

B.Sc. Botany

Programme Outcomes

PO1. Knowledge and understanding of:

1. The range of plant diversity in terms of structure, function and environmental relationships.
2. The evaluation of plant diversity.
3. Plant classification
4. The role of plants in the functioning of the global ecosystem.
5. A selection of more specialized, optional topics.
6. Statistics as applied to biological data.

PO2. Intellectual skills – able to:

1. Think logically and organize tasks into a structured form.
2. Transfer of appropriate knowledge and methods from one topic to another within the subject.
3. Understand the evolving state of knowledge in a rapidly developing field.

PO3. Practical skills:

1. Students learn to carry out practical work, in the field and in the laboratory, with minimal risk. They gain introductory experience in applying skills and gain greater proficiency in a selection of them depending on their choice of optional modules.
2. Interpreting plant morphology and anatomy.
3. Plant identification.
4. Vegetation analysis techniques.
5. A range of physiochemical analyses of plant materials in the context of plant physiology and biochemistry.
6. Analyze data using appropriate statistical methods.
7. Plant pathology helpful to identify common plant diseases.

PO4. Scientific Knowledge: Apply the knowledge of basic science, life sciences and fundamental process of plants to study and analyze any plant form.

PO5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern instruments and equipments for Biochemical estimation, Molecular Biology, Biotechnology, Plant Tissue culture experiments, cellular and physiological activities of plants with an understanding of the application and limitations.

PO6. The Botanist and society: Apply reasoning informed by the contextual knowledge to assess plant diversity, its importance for society, health, safety, legal

and environmental issues and the consequent responsibilities relevant to the biodiversity conservation practice.

PO7. Environment and sustainability: Understand the impact of the plant diversity in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development.

PO8. Ethics: Apply ethical principles and commit to environmental ethics and responsibilities and norms of the biodiversity conservation.

PO9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. Communication: Communicate effectively on complex engineering activities with the engineering 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.

Course Outcomes

- CO1.** Identify problems and independently propose solutions using creative approaches, acquired through interdisciplinary experiences, and a depth and breadth of knowledge/expertise in the field of Plant Identification.
- CO2.** Accurate interpretation of collected information and use taxonomical information to evaluate and formulate a position of plant in taxonomy.
- CO3.** Students will be able to apply the scientific method to questions in botany by formulating testable hypotheses, collecting data that address these hypotheses, and analyzing those data to assess the degree to which their scientific work supports their hypotheses with help of statistics.
- CO4.** Students will be able to access the primary literature, identify relevant works for a particular topic, and evaluate the scientific content of these works.
- CO5.** Students will be able to identify the major groups of plant kingdom and able to classify them. Students will be able to compare and contrast the characteristics of plants, algae, fungi, Bryophyte, Pteridophyte, Gymnosperm and Angiosperm that differentiate them from each other and from other forms of life.
- CO6.** Students will be able to use the evidence 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 will be able to use specific examples to explicate how descent with modification has shaped plant morphology, physiology, and life history.
- CO7.** Students will be able to explain how Plants function at the level of the gene, genome, cell, tissue, Flower development. Drawing upon this knowledge, they will be able to give specific examples of the physiological adaptations, development, reproduction and mode of life cycle followed by different forms of plants.
- CO8.** Students will be able to explain the ecological interactions of life on earth by tracing energy and nutrient flow through the environment. They will be able to relate the physical features of the environment to the structure of populations, communities, and ecosystems.
- CO9.** Students will be able to demonstrate proficiency in the experimental techniques and methods of analysis appropriate for their area of specialization within biology.

Programme Specific outcome

B.Sc. Part-I, Semester-I

Paper-I: Microbiology and Phycology

On completion of the course, students are able to:

- 1) Understand the types and diversity in bacteria, viruses and mycoplasma
- 2) Understand the diversity among Algae.
- 3) Know the systematic, morphology and structure, of Algae.
- 4) Understand the useful, harmful activities and industrial applications of Algae.

Paper – II Biomolecules and Cell Biology

On completion of the course, students are able to:

- 1) Understand the Biochemical nature of cell.
- 2) Know the chemical nature of biomolecules.
- 3) Understand the different types of interactions and bonds in Biomolecules.
- 4) Structure and general features of enzymes.
- 5) Concept of enzyme activity and enzyme inhibition.
- 6) Understand difference between prokaryotic and eukaryotic cell.
- 7) Structure and organization of cell membrane, cell wall and peroxisomes.
- 8) Mitotic cell division

B.Sc. Part-I, Semester-II

Paper – III: Mycology and Phytopathology

On completion of the course, students are able to:

- 1) Understand General characteristics, Thallus organization, Cell wall composition
Nutrition classification
- 2) Understand General characteristics, Occurrence, Thallus organization, Life cycle of fungi
- 3) Understand types and economic importance of Lichen
- 4) Understand types of Micorrhiza and its applications
- 5) Understand applied aspects of fungi with respect to biotechnology, industry
- 6) Understand the scope and importance of Plant Pathology.
- 7) Know the prevention and control measures of plant diseases and its effect on economy of crops.

