DEPARTMENT OF ZOOLOGY

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Programme Code: Z **Programme Name: B.Sc. Zoology**

Programme Outcomes

1. Learners would be able to analyze the relationships among animals, plants and microbes and gain skill in the systematics of animal kingdom. (Global)
2. Learners would be inspired to choose career options in the field of Developmental Biology, Fishery industry, Wild life conservation, Ecotourism, Biotechnology and Research etc. (Regional)
3. Apply the knowledge and understanding of Zoology to one's own life. (Global)
4. Gain knowledge of protection of vulnerable and endangered species. (Global)
5. Gain Information and skill of advanced biological techniques for experimental purposes. (National)
6. The programme is designed in such a way that students should be able to solve the problems, think scientifically, independently and draw rational conclusions. (Regional)
7. Students will understand the science of vermicomposting, dairy, aquaculture, beekeeping with respect to entrepreneurship. (Regional)

Programme Specific Outcomes

1. Maintain high standards of learning in animal sciences. (National)
2. Apply the knowledge to lead a healthy lifestyle. (Global)
3. Identify animals beneficial to humans. (National)
4. Awareness on ethical principles. (Global)
5. Acquire specific knowledge on the various sections of Life Sciences, Cell Biology, Genetics, Taxonomy, Applied Zoology, General Embryology and Public Health. (Global)
6. Understand good laboratory practices and safety. (Global)
7. Understand the applications of biological sciences in Biotechnology, Apiculture, Poultry, Fisheries, Aquaculture and Vermiculture. (National)

Course Outcomes

SEMESTER - I

Subject Code: 17Z111

Course Name: INVERTEBRATA (National)

Upon completion of the course, the students will be able to

1. Enable the students to understand the level of organization in Invertebrate classifications.
2. Help the students gain practical applications in the biomedical and agronomy fields of research.
3. Make the learners aware of the human misconceptions, bioethics and phobias associated with invertebrate interactions.

Subject Code: 17SEZ11

Course Name: COMPUTER APPLICATION (National)

Upon completion of the course, the students will be able to

1. Enable the students to understand the basic operations in computer hardware and software.
2. Make students develop the skill in using computer applications software.
3. Help the students to gain basic computing skills.

Subject Code: 17SEZ12

Course Name: AQUACULTURE (Global)

1. Produce protein rich, nutritive, palatable and easily digestible human food.
2. Produce ornamental fish for aesthetic appeal.
3. Make learners aware of the means of livelihood through commercial and industrial aquaculture.

Subject Code: 17NMZ1

Course Name: MEDICAL MICROBIOLOGY (Global)

1. Introduce basic principles and applications in relevance to clinical diseases.
2. Make students know the etiological agents responsible for global infections and diseases.
3. Make students acquire and demonstrate with competency in microbiological research.

SEMESTER - II

Subject Code: 17Z21

Course Name: CHORDATE (National)

Upon completion of the course, the students will be able to

1. Learners will be able to understand the origin and evolutionary relationship in different subphylum of chordates.
2. Understand the ecological role of different groups of chordates.
3. Make students learn and describe unique characters of urochordates, cephalochordates and fishes.

Subject Code: 17SEZ21

Course Name: VERMITECHNOLOGY (National)

Upon completion of the course, the students will be able to

1. Understand the basic principles and procedures of Vermicomposting and Vermiculture technology
2. Make students aware of ecofriendly agriculture through organic farming utilizing the byproducts of Vermiculture.
3. Students will be able to produce and generate income in the production of biomanure made from kitchen wastes.

Subject Code: 17SEZ22

Course Name: CLINICAL MICROBIOLOGY (Global)

Upon completion of the course, the students will be able to

1. Create knowledge and avenues for self employment.
2. Impart knowledge of the basic principles of bacteriology, virology, mycology and parasitology.
3. Students will understand the nature of pathogenic microorganisms, pathogenesis, laboratory diagnosis, transmission, prevention and control of diseases common in the country.

Subject Code: 17NMZ21

Course Name: ORNAMENTAL FISH CULTURE (National)

Upon completion of the course, the students will be able to

1. Analyse the impact of the aquarium fish trade on social and natural environments.
2. Collect baseline data on the ecosystems, socio –economy and diversity of fishes.
3. Develop best handling practices for the care of fishes .

Sub code :17Z2P
Name of the Course : LAB IN INVERTEBRATA AND CHORDATA INVERTEBRATA
(National)

Upon completion of the course, the students will be able to

1. Students will be able to describe the morphology, habit, habitat, systematic position and various systems in all phylums.
2. Enable to prepare mounting of mouth parts of few common insects.
3. Experience in anatomy through simple dissections.
4. Familiarize organ systems.

