

RRDS Government Degree College

Department of Biological Sciences

Program Outcomes (POs)

PO1. Critical Thinking: Apply critical thinking and enhance learning in the three major subjects of their choice with scientific reasoning and analytical skills.

PO2. Problem solving: Think logically and organize task into a structured form for problem solving by applying the knowledge of basic science.

PO3. Effective communication: To develop the ability of effective communication of scientific information in written and oral format.

PO4. Individual and team work: Function effectively as an individual and as a member or leader in diverse teams and in multi-disciplinary settings.

PO5. Ethics: Apply ethical, moral and social values in personal and professional life leading to holistic development of the individual.

PO6. Environment and sustainability: Develop interdisciplinary approach to provide better solution and innovative ideas for sustainable development and conservation of natural resources.

PO7. Self-directed and lifelong learning: Recognize the need for and have the ability to engage in independent, lifelong learning and adapt to technological changes to be globally competent.

Program Specific Outcomes (PSOs)

PSO1. Become aware about plant diversity and its conservation through plant tissue Culture and analyze the phytoconstituents of plants and plant drug adulteration.

PSO2. Acquire academic excellence with an aptitude for higher studies, research and to meet competitive exams

PSO3. Understand the current developments in the different areas of Botany and limitations and to solve problem, take real time decisions and innovate, while working with plants.

PSO4. Acquires knowledge and skill in the fundamentals of animal sciences, understand complex interactions among various living organisms.

PSO5. Understands environmental conservation processes and its importance, pollution control, biodiversity and protection of endangered species.

PSO6. Gains knowledge of small scale industries like sericulture, fish farming, butterfly farming and medical diagnostics. Understand the complex evolutionary processes and behavioral patterns of various animals.

PSO7. Develops theoretical and practical knowledge in handling the animals and using them as model organism.

PSO8. Acquire methodical and logical understanding of the fundamental concepts in Physical, Organic, Inorganic, Analytical and all other integrated Chemistry subjects.

PSO9. Achieve the ability to synthesize, separate, estimate and characterize compounds using experimental and instrumentation techniques

PSO10. Develop critical thinking and problem solving skills through solving by adopting research based pedagogical tools

Course Outcomes (COs)

Course – 1 Fundamentals of Microbes and Non-vascular Plants

Course Outcomes: By the completion of the course the graduate should be able to –

- Illustrate diversity among the viruses and prokaryotic organisms and can categorize them.
- Classify fungi, lichens, algae and bryophytes based on their structure, reproduction and life cycles.
- Analyze and ascertain the plant disease symptoms due to viruses, bacteria and fungi.
- Recall and explain the evolutionary trends among members of plant kingdom for their shift to land habitat.
- Evaluate the ecological and economic value of microbes, thallophytes and bryophytes

Course – 2 Basics of Vascular plants and Phytogeography

Course Outcomes: By the completion of the course the graduate should be able to –

- Classify and compare Pteridophytes and Gymnosperms based on their morphology, anatomy, reproduction and life cycles.
- Justify evolutionary trends in tracheophytes to adapt for land habitat.
- Explain the process of fossilization and compare the characteristics of extinct and extant plants.
- Critically understand various taxonomical aids for identification of Angiosperms.
- Analyze the morphology of the most common Angiosperm plants of their localities and recognize their families.
- Evaluate the ecological, ethnic and economic value of different tracheophytes and summarize their goods and services for human welfare.

Course – 3 Anatomy and Embryology of Angiosperms, Plant Ecology and Biodiversity

Course Outcomes: By the completion of the course the graduate should be able to –

1. Understand on the organization of tissues and tissue systems in plants.
2. Illustrate and interpret various aspects of embryology.
3. Discuss the basic concepts of plant ecology, and evaluate the effects of environmental and biotic factors on plant communities.
4. Appraise various qualitative and quantitative parameters to study the population and community ecology.
5. Correlate the importance of biodiversity and consequences due to its loss.
6. Enlist the endemic/endangered flora and fauna from two biodiversity hot spots in India and assess strategies for their conservation

Course – 4 Plant Physiology and Metabolism

Course Outcomes: By the completion of the course the graduate should be able to –

- Comprehend the importance of water in plant life and mechanisms for transport of water and solutes in plants.
- Evaluate the role of minerals in plant nutrition and their deficiency symptoms.
- Interpret the role of enzymes in plant metabolism.
- Critically understand the light reactions and carbon assimilation processes responsible for synthesis of food in plants.
- Analyze the biochemical reactions in relation to Nitrogen and lipid metabolisms.
- Evaluate the physiological factors that regulate growth and development in plants.
- Examine the role of light on flowering and explain physiology of plants under stress conditions.