Paper – IV: Archegoniate (Bryophytes, Pteridophytes, Gymnosperms)

On completion of the course, students are able to:

- 1) To understand unique characteristic features of archaegoniate.
- 2) Understand the morphological diversity, classification and economic importance of Bryophytes.
- 3) Understand the morphological diversity, classification and economic importance of Pteridophytes.
- 4) Understand the morphological diversity, classification and economic importance of Gymnosperm.

B. Sc. Part- II Semester-III:

Paper – V: Anatomy and Taxonomy of Angiosperms

On completion of the course, students are able to:

- 1) Understand the scope & importance of Anatomy.
- 2) Know various tissue systems.
- 3) Understand the normal and anomalous secondary growth in plants and their causes.
- 4) Perform the techniques in anatomy.
- 5) With respect to recent knowledge students should know about some angiospermic families and taxonomy.

Paper-VI: Plant Ecology

On completion of the course, students are able to:

- 1) Understand different climatic and edaphic factors
- 2) Understand form, Structure classification and characteristics of community.
- 3) Understand concept, components, pyramids, food chain, energy flow and biogeochemical cycles in Ecosystem
- 4) Understand process and types of succession
- 5) Understand adaptations in community
- 6) Understand types and control measures of various pollution.

B. Sc. Part- II Semester-IV:

Paper –VII: Plant Physiology and Cytogenetics

On completion of the course, students are able to:

- 1) Know about Photosynthesis and Nitrogen metabolism and its importance.

- 2) To study the phenomenon of dominance, laws of segregation, independent assortment of genes.
- 3) To understand the different types of genetic interaction, incomplete dominance, codominance, inter allelic genetic interactions,
- 4) To understand concept of linkage and crossing over
- 5) To understand role of multiple alleles

Paper-VIII: Economic Botany

On completion of the course, students are able to:

- 1) Gain knowledge about various plants of economic use.
- 2) Know importance of plants & plant products.
- 3) Understand the chemical contents of the plant products.
- 4) Know about the utility of plant resources.

B. Sc. Part- III Semester-V:

Paper-IX: Reproductive Biology of Angiosperms

On completion of the course, students are able to:

- 1) To know reproductive development in angiospermic plants.
- 2) To understand anther and pollen biology.
- 3) To understand ovule
- 4) To know the process of pollination and fertilization in the angiosperm.
- 5) To understand embryo and endosperm.

Paper-X: Genetics

On completion of the course, students are able to:

- 1) To understand sex determination and sex linkage
- 2) To know the concept of population genetics
- 3) Understand Extra-chromosomal inheritance
- 4) To know the structural and numerical changes in the chromosome
- 5) To know types of mutation, molecular basis and mutagens.

Paper-XI: Plant Physiology

On completion of the course, students are able to:

- 1) Know importance and scope of plant physiology.
- 2) To understand the plants and plant cells in relation to water.
- 3) Learn about the movement of sap and absorption of water in plant body

- 4) To understand mineral nutrients and its role
- 5) TO know the different growth regulators with its chemical structure and applications.

Paper-XII: Plant Breeding

On completion of the course, students are able to:

- 1) Understand the science of plant breeding.
- 2) To introduce the student with branch of plant breeding for the survival of human being from starvation.
- 3) To study the techniques of production of new superior crop varieties.
- 4) Understand the modern strategies applied in Genetics and Plant Breeding to sequence and analyze genomes
- 5) Get the detail knowledge about modern strategies applied in Plant Breeding for crop improvement i.e. Mass selection, Pure line Selection and clonal selection.
- 6) Know about exploitation of Heterosis, hybrid and variety development and their release through artificial hybridization.
- 7) Understand the role plants in human welfare.
- 8) Gain knowledge about various plants of economic use.
- 9) Know importance of plants & plant products.

B. Sc. Part- III Semester-VI:

Paper-XIII: Molecular Biology

On completion of the course, students are able to:

- 1) Learn the scope and importance of molecular biology.
- 2) Understand the biochemical nature of nucleic acids, their role in living systems, experimental evidences to prove DNA as a genetic material.
- 3) Understand the process of synthesis of proteins.

Paper-XIV: Plant Biotechnology

On completion of the course, students are able to:

- 1) Understand the fundamentals of Recombinant DNA Technology.
- 2) Know about the Genetic Engineering.
- 3) Understand the principle and basic protocols for Plant Tissue Culture.
- 4) To understand applications of biotechnology in relation to the crop improvement.

Paper-XV: Plant Metabolism

On completion of the course, students are able to:

- 1) Understand the concept of ATP synthesis
- 2) To know about Carbon oxidation with different pathways
- 3) Understand the properties of Monosaccharides, Oligosaccharides and Polysaccharides.
- 4) They will learn about the Significance of Carbohydrates.
- 5) Understand the Properties of saturated fatty acids, and unsaturated fatty acids.
- 6) Understand lipid metabolism in plants.
- 7) Understand the Beta Oxidation, Gluconeogenesis and its role in mobilization of fatty acids during germination.
- 8) They will learn about the Significance of lipids.