CHORDATA

1. To describe the salient features and classification of phylum Chordata and their origin.
2. Gain knowledge to distinguish between poisonous and non-poisonous snakes.
3. Describe the External features of fresh and marine water fishes and other aquaculture organisms.

SEMESTER - III

Subject Code: 17Z31
Course Name: CELL AND MOLECULAR BIOLOGY (Global)

Upon completion of the course, the students will be able to

1. Study the fundamentals of Cell and Molecular Biology and gain knowledge on how all living organisms develop, survive and evolve.
2. Learn about the significance of macromolecules- DNA, RNA and proteins.
3. Understand the importance of cell division and replication in developmental biology.

SEMESTER - IV

Subject Code: 17Z41
Course Name: DEVELOPMENTAL BIOLOGY (Global)

Upon completion of the course, the students will be able to

1. Helps one to investigate how fertilized egg cells divide in regulated manners to grow into full size bodies.
2. Students will be enriched with the basic knowledge of Developmental Biology, Experimental Embryology and Applied Embryology.
3. Learn about molecular genetics, cellular /integrative aspects of building an organism and developmental abnormalities.

Sub code :17Z4P
Name of the Course : LAB IN CELL AND MOLECULAR BIOLOGY& DEVELOPMENTAL BIOLOGY CELL AND MOLECULAR BIOLOGY (National)

Upon completion of the course, the students will be able to

1. Identify the phases of cell division.
2. Prepare Blood smear and identify the various cells
3. Ability to observe chromosomal arrangements during cell division.
4. Squash preparation of salivary glands in Chironomous larva.

DEVELOPMENT BIOLOGY

1. Identify and explain the types of eggs and placenta, blastula and gastrula of Frog .
2. Identify the age of chick embryo – 48hrs, 72hrs 96hrs.
3. Study the mammalian sperm and ovum.
4. Study the cleavage stages – 2cell, 4cell, 8cell stages.

SEMESTER - V

Subject Code: 17Z51
Course Name: GENETICS (Global)

Upon completion of the course, the students will be able to

1.Understand one's own health and make healthy choices.
2.Learn genetic technologies to help develop targeted medicines for certain diseases.
3.Gain knowledge on the arrangement of Genes, their interaction and the influence of environment on gene expression.

Subject Code: 17ZE5A
Course Name: ECOLOGY AND EVOLUTION (National)

Upon completion of the course, the students will be able to

1. Learn interdependence between people and nature that is vital for food production.
2. Able to solve biological problems that impact our lives.
3. Gain knowledge on the connections that exist between different species.

Subject Code: 17ZE5B

Course Name: BIOCHEMISTRY (Global)

Upon completion of the course, the students will be able to

1.Broadens our understanding of biochemical changes relating to physiological alteration in human body.
2.Understand the chemical aspects of biological processes such as digestion, hormonal action and muscle contraction –relaxation.
3.Application of skills in answering, critically analyzing, interpreting and presenting the results of laboratory investigations.

Subject Code: 17SEZ51

Course Name:BIOSTATISTICS (Global)

Upon completion of the course, the students will be able to

1. Demonstration and familiarization with core content of any one area in health sciences. Example- Genetics.
2. Enable to formulate and perform a descriptive and inferential analysis of a public health or other health sciences study using statistical software.
3. Capable of self directed learning of unfamiliar statistical methods and presentation of results/findings.

SEMESTER - VI

Subject Code: 17Z61

Course Name: PHYSIOLOGY (Global)

Upon completion of the course, the students will be able to

1. Provide thorough understanding of normal body function enabling more effective treatment of abnormal or disease states.
2. Provide insight into the complex nature of the human body and the countless different systems that make it up.
3. Acquire knowledge of the senses, movements and needs of the human body.

Subject Code: 17Z62

Course Name: MICROBIOLOGY AND IMMUNOLOGY (Global)

Upon completion of the course, the students will be able to

1. Acquire knowledge and understanding of the concepts of Microbiology in the field of medicine, industry, environment, genetics, agriculture, food and others.
2. Demonstrate key practical skills/competencies in working with microbes.
3. Demonstrate the basic knowledge of immunological processes at a cellular and molecular level and understand the principles governing vaccination and the mechanisms of protection against infectious diseases.

Subject Code: 17ZE6A

Course Name: BIOTECHNOLOGY (Global)

Upon completion of the course, the students will be able to

1. Understand the principles of animal culture, media preparation, Invitro fertilization and embryo transfer technology.
2. Aware of the applications of recombinant DNA technology in agriculture and production of therapeutic proteins.
3. Knowledge of the microbial degradation of Pesticides, Bioremediation & Biofertilizers.

