



Sanjivani Rural Education Society's
SANJIVANI ARTS, COMMERCE AND SCIENCE COLLEGE

At: Sahajanandnagar, Post: Shingnapur, Tal: Kopergaon,
Dist: Ahmednagar (M.S.) Pin:423603

Recognized by Govt. of Maharashtra, Affiliated to University of Pune, ID.No.PU/AN/ACS/130/2012



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Program Outcomes, Program Specific Outcomes and Course Outcome
Department of Zoology

Program outcome : M.Sc. (Zoology)	
PO1	<ul style="list-style-type: none">Apply the knowledge of Zoology, Life Sciences and allied subjects to the understanding of complex life processes and phenomena.
PO2	<ul style="list-style-type: none">Identify, review research literature, and analyse complex situations of living forms.
PO3	<ul style="list-style-type: none">Design processes/strategies that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	<ul style="list-style-type: none">Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions in real situations.
PO5	<ul style="list-style-type: none">Create, select, and apply appropriate techniques, resources, and ICT tools for understanding of the subject.
PO6	<ul style="list-style-type: none">Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	<ul style="list-style-type: none">Understand the impact of the natural and anthropogenic activities in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. Identify a range of invertebrates and vertebrates and justify their conservation.
PO8	<ul style="list-style-type: none">Apply ethical principles and commit to professional ethics and responsibilities and norms of the work/research practice.
PO9.	<ul style="list-style-type: none">Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10.	<ul style="list-style-type: none">Communicate effectively on complex life activities with the scientific community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.



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PO11.	<ul style="list-style-type: none">• Project management and finance: Demonstrate knowledge and understanding of Zoology and management principles and apply these to one's own work, as a member and leader in a team.
PO12.	<ul style="list-style-type: none">• Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.


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Program Specific Outcome : M.Sc./ (Zoology)	
PSO1	<ul style="list-style-type: none">• Develop in-depth understanding of Zoology through theoretical and practical learning.
PSO2	<ul style="list-style-type: none">• Gain proficiency in the principles and applications of recombinant DNA technology.
PSO3	<ul style="list-style-type: none">• Learn and apply methods to formulate and test scientific hypotheses.
PSO4	<ul style="list-style-type: none">• Operate models, charts, and advanced equipment relevant to Zoology.
PSO5	<ul style="list-style-type: none">• Understand the correlation between molecular structure and biological activity.
PSO6	<ul style="list-style-type: none">• Develop skills in adhering to laboratory standards and ensuring safety.
PSO7	<ul style="list-style-type: none">• Gain hands-on experience in handling advanced scientific instruments and equipment.
PSO8	<ul style="list-style-type: none">• Strengthen subject knowledge by engaging in practical experiments and real-world applications.
PSO9	<ul style="list-style-type: none">• Deepen understanding of DNA manipulation techniques and their research applications.


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Course Outcomes of M.Sc. (Zoology)

Class	Course title	Outcome
F.Y.M.Sc. (Paper-I)	Biochemistry and Biochemical Techniques.	<ul style="list-style-type: none">• Define basic terms in biochemistry and biochemical techniques.• Explain the applications of the various biochemical techniques.• Explain the structure and functions of various biomolecules. Explain the importance of tools and techniques in biology.• Explain the importance and applications of techniques in biochemistry.• Explain the principle and applications of various chromatographic techniques with examples.• Explain the principle, working, materials used and applications of electrophoresis.• Describe the concept of light, electromagnetic spectrum and its application in absorption spectroscopy.
F.Y.M.Sc. (Paper-II)	Cell Biology and Developmental Biology(<ul style="list-style-type: none">• Label the various cell parts• Sketch and label various types of cells and cell organelles.• Explain carbon as backbone of biomolecules.• Explain the ultrastructure and functions of various cell organelles.• Define the terms in developmental biology• Explain the significance of model organism for developmental studies.• Explain the types of eggs, concept of fertilization and cleavage pattern.• Explain the concept of mesoderm induction and pattern formation with examples.
F.Y.M.Sc. (Paper-III)	Genetics and English in Scientific Communication.	<ul style="list-style-type: none">• Define the basic terminologies in genetics.• Identify genetic disorders based on Karyotypes and traits.• Explain the concept of Mendelian genetics, gene, gene regulation and multiple alleles.