Paper-XVI: Biostatistics

On completion of the course, students are able to:

- 1) To know the basic concepts of Biostatistics
- 2) To understand collection of primary and secondary data
- 3) To understand calculation of mean, mode median and variations
- 4) To know probability
- 5) To know statistical inference with respect to 't' test and chi square test

Baburao Patil College of Arts and Science Angar
Department Of Chemistry
Programme outcome and course outcome

Introduction of Chemistry

Chemistry is the study of matter and the ways in which different forms of matter combine with each other. You study chemistry because it helps you to understand the world around you. Everything you touch or taste or smell is a chemical, and the interactions of these chemicals with each other define our universe. Chemistry forms the fundamental basis for biology and medicine. From the structure of proteins and nucleic acids, to the design, synthesis and manufacture of drugs, chemistry allows you.

Department of Chemistry Course Outcome

Title of the Course: B.Sc. Part-I (Sem.I & II)

Subject: Chemistry

- **Introduction:** This course provides a broad overview of chemistry and to produces expert hands that would have sufficient knowledge and expertise to solve the urgent problems of the region by using Chemistry. The course structure is basic science centric where students learn core science and are taught necessary fundamental subject for that purpose.

- **Objective of the course:** The objectives of B. Sc. Chemistry course are:

- a. To provide an intensive and in depth learning to the students in field of chemistry.

b. Beyond simulating, learning, understanding the techniques, the course also addresses the underlying recurring problems of disciplines in today scientific and changing world.

c. To develop awareness & knowledge of different organization requirement and subject knowledge through varied branches and research methodology in students.

d. To train the students to take up wide variety of roles like researchers, scientists, consultants, entrepreneurs, academicians, pharmaceutical industry.

- **Course outcome and Advantages :**

1. Chemistry has tremendous job potential.
2. The successful students will be able to establish research organizations with the help of agriculture, environment protection, and also their chemical industry.
3. Scientific Research Organizations.
4. Universities in India & abroad.
5. Eligibility and Admission: A Candidate passing 10+2 with Chemistry.

- **Program Outcome:**

1. Duration: The duration for this program is of 3 years with semester pattern.(06 Semesters)
2. Medium of language : English
3. Syllabus Structure.
4. The University follows semester system.
5. An academic year shall consist of two semesters.
6. Each B.Sc. course shall consist of three years i.e. six semesters.
7. B.Sc. Part-I Chemistry shall consist of two semesters: Semester I and Semester II.

Department of Chemistry UG Program Outcomes

Name of the Course: B.Sc. II

Chemistry (Sem–III & IV)

Course outcomes:

Student should learn

1. Basics of the chemistry along with the practical applications/skills, industrial usage
2. The principles underlying the different experiments
3. Functional group conversions
4. Preparation of standard solutions and analytical skills
5. Handling of instruments to develop instrumental skills with respect to industries
6. Nomenclature of inorganic and organic compounds and their characterization

The objectives of B.Sc. Chemistry Course are:

After completion of degree, students gained the theoretical as well as practical knowledge of handling chemicals. Also they expand the knowledge available opportunities related to chemistry in the government services through public service commission particularly in the field of food safety, health inspector, pharmacist etc. Afford a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective. Achieve the skills required to succeed in graduate school, professional school and the chemical industry like cement industries, agro product, Paint industries, Rubber industries, Petrochemical industries, Food processing industries, Fertilizer industries etc. Got exposures of a breadth of experimental techniques using modern instrumentation. Understand the importance of the elements in the periodic table including their physical and chemical nature and role in the daily life. Understand the concept of chemistry to inter relate and interact to the other subject like mathematics, physics, biological science etc. Learn the laboratory skills and safely to transfer and interpret knowledge entirely in the working environment.

Chemistry Program Outcomes:

Upon successful completion students should be able to: The syllabus are prescribed texts for first two semesters.⊗ Apply the fundamental principles of measurement, matter, atomic theory, chemical⊗ periodicity, chemical bonding, general chemical reactivity and solution chemistry to subsequent courses in science.

Graduates from the **Chemistry** degree **program** will have demonstrated: an understanding of major concepts, theoretical principles and experimental findings in **chemistry**. ... the ability to use modern instrumentation for **chemical** analysis and separation. the ability to use computers for **chemical** simulation and computation.

Course Outcomes:

Organic Chemistry-IV

1. **Nomenclature of Organic Compounds** To make student understand different organic compounds with respect to the functional group and become eligible to call the name of the organic compounds scientifically Basic Concepts In Organic Chemistry Students become eligible to study the subject initially by understanding the basic things for chemical reactions i.e. Substrate and Reagents Types of reagents Electrophilic and Nucleophilic Homolytic and heterolytic fission. Electron mobility Inductive effect etc
2. **Alkanes and Cycloalkanes:** many of the daily used materials are organic compounds and majority of them are hydrocarbons therefore this topic makes the concept regarding their formation
3. **Alkenes, Dienes and Alkynes** Basic of the alkenes and alkynes etc with respect to the chemical point of view
4. **Structure and Bonding:** definition and basic concepts of Sp, Sp² and Sp³ hybridization. Concepts of steric effect and Inductive effective.