Course – 5 Cell Biology, Genetics and Plant Breeding

Course Outcomes: By the completion of the course the graduate should able to –

- Distinguish prokaryotic and eukaryotic cells and design the model of a cell.
- Explain the organization of a eukaryotic chromosome and the structure of genetic material.
- Demonstrate techniques to observe the cell and its components under a microscope.
- Discuss the basics of Mendelian genetics, its variations and interpret inheritance of traits in living beings.
- Elucidate the role of extra-chromosomal genetic material for inheritance of characters.
- Evaluate the structure, function and regulation of genetic material.
- Understand the application of principles and modern techniques in plant breeding.
- Explain the procedures of selection and hybridization for improvement of crops

Course – 6 Plant Tissue Culture

Course Outcomes: By the completion of the course the graduate should able to –

1. Comprehend the basic knowledge and applications of plant tissue culture.
2. Identify various facilities required to set up a plant tissue culture laboratory.
3. Acquire a critical knowledge on sterilization techniques related to plant tissue culture.
4. Demonstrate skills of callus culture through hands on experience.

5. Understand the biotransformation technique for production of secondary metabolites.

Course – 7 Mushroom Cultivation

Course Outcomes: By the completion of the course the graduate should able to –

1. Understand the structure and life of a mushroom and discriminate edible and poisonous mushrooms.
2. Identify the basic infrastructure to establish a mushroom culture unit.
3. Demonstrate skills preparation of compost and spawn.
4. Acquire a critical knowledge on cultivation of some edible mushrooms.
5. Explain the methods of storage, preparation of value-added products and marketing.

Zoology

Course – 1 Animal Diversity – Biology of Nonchordates

Course Outcomes: By the completion of the course the graduate should able to –

- Describe general taxonomic rules on animal classification
- Classify Protozoa to Coelenterata with taxonomic keys
- Classify Phylum Platyhelminthes to Annelida phylum using examples from parasitic adaptation and vermin composting
- Describe Phylum Arthropoda to Mollusca using examples and importance of insects and Molluscs
- Describe Echinodermata to Hemichordate with suitable examples and larval stages in relation to the phylogeny

Course – 2 Animal Diversity – Biology of Chordates

Course Outcomes: By the completion of the course the graduate should be able to -

- Describe general taxonomic rules on animal classification of chordates
- Classify Protochordata to Mammalian with taxonomic keys
- Understand Mammals with specific structural adaptations
- Understand the significance of dentition and evolutionary significance
- Understand the origin and evolutionary relationship of different phyla from Protochordata to mammalian

Course – 3 Cell Biology, Genetics, Molecular Biology and Evolution

Course Outcomes:

The overall course outcome is that the student shall develop deeper understanding of what life is and how it functions at cellular level. This course will provide students with a deep knowledge in Cell Biology, Animal Biotechnology and Evolution and by the completion of the course the graduate shall be able to–

- To understand the basic unit of the living organisms and to differentiate the organisms by their cell structure.
- Describe fine structure and function of plasma membrane and different cell organelles of eukaryotic cell.
- To understand the history of origin of branch of genetics, gain knowledge on heredity, interaction of genes, various types of inheritance patterns existing in animals
- Acquiring in-depth knowledge on various aspects of genetics involved in sex determination, human karyo typing and mutations of chromosomes resulting in various disorder.
- Understand the central dogma of molecular biology and flow of genetic information from DNA to proteins.

□ Understand the principles and forces of evolution of life on earth, the process of evolution of new species and apply the same to develop new and advanced varieties of animals for the benefit of the society.

Course–4 Animal Physiology, Cellular Metabolism and Embryology

Course Outcomes:

This course will provide students with a deep knowledge in Physiology, Cellular metabolism and Molecular Biology and by the completion of the course the graduate shall able to –

- Understand the functions of important animal physiological systems including digestion, cardio- respiratory and renal systems.
- Understand the muscular system and the neuro-endocrine regulation of animal growth, development and metabolism with a special knowledge of hormonal control of human reproduction.
- Describe the structure, classification and chemistry of Biomolecules and enzymes responsible for sustenance of life in living organisms
- Develop broad understanding the basic metabolic activities pertaining to the catabolism and anabolism of various Biomolecules
- Describe the key events in early embryonic development starting from the formation of gametes upto gastrula ion and formation of primary germ layers.

Course – 5 Immunology and Animal Biotechnology

Course Outcomes:

This course will provide students with a deep knowledge in immunology, genetics, embryology and ecology and by the completion of the course the graduate shall able to –

- To get knowledge of the organs of Immune system, types of immunity, cells and organs of immunity.
- To describe immunological response as to how it is triggered (antigens) and regulated(antibodies)

- Understand the applications of Biotechnology in the fields of industry and agriculture including animal cell/tissue culture, stem cell technology and genetic engineering.
- Get familiar with the tools and techniques of animal biotechnology

Course – 6 Sustainable Aquaculture Management

Learning Outcomes:

Students at the successful completion of this course will be able to

- Evaluate the present status of aquaculture at the Global level and National level
- Classify different types of ponds used in aquaculture
- Demonstrate induced breeding of carps
- Acquire critical knowledge on commercial importance of shrimps
- Identify fin and shell fish diseases

Course – 7 Postharvest Technology of Fish and Fisheries

Learning Outcomes:

Students at the successful completion of this course will be able to

- Identify the types of preservation methods employed in aquaculture
- Choose the suitable Processing methods in aquaculture
- Maintain the standard quality control protocols laid down in aqua industry
- Identify the best Seafood quality assurance system