Subject Code: 17SEZ61

Course Name: ECONOMIC ZOOLOGY (National)

Upon completion of the course, the students will be able to

1. Gain knowledge on the concepts of origin, growth and study of Sericulture as science, to acquaint the general aspects of Sericulture industry.
2. Identify various types of honeybee , importance of wax and identify what to look for in comb during hive inspections
3. Understand the principles, importance, purpose and application of the basic technologies in fisheries and aquaculture.
4. Gain skill on the economic importance of poultry farming to determine the best poultry management system.
5. Promote women entrepreneurship in rural areas through incorporation of women into economic activity.
6. Understand basic characteristics of common breeds of livestock species.

Sub code :17Z61P
Name of the Course : LAB IN BIOCHEMISTRY. GENETICS, ECOLOGY & EVOLUTION (Global)

Upon completion of the course, the students will be able to

BIOCHEMISTRY:

1. Enable to estimate Hb by Sahli's method.
2. Enable to investigate sugar in urine samples.
3. Qualitatively analyse the given carbohydrates, Proteins and Fats
4. Measure the pH of given samples.

GENETICS:

1. Biological data- calculation of Mean, Median, Mode and Standard deviation.
2. Observing Simple Mendelian traits.
3. Understand the significance of sex linked and sex limited inheritance in humans.

ECOLOGY:

1. Observe turbidity using Secchi disc.
2. Familiarize with ecological adaptations.
3. Analyse the content of dissolved Oxygen in various water samples –pond water, river water ,tap water etc.

EVOLUTION:

1. Study of living fossils ,connecting link, evolutionary significance of Peripatus and Limulus.
2. Explain the stages of human evolution.
3. Identify the fossil types and adaptations in animals.

Sub code :17Z62P
Name of the Course :LAB IN PHYSIOLOGY, MICROBIOLOGY, IMMUNOLOGY AND BIOTECHNOLOGY (Global)

Upon completion of the course, the students will be able to

PHYSIOLOGY:

1. Activity of human salivary amylase in relation to pH, enzyme and temperature.
2. Enable to detect ammonia (nitrogenous waste) in fish tank water.
3. Use of BP apparatus, Stethoscope etc.
4. Count total leucocytes from Blood samples.
5. Estimate dissolved O_2 content of various water samples with reference to weight of fish.

MICROBIOLOGY:

1. Students will be able to get the basics and importance of practicals of microscopy, staining and sterilization.
2. Master aseptic techniques and be able to perform routine culture handling tasks safely and effectively.

IMMUNOLOGY:

1. To identify the prepared slides of histology- Thymus, Spleen, Bone marrow, Lymph node.
2. To understand Ag–Ab reactions and to report human blood groups.
3. To be familiar with immunization schedule and its importance.

BIOTECHNOLOGY:

1. Explain the basics of Animal Biotechnology.
2. Explain gene transfer methods for the production of transgenic animals.
3. Address bioethical and biosafety issues related to animal transgenics.
4. Gain knowledge on the production of GMOs.

ALLIED CHEMISTRY-I

Allied Chemistry

(for B.Sc. Mathematics and Zoology Majors)

Course Outcomes

SEMESTER - I

Subject Code: 17AK1
Course Name: GENERAL CHEMISTRY-I (Global)

Upon completion of the course, the students will be able to

1. Understand the proper setups and various steps involved in metal extraction.
2. Provide a comprehensive overview on colloids.
3. Mention the types of catalysis and the laws of photochemistry.
4. Define chromophore, auxochrome theory and the explain in preparation of dyes.
5. Describe the arrangements of elements and a the variation in periodic properties.

SEMESTER - II

Subject Code: 17AK2
Course Name: GENERAL CHEMISTRY-II (Global)

Upon completion of the course, the students will be able to

1. Describe the structure of atom by quantum mechanical approach.
2. Acquaint with the knowledge in preparation and usage of isotopes of hydrogen, covalent hydrides, polymeric hydrides.
3. Explain the fundamental concepts of sp^3, sp^2,sp hybridization ,bond fission and stability of reaction intermediates.
4. Get insight into synthesis and uses of naphthalene, furan, and pyridine.
5. Acquire in-depth knowledge about the carbohydrates.

Subject Code: 17AK2P
Course Name: SALT ANALYSIS (National)

Upon completion of the course, the students will be able to

1. Identify the simple cation and anions by preliminary reactions.
2. Follow the procedures systematically in the elimination of interfering radicals. and identify the cations in the group separation(Group I –VI).
3. Recording the result of salt analysis test.

SEMESTER - III

Subject Code: 17AK3
Course Name: GENERAL CHEMISTRY-III (Global)

Upon completion of the course, the students will be able to

1. Learn and analyze the bonding characteristics in compounds.
1. Predict the oxidation states and balance redox reactions.
2. Familiar with the organic halogen compounds.
3. Get concise information about polymers.
4. Know the fundamental aspects of ionic equilibrium.