B.Sc.III Chemistry

Semester-V

Organic Chemistry

- 1.To study UV, IR ,NMR& Mass spectroscopy.
2. Discuss different types of rearrangement reactions.
3. Determine structure of compound by spectroscopic methods.
4. Understand the difference between Stereroselective & Stereospecific reactions.
- 5.To study Organic synthesis via enolates .

Semester-V
Inorganic Chemistry

1. Study the Metal ligand bonding in transition metal complexes.
2. To study Nuclear chemistry .
3. To study Bioinorganic chemistry.
4. Study the Catalysis .
5. Know the basic concept of Fertilizers.

Semester-V
Analytical Chemistry

1. Know the different analytical techniques.
2. To understand different types of separation technique
3. To study principle, construction and working of Colorimetry, potentiometry & Flame photometry
4. To understand Electroplating.

Semester V

Physical chemistry

1. Know the basic concept in phase equilibria, various one component and two component system.
2. Derivation of Nernst equation.
3. Calculation of emf of cell.
4. Study Various types of cells.
5. Know the Photochemistry and Various law of photochemistry.

Course Outcomes

Semester VI

Physical chemistry

1. Know the basic concept of spectroscopy.
2. Basic concept of rotational and Vibrational spectroscopy .
3. know the basic concept of solution .
4. Study the theoretical concept of free energy using various derivations .
5. Know the basic concept of simultaneous reaction and third order reaction in detail.

Semester VI

Inorganic chemistry

1. Study the f block elements.
2. Study the electronic configuration of lanthanides and actinides.
3. Understand the p-type semiconductor and n-type semiconductor.
4. Study the Structural chemistry.
5. Study the Organometallic chemistry.

Semester VI

Organic chemistry

1. Study the Heterocyclic compounds.
2. Study the Carbohydrates.
3. To synthesis different drugs and Agrochemicals.
4. Study the Vitamins and Hormone

Semester VI

Analytical & Industrial Organic chemistry

1. Know the different analytical techniques.
2. To understand different types polymers
3. To study principle, of Green chemistry.
4. To understand Sugar and Alcohol Industry.

5. Know the general principles of chromatography.

Physical chemistry practical

1. Calculate molar and normal solution of various concentrations.
2. Determine specific rotations and percentage of optically active substances by polarimetrically.
3. Study the energy of activation and second order reaction.
4. Study the stability of complex ion and standard free energy change and equilibrium constant by potentiometry.
5. Find out the acidity, Basicity and PKa Value on pH meter.

Inorganic Chemistry Practical

1. Study the gravimetric and volumetric analysis of ores and alloy.
2. Prepare a various inorganic complexes and determine its % purity.
3. To study binary mixture with removal of borate and phosphate.
4. To understand the chromatographic techniques

Organic Chemistry Practical

1. Perform the Binary mixtures.
2. Preparation of organic compounds, their purifications . 3. Organic estimation.

BABURAO PATIL COLLEGE OF ART'S AND SCIENCE ANGAR

Department of Physics (B.sc.)

Program Outcome and Course Outcome

Programme Specific outcomes

PSO1 Students are expected to acquire a core knowledge in physics, including the major premises of classical mechanics, quantum mechanics, electromagnetic theory, electronics, optics, special theory of relativity and modern physics.

PSO2 Students are also expected to develop a written and oral communication skills in communicating physics-related topics.

PSO3 Students will develop the proficiency in the acquisition of data using a variety of laboratory instruments and in the analysis and interpretation of such data.

PSO4 Students will learn the applications of numerical techniques for modeling physical systems for which analytical methods are inappropriate or of limited utility.

PSO5 Students will realize and develop an understanding of the impact of physics and science on society.

PSO6 Apply conceptual understanding of the physics to general real-world situations.

PSO7 Describe the methodology of science and the relationship between observation and theory.

PSO8 Learn to minimize contributing variables and recognize the limitations of equipment.

PSO9 Discover of physics concepts in other disciplines such as mathematics, computer science, engineering, and chemistry.

PSO10 Develop the following experimental tools: Numerically model simple physical systems using Euler's method, curve fitting, and error analysis.

Course Outcomes of B.Sc.I

Mechanics and properties of matter (Paper I):

After going through the course, the student should be able to

- Understand laws of motion and their application to various dynamical situations, notion of inertial frames and concept of Galilean invariance. He / she will learn the concept of conservation of energy, momentum, angular momentum and apply them to basic problems.
- Understand the analogy between translational and rotational dynamics, and application of both motions simultaneously in analyzing rolling with slipping.
- Write the expression for the moment of inertia about the given axis of symmetry for different uniform mass distributions.
- Understand the phenomena of collisions and idea about center of mass and laboratory frames and their correlation.
- Understand the principles of elasticity through the study of Young Modulus and modulus of rigidity.
- Understand simple principles of fluid flow and the equations governing fluid dynamics.

Optics and Laser (Paper II):

- Recognize and use a mathematical oscillator equation and wave equation, and derive these equations for certain systems.
- Apply basic knowledge of principles and theories about the behavior of light and the physical environment to conduct experiments.
- Understand the principle of superposition of waves, so thus describe the formation of standing waves.
- Explain several phenomena we can observe in everyday life that can be explained as wave phenomena.
- Use the principles of wave motion and superposition to explain the Physics of polarisation, interference and diffraction.
- Understand the working of selected optical instruments like biprism, interferometer and diffraction grating.
- In the laboratory course, student will gain hands-on experience of using various optical instruments and making finer measurements of wavelength of light using Newton Rings experiment, Fresnel Biprism etc. Resolving power of optical equipment can be learnt firsthand.

