepts of HDI, GDI and GEM
- To know the women development policies and programmes

Course Outcomes

- On successful completion of this course students will be able to investigate issues and
- debates around gender, particularly in relation to Australian society.
- This course explains the ways in which gender shapes our everyday lives through the
- intersections of gender, race, class, sexuality, age, religion, culture, and nation.
- It will discuss the ways in which systems of power, privilege, and oppression shape
- our experiences as individuals and members of communities.



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7BZO5C1: ANIMAL PHYSIOLOGY

Course Description

- Essentials of food and its biological role in animal physiology is described.
- Human organ structures and its physiological mechanism will be dealt.
- Nervous coordination, muscle physiology and endocrine system of insects and human beings will be described.
- Vertebrate immune mechanisms and immune deficiency disorders will be taught.

Course Objectives

- To understand the metabolic activities in mammalian body
- To explain the role of various bio-molecules in human body
- To understand the process of respiration and excretion
- To enlighten the various process of circulation, osmoregulation and nervous system.

Course Outcome (COs)

- Students are able to understand the physiology at cellular and system level
- Able to describe physiology of respiration, circulation and digestion.

Students are able to understand how mammalian body get nutrition from different biomolecules.

7BZO5C2: BIOCHEMISTRY.

Course Description

- Biochemical events taken place in the body for generation of energy
- Classification of bio-molecules and their metabolism
- Different types of chemical bonds
- Role of macro molecules, amino acids and vitamins are described

Course Objectives

- Discuss the various macromolecular compounds of cells and their functions
- To know the classification and properties of carbohydrates, proteins and lipids
- To understand the classification and types of amino acids
- To understand the basic concepts of enzymes and vitamins

Course Outcome (COs)

- Understanding the macromolecules, chemical bonds and thermodynamics
- Understand the structure and function of carbohydrate, amino acid, proteins, and lipids
- Understand the concepts of enzymes and vitamins
- Found the principle and role of vitamins in metabolism and deficiency diseases.



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7BZOE1A: FISHERIES BIOLOGY.

Course Description

- Inland and marine resources management and their utilization to meet out the population demand.
- Aquaculture methods and fish species selection will be discussed
- Student will make self employment by developing the skills of fish, prawn culture and molluscan culture.

Course Objectives

- To provide the students about necessary basic information regarding fishery and aquaculture.
- To improve the technical and general knowledge necessary for competent fisheries management
- To discuss important factors for performing a sustainable fishery and sustainable aquaculture.

Course Outcome (COs)

- Students will learn about the role of fisheries management
- Students will learn about fresh water and marine water fish species
- Students able to understand about prawn culture and molluscan culture.

7BZOE1B: VERMICULTURE.

Course Description

- Self employment generation is the core content of the course vermiculture. Identification of
- earthworm, study about the morphology, anatomy and selection of earthworms, vermiculture
- and vermicomposting methods are useful to develop the skills to start a vermiculture farm.
- Advantages, economics and scale of operation will be included as a process of income generation.

Course Objectives

- To study about the earthworms
- To learn the skills of vermiculture and vermicomposting methods
- To teach about the eco-friendly technology
- To generate employment after completion of the Degree

Course Outcome (COs)

- Creation of knowledge about conservation of soil health through development of vermiculture and vermicomposting. Morphology and taxonomy of earthworms will be helpful to save our native earthworm species.
- Student can generate minimum income through install a small scale vermi unit.



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7BZOE1C: MUSHROOM CULTURE

Course Description

- The role of mushrooms as useful and harmful in the natures and as the source of human nutrition and medicaments is shortly discussed.
- The nutritional and reproductional biology of mushrooms, the media for mushroom cultivation and the preparation of chemical media is discussed.

Course Objectives

- To teach the students knowledge and skills which allow them to establish a mushroom cultivation enterprises.
- Appropriate knowledge belongs principally to a new applied science and practice of mushroom cultivation.
- The develop skill work will autoclaves preparing sterile microbiological media and work with pure culture.

Course Outcome (COs)

- Determine the most important species of cultivates mushroom and known the basic ways of the cultivation of each of them.
- Can work with autoclaves
- Can prepare microbiological media
- Can work with pure culture of microorganisms.

7BZOE2A: FUNDAMENTALS OF MICROBIOLOGY

Course Description

- This course includes preparing stained smears, culturing microorganisms conducting immunology experiments performing tests to identify bacteria and fungi and studying microbial growth of control methods.