SEMESTER – IV

Subject Code: 17AK4
Course Name: GENERAL CHEMISTRY-IV (National)

Upon completion of the course, the students will be able to

1. Recognize the basic concepts of co-ordination chemistry.
2. Acquire basic idea about the alkaloids and Terpenoids.
3. Asses the chemistry of organic and industrial organic compounds.
4. Gain knowledge on the structure and uses of some drugs such as antibacterials, antimalarials, antibiotics and arsenical drugs.
5. Acquire the knowledge in various pesticides, insecticides, fungicides and herbicides.

Subject Code: 17AK4P
Course Name: VOLUMETRIC ANALYSIS (National)

Upon completion of the course, the students will be able to

1. Perform simple acid, base and redox titrations skillfully
2. Know the applications of volumetric analysis
3. Identify different types of errors in quantitative analysis.

ALLIED BOTANY-II

ALLIED BOTANY

Semester III

Course Outcomes

Subject Code: 17AG4
Course Name: PLANT DIVERSITY I- ALGAE, FUNGI, BRYOPHYTE, PTERIDOPHYTE & GYMNOSPERM (Global)

Upon completion of the course, the students will be able to

1. Understand the systematic position, diversity, morphology, structure, reproduction and life cycle of various types of Algae and Fungi species.
2. Know the systematic position, occurrence, thallus structure, reproduction and life cycle of selected Bryophyte and Pteridophyte species.
3. Analyze the evolutionary trends of living gymnosperms external, internal features, reproduction and life cycle.

Semester IV
Course Outcomes

Subject Code: 17AG4

Course Name: CELL BIOLOGY, PLANT ANATOMY, GENETICS, PLANT BREEDING & HORTICULTURE. (Global)

Upon completion of the course, the students will be able to

1. Analyze basic structures of the plant cell, its function and cell inclusions.
2. Understand plant cells ,tissues, their functions and internal structure of various tissues in the stem and root.
3. Acquire the basic concepts of Mendelian genetics.
4. Explain the concepts of plant breeding involving the principles, selection procedure and its achievements in the field of agricultural crop improvement.
5. Know the plant propagation type and its practices in specific plants.

Subject : 17AG4P
Course Name: PRACTICAL I (National)

Upon completion of the course, the students will be able to

1. Acquire hands-on practice about micro-preparation, hand sectioning and observation of permanent slides of the lower and higher group of plant species.
2. Categorize the internal structure of monocot and dicot (stem, leaf and root), secondary thickening and anomalous secondary thickening (Dicot and Monocot).
3. Attain the knowledge of plant cellular organelles.
4. Perform emasculation techniques.
5. Analyze the genetic variations among plants.
6. Demonstrate the techniques of gardening - Types, Methods & Tools.

Semester V
Course Outcomes

Subject Code: 17AG5
Programme Name: MORPHOLOGY, TAXONOMY OF ANGIOSPERMS, MEDICINAL BOTANY & ECONOMIC BOTANY (Global)

Upon completion of the course, the students will be able to

1. Understand various modifications of plant parts and their purpose in plants.
2. Comprehend the concepts of plant taxonomy and classification of Angiosperms.
3. Know the Salient feature, taxonomy and economical values of plants in each family.
4. Gain knowledge of traditional medicine, sources of drugs and its application for human ailments.
5. Expansion of knowledge in the economic importance of certain plant and its demand for human needs.

Semester VI
Course Outcomes

Subject Code: 17AG6

Course Name: PLANT PHYSIOLOGY, EMBRYOLOGY, PLANT TISSUE CULTURE & PLANT PATHOLOGY (National)

Upon completion of the course, the students will be able to

1. Know about Photosynthesis and Respiration, absorption of water and translocation of solutes in plants.
2. Familiar with the application of plant growth hormones in agriculture and horticulture.
3. Understand the growth and developmental processes, pollination, fertilization, embryogeny and types endosperm in plants.
4. Acquire knowledge about the basic perception, procedural skill and applications of plant tissue culture.
5. Comprehend the scope and importance of plant pathology, its effect on the economy of crops and control measures for the plant diseases.

Subject : 17AG6P

Course Name: PRACTICAL II (National)

Upon completion of the course, the students will be able to

1. Relate the morphological features and dissected out floral parts of the plants in identifying its taxonomic family.
2. Recognize the economically important plants.
3. Knowledge of pharmacological importance of medicinal plants and their bioactive compounds.
4. Analysis of the process of photosynthesis through experimentations.
5. Get adequate knowledge in dissection and perceiving the internal structure of anthers, and ovules.
6. Demonstrate the plant tissue culture techniques and preparation of culture medium.
7. Categorize the organisms and causal factor responsible for some common plant diseases.