Heat and Thermodynamics (Paper III):

- Comprehend the basic concepts of thermodynamics, the first and the second law of thermodynamics, the concept of entropy and the associated theorems, the thermodynamic potentials and their physical interpretations.
- Learn about Maxwell's thermodynamic relations.
- Learn the basic aspects of kinetic theory of gases, Maxwell-Boltzmann distribution law, equipartition of energies, mean free path of molecular collisions, viscosity, thermal conductivity, diffusion and Brownian motion.

Electricity , Magnetism and Basic Electronics (Paper IV):

- Growth and decay of L-R Circuit.
- Learn about complex number, J operator and A.C. circuits
- Introduction about Ballistic Galvanometer and construction working of B.G
- Apply Gauss's law of electrostatics to solve a variety of problems.
- Articulate knowledge of electric current, resistance and capacitance in terms of electric field and electric potential.
- Demonstrate a working understanding of capacitors.

- Describe the magnetic field produced by magnetic dipoles and electric currents.

Course Outcomes of B.Sc.II

General Physics and Sound (Paper V)

- Explains the concepts related to Fundamental Movement
- Describes measurement.
- Explains motion and causes .
- Describes velocity, acceleration and Newton Laws.
- Explains electromagnetic waves.
- Analyzes the characteristics of sound.
- Explains the sound insulation.
- Describes characteristics of sound.
- Describes sound and acoustics of Building.
- Explain the sound interaction with matter.

Electronics (Paper VI)

- Able to design amplifier circuits.
- Explain the circuit operation.
- Design and analyze oscillator circuit.

Optics (Paper VII)

- Understand the basic concepts of wave optics and an ability to compute basic quantities in optics.
- Learn to use methods for solving differential equations.
- Experience the diverse applications of the wave equation.

Modern Physics (Paper VIII)

- Develop the concepts of modern physics: basic knowledge of special theory of relativity and general theory of relativity, elementary quantum mechanics, nuclear physics, and particle physics.
- Understand the relationship between observation and theory and their use in building the basic concepts of modern physics.
- Understand how major concepts developed and changed over time.
- Capable of analyzing and solving problems using oral and written reasoning skills based on the concepts of modern physics.

Department of Zoology

Introduction:

This course provides a broad overview of Zoology and to produces expert hands that would have sufficient knowledge and expertise to solve the urgent problems of the region by using Zoology. The course structure is basic science centric where students learn core science and are taught necessary fundamental subject for that purpose.

What is Zoology

Zoology deals with study of the animals. It embodies study of the structure, embryonic development, classification, habits, distribution and evolution of all animals, both living and extinct. There are several specializations available to students pursuing this field. There are several groups of animals studied in Zoology like Invertebrates, Vertebrates and others. In the study of zoology, there are many options to choose from depending on individual capabilities and interests.

The objectives of B. Sc. Zoology course are:

To provide an intensive and in depth learning to the students in field of Zoology. Beyond simulating, learning, understanding the techniques, the course also addresses the underlying recurring problems of disciplines in today scientific and changing world. To develop awareness & knowledge of different organization requirement and subject knowledge through varied branches and research methodology in students. To train the students to take up wide variety of roles like researchers, scientists, consultants, entrepreneurs, academicians, industry leaders and policy.

Zoology Program Outcomes:

1. Students gain knowledge and skill in the fundamentals of animal sciences, understands the complex interactions among various living organisms.
2. Analyse complex interactions among the various animals of different phyla, their distribution and their relationship with the environment
3. Understands the complex evolutionary processes and behaviour of animals
4. Gain knowledge of Agro based Small Scale industries like sericulture, fish farming, butterfly farming and vermicompost preparation.
5. Understands about various concepts of genetics and its importance in human health
6. Apply ethical principles and commit to professional ethics and responsibilities in delivering his duties.
7. Apply the knowledge and understanding of Zoology to one's own life and work
8. Develops empathy and love towards the animals.

9. Enable the learners to take certification of Graduate degree in Zoology.
10. Widen the scope of the learners for careers in different sectors of employment.
11. Apply the knowledge of various branches of Zoology and General biology meant both for a graduate terminal course and for higher studies.
12. Develop positive attitude towards sustainable development.
13. Understand the unity of life with the rich diversity of organisms and their ecological and evolutionary significance.
14. Acquire basic skills in the observation and study of nature, biological techniques, experimental skills and scientific investigation

Program Specific Outcomes:

1. Understand the nature and basic concepts of cell biology, genetics, taxonomy, physiology, ecology and applied Zoology
2. Analyse the relationships among animals, plants and microbes.
3. Perform procedures as per laboratory standards in the areas of Taxonomy, Physiology, Ecology, Cell biology, Genetics, Applied Zoology, Clinical science, tools and techniques of Zoology, Toxicology, Entomology, Nematology Sericulture, Biochemistry, Fish biology, Animal biotechnology, Immunology and research methodology .
4. Understand the applications of biological sciences in Apiculture, Aquaculture, Agriculture and Medicine Gains knowledge about research methodologies, effective communication and skills of problem solving methods
5. Contributes the knowledge for Nation building.
6. Develop insight and improve their analytical communication and professional skills
7. Understanding the morphology and functional characteristics at cellular and sub-cellular (molecular) level
8. Focusing to prepare them with research-oriented approach in frontier areas of research in Zoology
9. Demonstrated a broad understanding of animal diversity, including knowledge of the scientific classification and evolutionary relationships of major groups of animals.
10. Characterized the biological, chemical, and physical features of environments (e.g., terrestrial, freshwater, marine, host) that animals inhabit.
11. Explained how animals function and interact with respect to biological, chemical and physical processes in natural and impacted environments.
12. Drawing upon this knowledge, they are able to give specific examples of the physiological adaptations, development, reproduction and behavior of different forms of life.

13. Understood the applied biological sciences or economic Zoology such as sericulture, Apiculture, aquaculture, Industrial microbiology, rDNA technology and medicine for their career opportunities.
14. Identify and list out common animals.
15. Explain various physiological changes in our bodies
16. Analyze the impact of environment on our bodies.
17. Understand various genetic abnormalities.
18. Develop respect for nature.
19. Explain the role and impact of different environmental conservation programmes
20. Identify animals beneficial to humans.
21. Identify various potential risk factors to health of humans.
22. Explain the importance of genetic engineering.
23. Use tools of information technology for all activities related to zoology

Course Outcomes:

Animal Diversity –I (Invertebrates)

1. Describe general taxonomic rules on animal classification
2. Classify Protista up to phylum using examples from parasitic adaptation
3. Understand the general characters and Classify Phylum Porifera to Echinodermata with taxonomic keys
4. Ability to love and understand the fascinating world of invertebrates.
5. Get a concrete idea of the evolution, hierarchy and classification of invertebrate phyla.
6. Understand the basics of systematics by learning the diagnostic and general characters of various groups Getting an overview of typical examples in each phyla.
7. Aware the economic importance of invertebrates with the special reference to insect pest
8. Know about some of the important and common protozoans, helminthes of parasitic nature causing diseases in human beings.
9. Understood the importance of metamerism in annelids.

Animal Diversity –II (Chordates)

1. Identified the taxonomic status of the entire chordates and discussed the evolutionary model of the group.
2. Learn the evolution, hierarchy and classification of different classes of chordates
3. Get an overview of the morphology and physiology of typical examples.

4. Familiarise the adaptations and economic importance of specific vertebrates
5. Understand the general characters and classification of phylum Protochordates to Mammalia.
6. Make able to discuss some and very important phenomena in Chordates.

Comparative Anatomy of Vertebrates

1. To understand the anatomy of Integument and its derivatives.
2. To understand the anatomy of Skeletal System .
3. To understand the anatomy of Digestive System.
4. To understand the anatomy of Circulatory and Respiratory Systems .
5. To understand the anatomy of Urino-genital System.
6. To understand the anatomy of Nervous System.

Developmental Biology

1. Understood the process of development of animals.
2. Understood the process of organogenesis of selected organs, development of extra-embryonic membrane and the nature and physiology of placenta.
3. Understood the process of fertilization and types of fertilization.
4. Familiar with various stages involved in the developing embryo
5. Understand the initial developmental procedures and stages involved in frog , chick and human
6. Understood the implantation process of embryo in frog, chick and human
7. Understood the process of apoptosis.
8. Familiar with types of placenta.
9. Familiarize with the principle of developmental biology.
10. Familiarize with various Techniques and tools of Embryology

Cell Biology

1. The learner will understand overview of cell
2. The learner will understand the importance of cell as a structural and functional unit of life.
3. The learner understands and compares between the prokaryotic and eukaryotic system and extrapolates the life to the aspect of development.
4. Describe the structure and function of plasma membrane
5. The dynamism of bio membranes indicates the dynamism of life its working mechanism and precision are responsible for our performance in life.
6. Describe cellular membrane structure and function, fine structure and function of cell organelles.
7. The learner will understand the cell signaling.

8. The learner will understand the mitotic and meiotic cell divisions and their significance

Principles of Ecology

1. The learner will understand the introduction and history of Ecology
2. The learner will understand population & community ecology
3. The learner will understand animal association in nature.
4. The learner will understand aquatic and terrestrial ecosystem.
5. The learner will understand the biodiversity hot spot and sacred grooves.
6. The learner will be able to link the intricacies of food chains, food webs and link it with human life for its betterment and for non-exploitation of the biotic and abiotic components.
7. The working in nature to save environment will help development of leadership skills to promote betterment of environment.
8. The Learner understands and appreciates the diversity of ecosystems and applies beyond the syllabi to understand the local lifestyle and problems of the community.