Course Objectives

- Proper usage, identify the parts / functions of the following microscope SEM and TEM.
- Streak plate isolation techniques, bacterial staining techniques web mounts, and proper culture handling.
- Understand and explain environmental factors that influence microbes.

Course Outcome (COs)

- To understand the function and common live culture media
- To identify unknown microves using biochemical and immunologic testing
- To understand physical and chemical control of microbes.



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7BZOE2B: POULTRY SCIENCE

Course Description

- Survey of systems of poultry production including: concepts and terminology pertaining to management and marketing; types and breeds of poultry; and an introduction to nutrition, genetics, physiology, and management of poultry.

Course Objectives

- This course will cover all aspects of modern poultry production including breeding, nutrition, health, behavior, and well fare as well as quality of meat and eggs.
- The course is relevant for all students working in the field of poultry science and will provide the understanding of poultry production.

Course Outcome (COs)

- To understand breeding, nutrition half welfare and product quality
- Understand the power of genetic selected formulate diets for poultry
- Formulate diets for poultry
- Evaluate the quality of poultry meat and eggs.

7BZOE2C: SERICULTURE

Course Description

- Since agriculture is a basic need for humans, there is always a lot of scope in this field of study.
- With the advent of technology and developments that come with it, there has been a wide variety of job opportunities in both public and private enterprises.

Course Objectives

- Imparting training in Mulberry cultivation, silk worm rearing and silk reeling.
- To know various new technologies of mulberry production
- To know about significance of biological chemistry of silk worm.
- To know about the importance of cocoons.
- To understand the occurrence, distribution and crop loss due to mulberry pests and diseases.

Course Outcome (COs)

- Sericulture offers career opportunity in Govt. research centers, silk boards, academic fields, sericulture units, agriculture sector banks etc. One can get jobs in Central Government agencies like Central Silk Board/Silk Export Promotion Council/Fao/Nabard, Krishi Vigyan Kendra etc.
- Candidates with M.Sc sericulture can apply for the post of lecturer, professor and lab assistant. Sericulturists can find employment as officers, managers in the agricultural loan sector of nationalized as well as private banks. Consultants with in-depth and updated knowledge of the field are also in demand, especially to provide guidance for the setting up of sericulture farms



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7BZO5P1: ANIMAL PHYSIOLOGY, BIOCHEMISTRY AND ELECTIVE COURSE

Course Description

- Study about the qualitative analysis of carbohydrate, protein and lipids
- Study on enzyme action of starch
- Study of ciliary activity, heart beat of freshwater muscle
- Explain the preparation of haemin crystals

Course Objectives

- To estimate the oxygen consumption by fish
- To mount blood cells and haemin crystals
- Find out present or absent of carbohydrate, protein, lipid / nitrogenous wastes products
- To know about the working mechanism of haemoglobinometer, haemocytometer

Course Outcome (COs)

- After the completion of course the students can able to understand the qualitative procedure of carbohydrate, protein and lipid
- The student can able to find out the presence or absence of nitrogenous waste products in the given samples

7SBS5A4: ENTREPRENEURIAL DEVELOPMENT SKILLS

Course Description:

- This course has five units of syllabus which introduces the concept of Entrepreneurship, basic
- methods to select the business. It also includes the preparation of project skills, marketing
- skills, management of men, material and money and industrial management

Course objectives:

- To understand the concept of Entrepreneur.
- To expose business management idea.
- To impart the knowledge of marketing skills ,management of men, material and money
- To empower to become successful Entrepreneur.

Course outcome:

Upon completion of the course, the student will be able to develop understanding of:

- Entrepreneurship scenario in the country
- Basic principle of economics and management
- Role of public and partnership



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(7SB5A5) HERITAGE & TOURISM

Course Description:

- Culture and heritage are intricately connected to the appeal of tourist destinations. This course introduces the relationship between culture, heritage and contemporary tourism, exploring the phenomenon of cultural tourism. In this course, both positive and negative effects of global tourism on heritage destinations are mainly focused

COURSE OBJECTIVES:

- To introduce the concept and significance of tourism.
- To Discuss the importance of Effects of Tourism –Social, Economic and Environmental aspects – Human Rights
- To understand Brief history of the heritage spots – The role of heritage spots in promoting tourism – UNESCO guidelines on Heritage
- To know the role of Guide and their skills.
- To arrange the Field visit to heritage and tourism spots in different Districts and submission of a report.

Course Outcomes:

On successful completion of the course students will be able to:

- Demonstrate a critical understanding of the relationships between culture, heritage and tourism;
- Analyze the role that tourism plays in the production and consumption of culture;
- Evaluate both the positive and negative impacts of tourism on cultures and communities;
- Identify current issues in the development and management of cultural and heritage tourism products;
- Describe cultural and heritage tourism policy, planning and management issues;
- Explain cultural sustainability and sustainable tourism principles. (House).