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		<ul style="list-style-type: none"> • Discuss Linkage and crossing with their types and significance. • Explain the principles of Population genetics. • Write the outline of a scientific paper. • Write the title, abstract, discussion and citations of a given scientific article. • Prepare a scientific presentation using PowerPoint. • Explain language as a tool for effective scientific communication. • Use the formal elements of specific types of scientific writing.
F.Y.M.Sc. (Paper-IV)	Freshwater Zoology	<ul style="list-style-type: none"> • Enlist the diagnostic features of shrimps. • Explain the types of aquatic habitats. • Discuss the aquatic adaptations of common freshwater forms. Explain the adaptations in freshwater Turtles and Crocodiles.
F.Y.M.Sc. (Paper-I)	Molecular Biology and Bioinformatics.	<ul style="list-style-type: none"> • Explain the DNA structure & types, topology, Physical properties; chromatin structure and organization. • Discuss genome organization, DNA and Protein sequencing with their application in evolutionary studies. • Explain the mobile DNA elements. • Explain mechanism of DNA damage and repair. • Illustrate the process of DNA replication, transcription, translation and their regulations.
F.Y.M.Sc. (Paper-II)	Endocrinology and Parasitology.	<ul style="list-style-type: none"> • Discuss the roles of Pituitary gland and pineal body. • Explain hormonal regulation of biomolecules and mineral metabolism. • Describe the role of osmoregulatory and gastrointestinal hormones. • Explain the role of hormones in moulting, change in body colour of crustaceans; yolk synthesis in amphibians; insect development. • Define the terminologies of parasitology. • Explain the concepts of animal association with examples. • Describe the role of parasites in public health and hygiene. • Explain the morphology and life cycle of common parasites.



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F.Y.M.Sc. (Paper-III)	Comparative Animal Physiology & Environmental Biology	<ul style="list-style-type: none">• Explain the physiology of processes like digestion, respiration, muscle contraction and excretion.• Describe the mechanism of thermoregulation in both poikilotherms and homeotherms.• Explain the mechanism of chemical communication in vertebrates.• Comment on the structure and functions of various sense organs.• Illustrate the concept of osmotic regulation in various animals with suitable examples.• List the endangered, endemic and extinct animal species of India.• Identify various types of natural resources, human impact on these resources, and Common resource management practices.• Explain the structure and impact of biogeochemical cycles, ecosystems and energy transformation across trophic levels.• Describe concepts in population ecology and their significance.
F.Y.M.Sc. (Paper-IV)	Metabolic Pathways	<ul style="list-style-type: none">• Define basic terminologies of metabolic pathways.• Explain the laws of thermodynamics, concept of free energy and ATP as currency molecule.• Describe the Concepts and regulation of metabolism.• Discuss the oxidation of fatty acids and its significance.• Illustrate the reactions, energetics and regulation of glycolysis, glycogen biosynthesis, TCA cycle, Purine and Pyrimidine metabolism



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		<ul style="list-style-type: none"> Write the general reactions of various metabolic pathways.
S. Y. M. Sc. (Paper-I)	Entomology-I	<ul style="list-style-type: none"> Define entomology and Insects and understand origin and evolution of insects and their relation to other arthropods. Give outline of Classification of insects up to family with distinguishing characters and examples of each order and family. Explain the structure, chemical composition and functions of Integument and Derivatives of Integument. Explain the structure, modifications of insect body regions and their appendages. Explain the Comparative anatomical and histological structure of various body systems.
S.Y.M.Sc. (Paper-II)	Fundamentals of Systematics and Economic Zoology	<ul style="list-style-type: none"> Explain principles, methods of biological classification and diversity in kingdom Animalia. Explain the importance of taxonomic keys and taxonomic characters. Explain the principles of zoological classification and nomenclature Discuss the various taxonomic procedures and molecular phylogenetics & phylogeography. Illustrate the methodologies used in systematics. Illustrate the lac culture, apiculture, prawn culture, vermiculture, Poultry, dairy industry and Piggery. Explain the role of insects of economic importance. Explain parasitic roundworms of animal and plants. Signify the role of parasitic and soil protozoan in human