Fundamentals of Biochemistry

1. Knowledge of basic terms in biochemistry.
2. The student will be able to explain the structure, functions and reactions of the various biomolecules
3. Attained the knowledge of macromolecule such as carbohydrates, protein and fat, their types and significance.
4. The student will be able to explain the enzymes, mechanism of enzyme action and factors affecting the enzyme activity
5. The student will be able to Describe the structure, types ,function and significance of amino acids proteins, enzymes, lipids and nucleic acids.
6. The student will be able to explain the central dogma of molecular biology like transcription and translation etc.

Animal Physiology : Controlling and coordinating system.

1. Knowledge of basic terms in histology.
2. The student will be able to Understands all four types of tissues.
3. Identify the histological structure and function of various organs.
4. The student will be able to explain the location, structure and functions of all four types of tissues and blood cells various organs.
5. The student will be able to explain the location, structure and functions of various organs.
6. The student will be able to illustrate the histology of tooth, salivary gland, stomach, liver, pancrease, Iieum, kidney, testies and ovary.

7. Knowledge of basic terms in physiology
8. The student will be able to understand the physiological processes in mammals
9. Illustrate the reproductive cycles with hormonal control.
10. Understands about neurophysiology and receptors
11. Gain knowledge about hormones and bioluminescence
12. Familiarize students with renal physiology and muscle
13. Develop basic understanding of endocrine system and its interactions with other systems
14. Knowledge of neuromuscular coordination and the mechanism of osmoregulation in animals and endocrine system and their function is attained.
15. Understood the menstrual cycle and the role of contraceptive in population control.
16. The student will be able to Understand the in-vitro fertilization techniques.
- 17.

Department of Mathematics

Introduction :

There are people who say B.Sc. Mathematics is too tough handle but if you are genuinely interested in this subject and are willing to work equally hard to achieve your goals then nothing is tough for you. You can make it interesting in your way of studying. The course is for different from what we have studied in school. In school, there used to be a simple formula, and concepts and questions were based on that only but in collage, mathematics becomes more theoretical. The syllabus includes lots of theorems and proofs which gives is deeper insights of how concepts or formula was built. Students must have the patience and ability to spend long studying hours to understand complex terms and concepts they must possess the ability to work independently and think of their own ideas and conclusions for solving theorems.

The course gives students a strong base in Mathematics of they want to do future studies in subjects only.

What is Mathematics

Mathematics is the framed to provide the tool to get easy and precise outcomes to various applications of science and technology. Also logical development of the various algebraic statements can be made to develop innovate approach of various concept and it can be applied to various abstracts thing.

Mathematics is essential in many fields Including Natural science, Engineering, Medicine, Finance and Social sciences applied Mathematics has led to entirely new Mathematical discipline, such as Statistics and Game Theory.

The Objectives of B.Sc. Mathematics Course are

The aim of our course is to generate intelligent and skillful human being with adequate theoretical and practical knowledge of Mathematical system. To include conceptual understanding in basic phenomenon, statements, theorems solving skills suitable for applications and abstract algebraic techniques sufficient logical connectivity is provided.

- 1) To design the syllabus with specific focus on key learning areas.
- 2) To equip students with necessary fundamental concepts and knowledge base.
- 3) To develop specific problem using skills.
- 4) To impart training on abstract concepts, analysis, deductive techniques.
- 5) To prepare students for demonstrating the acquiring knowledge.
- 6) To encourage students to develop skills for developing innovative ideas.

Mathematics Program Outcomes:

- 1) Students will possess basic subjects knowledge required for higher studies, professional and applied courses like management studies, law etc..
- 2) Scientific temper will be developed in students.
- 3) Students will be aware and able to develop solution oriented approach towards various social and environmental issues.
- 4) Students will become employable, they will be eligible for career opportunities in Industry .
- 5) understand about various concepts of algebra, calculus, differential equation in Mathematics.
- 6) To develop positive attitude to learn the Mathematics.
- 7) Ability to pursue advanced studies and research in pure and applied Mathematical science.
- 8) Introduction to various courses like Group Theory, Ordinary Differential Equation.
- 9) A student should get a relationship understanding of Mathematical concepts and concerned structures
- 10) To develop problem solving skills, creative talent and power of communication necessary for various kinds of employment.

11) Students will acquire basic practical skills.

12) Understands various concepts of Mathematics and it's important in daily life.

Program Specific Outcomes:

- 1) Students to develop positive attitude towards mathematics as in interesting and valuable subject of study.
- 2) A subject should be able to recall basic facts about Mathematics and should be able to display knowledge of conventions such as notations, terminology.
- 3) Think in critical manner.
- 4) Acquire good knowledge and understanding in advance areas of pure Mathematics and applied Mathematics chosen by student from the given course.
- 5) Formulate and develop Mathematical argument in a logical manner.
- 6) Understand, formulate and use quantitative models arising in social science, Business and other contexts.
- 7) Students should be able to apply their skills and knowledge that is translate information presented verbally into Mathematical form.
- 8) A Students should get adequate exposure to global and local concerns that explore them many aspects of Mathematical science.
- 9) Use appropriate Mathematical formulae in order process the information and draw the relevant conclusion.
- 10) Know when there is a need for information, to be able to identify, locate, evaluate and effectively use that information for the issue or problem at hand

Course Outcomes:

B.Sc Mathematics Semester I Paper I

Algebra

At the end of the semester the student is able to:

- 1) How to find inverse of Matrix by Cayley-Hamilton theorem.
- 2) Learn application of Matrices.
- 3) Learn how to find rank of Matrix.
- 4) Learn to solve system of Linear Equation.