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7SBS5A6: MARKETING AND SALES MANAGEMENT

Course Objectives

- Discuss the sales, sales management and related concepts.
- Explain the structure and objectives of a sales organisation.

Course Outcome

- Create a complete business plan for a start up business that you could actually take to a bank to secure financing
- Craft a retail store layout and merchandise plan
- Budget, schedule, and create an advertising campaign for a product or business
- Sell in multiple selling situations including to a real business buyer
- Work with an area business in a consulting role to create a marketing plan and promotion pieces
- Develop a territory plan for a business to business sales territory
- Job shadow with business to business sales reps
- Attend several business conferences
- Earn on the job experience with the company of your choice through an internship

7BZO6C1 FUNDAMENTALS OF BIOTECHNOLOGY

Course Description

- Our course will enable you to learn about the science behind biotechnology while also looking at how to succeed in a career in the industry.
- You will learn about how new start-up biotechnology companies are created, as well as about exploring the market potential of products and processes, creating business plans and raising money from venture capitalists.
- This course is designed to produce graduates who have a solid understanding of science, technology and business management, along with the entrepreneurial skills required to exploit technological advances within a competitive environment.

Course Objectives

- To understand history, areas, and gene transfer techniques in biotechnology
- To understand gene cloning, restriction enzymes vectors, cosmids.
- To understand basic skills applied in DNA finger printing, DNA sequencing and DNA microarray
- To understand transgenic animal technology

Course Outcome (COs)

- Understand the various application of biotechnology study and understand the DNA recombinants technology
- Understand the scope and significance of biotechnology



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7BZO6C2: ENVIRONMENTAL BIOLOGY AND BIostatISTICS

Course Description

- The course was established in response to the increasing awareness of environmental and nature issues. It is the study of the interactions between animals, plants and microbes and their environment. It includes the study of how individual organisms interact in communities and how communities interact with the surrounding ecosystem.

Course Objectives

- This course focuses on terrestrial and aquatic ecosystem
- This course covers ecosystem structure, and functions, ecological energetics, (Primary production) secondary production and consumer energetics), biogeochemistry (carbon, nitrogen and phosphorous)
- To develop professional who can have a critical approach to the evaluation of their own and other research work.

Course Outcome (COs)

- To understand major biogeochemical cycles including nutrients, metals and synthetic organic compound
- Understand human impacts to ecosystem describe and discuss basic statistical concept assess the distribution characteristics of variable.
- Formulate and test hypothesis.

7BZOE3A: RECOMBINANT DNA TECHNOLOGY

Course Description

- This course will cover isolation and purifications of nucleic acids, Mechanisms of gene cloning, practical aspects of recombinant DNA technology, model organisms in recombinant DNA technology, recombinant gene expression systems.

Course Objectives

- List out tools used for gene exploration
- Utilize the knowledge on creation of a genomic library
- Recall about transgenic plants and animals

Course Outcome (COs)

- Isolate and purify nucleic acids for routine laboratory procedures
- Explain the underlying mechanisms of gene cloning
- Discuss the practical aspect of applying recombinant DNA technology
- Explain the significance of model organisms in recombinant DNA technology
- Describe recombinant gene expression systems.



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7BZOE3B: BIOLOGY OF CLONING VECTORS

Course Description

- The course will provide the students with the basic biological and technical principles with regard to the field of gene cloning and its application in the various fields of biotechnology.

Course Objectives

- To provide students with basic knowledge of the concepts and themes of gene cloning.
- To present the students with an overview of the various biological tools used in gene cloning.
- To outline the process of science in studying biological problems based on gene cloning techniques.

Course Outcome (COs)

- At the end of this module, students will be able to gain knowledge about
- The various fundamental biological concepts and tools used in gene cloning
- The various steps of gene cloning
- The importance of gene cloning in the various fields of biotechnology.
- Cognitive skills (thinking and analysis).
- At the end of this module, students will be able to develop their intellectual skills through understanding the concepts of gene cloning and formulating questions and thinking of the appropriate answers to their questions. Communication skills (personal and academic).
- At the end of this module, students will be able to develop personal communication skills through participating in open-discussions with their colleagues and instructors. Practical and subject specific skills (Transferable Skills)
- At the end of this module, students will be able to improve their ability to search for information using various communication settings.
- Improve their ability to analyze data based on their understanding to the basic biological concepts of gene cloning.



