

## **Program Outcome of B.Sc. (Bachelor of Science)**

BSc. is Bachelor of Science. The students will be proficient in the subject of their choice when they graduate. The students will be qualified to pursue further education in their field. The students will be able to continue their further education abroad. The pupils will be qualified to take the tests required for employment in governmental institutions. The students will be qualified to apply for positions with a B. Sc. programme minimum qualification.

### **Course Outcomes** **Foundation Course** **Skill Enhancement Courses (SEC)** **Semester I**

#### **Learning Objective:**

1. To give students an overview of Indian society and its multicultural diversity.
2. To understand students the concept of Disparity, its causes, and effects.
3. To understand the importance of The Indian constitution and its basic constituents.
4. To make students understand about the current Indian political system.

#### **Learning Outcome:**

1. Sensitizes the students regarding social issues, constitution, and preamble.
2. Creates basic awareness amongst the students regarding various social issues ranging from gender, religion, caste, social justice, etc.
3. To understand the political scenario in India and the importance of government formation.

## **BOTANY**

### **Semester I**

#### **Learning Objectives:**

1. To identify & classify the various groups of thallophytes with the help of morphology, anatomy, life cycle and economic importance of Algae, Fungi and Bryophytes.
2. To understand the Cell Biology, Ecology and Genetic with the help of structures and functions of various cell organelles, interactions of producers and consumers taking place in the ecosystem, flow of energy and phenomenon of inheritance.

#### **Learning Outcomes:**

1. Understand the differences & how to identify and classify Chlorophyta & Cyanophyta from Algae, Phycomycetes & Ascomycetes from Fungi, Hepaticae from Bryophytes along with the general characters, range of thallus, their modes of nutrition, life cycles, economic importance & its significance in nature.
2. Understand the basic concepts of components of prokaryotic and eukaryotic cells, their structure, function & importance.
3. Understand the importance of producers & consumers, energy flow in ecosystem & productivity of an ecosystem, Mendelian genetics and its modified ratios.

## **CHEMISTRY**

## Semester I

### Learning Objectives:

1. To understand the core concepts of organic chemistry i.e. resonance, hyperconjugation, inductive effect, isomerism, stereochemistry of organic compound, Nomenclature, synthesis etc. and their applications.
2. To acquire basic Knowledge of reactive intermediates and mechanism of organic reaction.
3. To understand the concept of pressure from a macroscopic and microscopic perspective, chemical behaviour and physical properties of substances, kinetic molecular theory using periodic table as a reference, thermodynamics.
4. To understand the shapes of different orbital's, how to draw energy diagram, to calculate bond order, lattice energy, principle for filling electrons.

### Learning Outcomes:

1. Able to write electronic configuration of given atomic number, recognizing shapes of orbital, to draw Molecular orbital diagrams of different molecules, to analyse different ionic solids, calculate effective nuclear charges.
2. Able to determine the difference between solids, liquids, gases, to describe thermodynamic and terms involved, surface tension, viscosity & importance.
3. Recognize and draw constitutional isomers, enantiomers and diastereomers, know the fundamental principal of organic chemistry and derive mechanism of various organic reaction.

## ZOOLOGY Semester I

### Learning Objectives:

1. To make learners aware of risks involved in handling of different hazardous chemicals, sensitive (electrical/electronic) instruments and infectious biological specimens especially during practical sessions in the laboratory and to train them to avoid mishap.
2. To acquaint learners to the modern developments and concepts of Zoology highlighting their applications aiming for the benefit of human being.
3. To provide all learners a complete insight about the structure and train them with operational skills of different instruments required in Zoology.

### Learning Outcomes:

4. Learners would work safely in the laboratory and avoid occurrence of accidents (mishaps) which will boost their scholastic performance and economy in use of materials/chemicals during practical sessions.
5. Learners would understand recent advances in the subject and their applications for the betterment of mankind; and that the young minds would be tuned to think out of the box.
6. Students will be skilled to select and operate suitable instruments for the studies of different components of Zoology of this course and also of higher classes including research.

## Foundation Course Skill Enhancement Courses (SEC) Courses Semester II

### Learning Objective:

1. To understand the concept of globalisation and its impacts on Indian society.
2. To understand the vital concept of Human Rights.
3. To understand the importance of the environment and sustainable development.
4. To develop students to upgrade their knowledge on current challenges and issues of Indian society.