5) Learn Complex Number system and its graphical representation.

6) Learn Trancendental function and its inverse.

B.Sc Mathematics Semester I Paper II

Calculus

At the end of the semester the student is able to:

1) Learn how to find nth differentiation of standard function.

2) Verify the value of the limit of a function at a point using the definition of the limit.

3) Learn to check the function is continuous and understand the concept of continuity.

4) Learn Reduction formulae.

5) Learn properties of Gradient, Divergence and Curl.

B.Sc Mathematics Semester II Paper III

Geometry

At the end of the semester the student is able to:

1) Learn how to identify Conic.

2) Learn how to find the equation of Plane passing through one point, two point, three point.

3) Learn how to find length of perpendicular from point to plane.

4) Learn family of Plane.

5) Learn how to find equation of

6) Learn family of Sphere.

B.Sc Mathematics Semester II Paper IV

Differential Equation

At the end of the semester the student is able to:

1) To be able to solve first order and first degree Differential Equation.

- 2) Learn types of Differential Equation.
- 3) To study finding the solution of Differential Equation.
- 4) To study Linear Differential Equation with Constant Coefficient and its solution.

B.Sc Mathematics Semester III Paper V

Differential Calculus

At the end of the semester the student is able to:

- 1) Students will able to understand concepts of Tangents and Normal.
- 2) Learn how to find Jacobian, Properties of Jacobian and Example on it.
- 3) Introduction to Curvature and Radius of Curvature in Cartesian, Parametric, Polar, Pedal form.
- 4) Learn how to find Extreme Value of function of two variable, three variable.
- 5) To study Lagranges Method of Undetermined Multipliers of two variable.

B.Sc Mathematics Semester III Paper VI

Laplace Transform

At the end of the semester the student is able to:

- 1) To learn the evolution of Laplace Transform of different types of functions, their derivatives and integration.
- 2) To learn the evolution of Inverse Laplace Transform of function their derivatives and integrations.
- 3) To learn the application of convolution theorem.
- 4) To learn to apply Laplace Transform to solve Ordinary Differential Equation.
- 5) To learn to apply Laplace Transform to solve Linear Differential Equation with Constant Coefficient.

B.Sc Mathematics Semester IV Paper VII

Differential Equation

At the end of the semester the student is able to:

- 1) To be able to solve First Order and Degree higher than First Differential Equation.
- 2) Learn how to reduce Differential Equation to Clairauts form.

- 3) To study linear equation of the 2nd order.
- 4) To study Homogeneous Linear Equation .
- 5) Learn how to find Simultaneous Equation and Total Differential Equation.
- 6) To study Condition for the Integrability of Total Differential Equation.

B.Sc Mathematics Semester IV Paper VIII

Abstract Algebra

At the end of the semester the student is able to:

- 1) To learn fundamental properties and Mathematical tools such as Closure, Identity, Inverse and Commutative.
- 2) To study Algebraic Structure Group in detail which is useful in Rings, Modules and Algebraic topology.
- 3) To enhance abstract thinking of student.
- 4) To learn to compare two different algebraic structures.
- 5) To study of transfer of properties in between these structures through Homomorphism and Isomorphism.
- 6) To study theorems on Homomorphism and Isomorphism.

Mathematics Practical

At the end of the semester the student is able to:

- 1) Problem solving skills of students are enhanced.
- 2) Students learn how to apply Mathematical concepts to practical and real life problem.
- 3) Learn to built Logical concept.
- 4) To create a interest in Mathematics among the student.
- 5) To problems on each topic.

Department of Geology

Geology B.Sc. I Semester I and II

After completion of B.Sc. I Sem. I and II students are able to:

Course outcome and Advantages:

- a) Students can demonstrate competence in geological skills including: identification of crystals, minerals, ores and rocks visually as well as microscopically; interpretation of topographic maps and construction of geologic maps and cross sections; three-dimensional conceptualization; and various rock attitudes and structures; and collection of organized field, survey (hydrogeology and engineering), imagery, digital and laboratory data as well as understand Indian geologic time and earth history.
- b) Students can make reasoning about Earth systems; and readily solve problems, especially those requiring spatial and temporal interpretation; and Work with uncertainty, nonuniqueness, incompleteness, ambiguity, and indirect observations; and Integrate information from different disciplines and apply systems thinking
- c) Gain an understanding of the societal and environmental relevance of earth systems.
- d) Effectively communicate ideas, research results, and interpretations using written, oral, and graphical design skills both on a formal and extemporaneous basis.

Geology B.Sc. II Semester III and IV

After completion of B.Sc. II Sem. III and IV students are able to:

Course outcome:

- a) Students able to understand various concepts related to formation and characteristics of various types of rock and knowledge in various rock industrious mining and construction industrious.
- b) Students tend to explore unmapped regions.
- c) Students gain sense of preservation and conservation of natural resources.
- d) Students able to understand paleo-environment and stratigraphy of various regions.