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7BZOE3C: FERMENTATION TECHNOLOGY

Course Description

- This course is aimed at introducing the students to the basic concepts of fermentation; aerobic and anaerobic fermentation, alcoholic fermentation resulting in the production of bread, beer, wine and vinegar. Acid fermentation resulting into the production of cheese, butter, yoghurt etc. Malolactic fermentation processes.

Course Objectives

- To make students acquainted with principles of using of microorganisms in fermentation process. Attain knowledge of production equipment in fermentation industry, application of microorganisms and enzymes in technological operation, substrate preparation and control of fermentative process and isolation of products. Substantial time is devoted to particular fermented products -- spirits industry, yeast industry, brewing industry, production of microbial biomass and selected organic acids.

Course Outcome (COs)

- Generic competences:
 - ability to apply knowledge
 - capacity to learn
 - general knowledge
 - professional knowledge
- Specific competences:
 - Knowledge of industry cultivation of microorganisms.
 - Knowledge of principles of fermentation technology.
 - Knowledge of production alcoholic beverages, beers, yeasts and food acids.
 - Knowledge of production equipment in fermentation technology.



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7BZO6P1: FUNDAMENTALS OF BIOTECHNOLOGY, ENVIRONMENTAL BIOLOGY & BIostatISTICS AND ELECTIVE COURSE III

Course Description

- Study about the sterilization techniques, blotting techniques
- Explain about the differentiation of haemolymph and blood
- Identify and comment on Spirulina, Azolla, Penicillin, etc.,
- Explanation of basic environmental analysis
- Study of ciliary activity, heart beat of freshwater muscle
- Explain the preparation of haemin crystals

Course Objectives

- To find out the estimation of oxygen in the pond water
- To study the mounting techniques of planktons
- To describe the working mechanism of blotting techniques, sterilization techniques.

Course Outcome (COs)

- After the completion of course the students can able to understand the blotting techniques, sterilization techniques, Extraction of DNA technology
- Students can able to differentiate the haemolymph and blood
- Student can able to estimate the dissolve oxygen, salinity of different samples
- Students can understand animal association like symbiosis, parasitism, commensalism.

7SBS6B3: INTERNET AND OFFICE AUTOMATION.

Course Description

- Creation of E.mail ID, method of browsing, search engines, MS office - MS Word, MS Excel, MS Power point.

Course Objectives

- To aware the students about the usages of E. mail and sending document through E.mail.
- To teach about usage of internet for collection of reading materials.
- To explain about the short cut keys and create a new word document.
- To teach to draw various diagrams using MS Excel.
- To motivate the students to prepare power point slides for effective presentation.

Course Outcome (COs)

- Student will familiar about the usage of E. mail and attaching documents.
- Students will learn about the collection of search engines and reading materials for their assignments and university examinations.
- The presentation will become easy and effective while attending interviews.



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7SBS6B4: FRUIT, VEGETABLE PRESERVATION SKILLS.

Course Description

- This course introduces the principles methods of preservation skills, study of various type container s and Importance of personal hygiene and sanitary standards.

Course Objectives

- This course is meant for the candidates who aspire to become: Quality Analysis in Fruits and vegetable processing industry
- Supervisor in Fruits and Vegetable Processing Industry
- Cold Storage Supervisor in Frozen fruits and vegetables industry • Packaging Supervisor in Fruits and Vegetable Processing industry
- Skilled worker in Food MNC
- Entrepreneur in Fruits and vegetables processing.

Course Outcome (COs)

- Identify and select fresh fruits and vegetables with the help of checklist.
- Identify the spoilage in fruits and vegetables and state the reason for the spoilage.
- Identify spices and food additives by visual inspection.
- Prepare and pack perishables for storage and then store under refrigerated conditions with safety precautions.
- Prepare fruit juices with juice extracting machines with safety precautions and preserve fruit juices with addition of preservatives and determine the acidity content.
- Prepare and package fruit beverages such as Squashes, Nectar, Cordial, Crush and Syrup by using appropriate machines such as pulper, juice extractor, autoclave, and corking machine with safety precautions, determine the acidity content.
- Prepare and preserve Tomato products by using appropriate machines such as pulper, autoclave, and corking machine with safety precautions, determine acidity content.
- Prepare, dry and storage fruits and vegetables with appropriate methods such as drying, cabinet drying and solar drying with safety precautions and determine the moisture.
- Prepare, preserve, and store jam, jelly and marmalades by using appropriate machines such as pulper, autoclave & sealer with safety precautions, determine acidity content, pectin test.