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		<p>welfare.</p> <ul style="list-style-type: none"> Justify the use of animals in pharmaceutical research.
<p>S.Y.M.Sc. (Paper-III)</p>	<p>Research Methodology and Insect Physiology and Biochemistry</p>	<ul style="list-style-type: none"> Demonstrate knowledge of research processes (reading, evaluating, and developing) Perform literature reviews using print and online databases. Select and define appropriate research problem and parameters to prepare a project proposal. Identify, explain, compare, and prepare the key elements of a research proposal/report. Compare and contrast quantitative and qualitative research paradigms Use sampling methods, measurement scales and instruments, and appropriate uses of each. Justify the rationale for research ethics Explain the structure, Chemistry of integument and sclerotization. Describe the process of digestion and metabolism Explain the characteristics of haemolymph and types of haemocytes. Illustrate the structure, physiology and biochemistry of flight muscle. Demonstrate the process of excretion, detoxification and water balance
<p>S.Y.M.Sc. (Paper-IV)</p>	<p>Immunology</p>	<ul style="list-style-type: none"> List the primary and secondary immune organs. Explain the concepts of immunity, self-nonsel immune response, autoimmune disease. Explain the theories of antibody synthesis and generation of antibody diversity. Explain the principle and application of the common techniques



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		<p>used in Immunology</p> <ul style="list-style-type: none"> • Illustrate the events and dynamics of inflammation • Compare the MHC molecules and diseases associated with HLA. • Differentiate between active and passive immunization • Compare the three pathways of complement fixation pathway.
<p>S.Y.M.Sc. (Paper-I)</p>	<p>Entomology-II</p>	<ul style="list-style-type: none"> • Explain Gametogenesis, Fertilization and oviposition. • Explain embryonic developmental stages such as Cleavage, Blastoderm and Germ band formation; Gastrulation, Blastokinesis, differentiation of germ layers, Segmentation and Appendages formation and organogenesis. • Explain post-embryonic developmental stages such as Nymph, Naiad, larva, Pupa and Metamorphosis. • Explain specialized reproductive mechanisms. • Explain Hadorn's experiments with imaginal disc, Regeneration and Aging. <p>Explain Occurrence, Initiation, Preparations for diapauses and its Controls.</p>
<p>S.Y.M.Sc. (Paper-II)</p>	<p>Mammalian Reproductive Physiology and Aquaculture</p>	<ul style="list-style-type: none"> • Explain the male and female reproductive systems and sexual dimorphic characteristics • Explain the sexual cycles with examples • Illustrate the reproductive dysfunctions. • Diagrammatically represent the hormonal regulation of reproductive processes like pregnancy, lactation and parturition. • Prepare the flow chart to demonstrate the hormonal coordination of reproductive Processes • Justify the artificial control of reproduction. • Identify the fish diseases and the causative organisms • Mention the various composite fish culture with significance of each type. Describe the methods of freshwater prawn culture and its management. Explain the methods of pearl culture and pearl



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		<p>harvesting.</p> <ul style="list-style-type: none">• Illustrate the preparation and management of fish culture ponds.• Demonstrate the methods of packaging and transport of fish and brood fish.
S.Y.M.Sc. (Paper-III)	Pest Control	<ul style="list-style-type: none">• Explain the Pest, nature of damage caused by pests and pest control.• Explain medical, veterinary, Household and stored grain pests.• Explain the Principles and methods of pest control including Biological control measures.• Explain the Integrated pest management (IPM)• Explain the Non- insect pest and their control: Rat, Bandicoots, Crabs, Snails, Slugs, Birds and Squirrels.• Explain the principle and working of pesticide appliances.
S.Y.M.Sc. (Paper-IV)	Apiculture	<ul style="list-style-type: none">• Explain the basic concepts of apiculture like systematics, colony organization, polymorphism, morphology and foraging.• Explain the tools and management of apiary.• Explain the importance of institutions pertinent to apiculture.• Discuss the setup of beekeeping business.• Illustrate the bee keeping as occupation.• Justify the presence of bees to increase the agriculture productivity.


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