**Learning Outcome:**

1. To understand the concepts of Liberalization, Privatization, and Globalization, Growth of Information technology, Communication, and Migration.
2. Evolves the concept of Human Rights, Importance of Ecology
3. Students gain knowledge about the causes of stress and management of stress.

## **BOTANY**

### **Semester II**

**Learning Objectives:**

1. To identify & classify the various groups of cryptogams & phanerogams with the help of morphology, anatomy, life cycle and economic importance of Pteridophytes, Gymnosperms & Angiosperms.
2. To learn and state the meaning of scientific and taxonomical terminologies.
3. To understand the anatomical structure and functions of various tissues, physiological mechanism in plants and traditional use of plants as medicine.

**Learning Outcomes:**

1. Understand the differences & how to identify and classify *Nphrolepis* & stele from Pteridophytes, *Cycas* from Gymnosperms, leaf morphology, families like Malvaceae & Amaryllidaceae from Angiosperms along with the general characters, economic importance & its significance in nature.
2. Understand the basic concepts of anatomical features and physiological mechanisms in plants & its importance.
3. Understand the importance of secondary metabolites & medicinal plants to humans.

## **CHEMISTRY**

### **Semester II**

**Learning Objectives:**

1. To understand the core concepts of organic chemistry i.e. addition reaction of alkanes, alkenes, and alkynes, difference between dienes and alkenes, mechanism of electrophile and Nucleophiles, stereochemistry of organic compounds.
2. To understand the concept of pressure, difference between solids, liquids, gases, to describe thermodynamic and terms involved, Kinetic theory of gases, chemical behaviour of gases.
3. To understand the concept of acid base theory, concept of qualitative analysis, calculate oxidation state, redox reaction.

**Learning Outcomes:**

1. Able to predict the reactivity of organic compound, the rules for naming different organic compound.
2. Recognize the basic practical skills for the synthesis of alkanes, alkenes and alkynes.

3. Able to determine the difference between solids, liquids, gases, to describe thermodynamic and terms involved & importance.
4. Recognize the basic principle of Redox reaction, balancing the chemical reaction, electromagnetic theory.

## **ZOOLOGY**

### **Semester II**

#### **Learning Objectives:**

1. To make learners understand the importance of balanced diet and essential nutrients of food at different stages of life.
2. To impart knowledge about source, quantum and need for conservation of fast depleting water resources and essentials of maintaining proper sanitation, hygiene and optimizing use of electronic gadgets.
3. To educate learners about causes, symptoms and impact of stress related disorders and infectious diseases.

#### **Learning Outcomes:**

1. Healthy dietary habits would be inculcated in the life style of learners in order to prevent risk of developing health hazards in younger generation due to faulty eating habits.
2. Promoting optimum conservation of water, encouragement for maintaining adequate personal hygiene, optimum use of electronic gadgets, avoiding addiction, thus facilitating achievement of the goal of healthy young India in true sense.
3. Learners will be able to promptly recognize stress related problems at initial stages and would be able to adopt relevant solutions which would lead to psychologically strong mind set promoting positive attitude important for academics and would be able to acquire knowledge of cause, symptoms and precautions of infectious diseases.

## **Skill Enhancement Courses (SEC)**

### **Foundation Course –III Contemporary Issues**

#### **Semester –III**

#### **Learning Objective :**

1. To provide a brief description on provisions governing protection law. Learners would be aware of the rights of consumers and remedies in relation to unfair trade practices
2. To sensitise learners towards various ecological issues students would develop a deeper understanding of ecological issues and would motivate them to be a part of environmental conservation.
3. To introduce various technologies used in day to day life. Learners would develop curiosity in the application of science in everyday life.
4. To provide necessary life skills such as time management, goal setting etc. The topics would equip them with necessary life skills.

#### **Learning Outcome:**

1. Learners would be aware of the rights of citizens and understand constitution better.

2. Learners would be responsible towards various environmental issues and develop a deeper understanding of environmental issues and would motivate them to be a part of environmental conservation
3. Technology is the need of the hour and knowledge will help them use at the right time for the right cause. It will help use gadgets with more useful applications.
4. To provide necessary soft life skills such as time management, goal setting, motivation etc. which would equip them with necessary life skills.
5. They would be learning on how to appear for interview.

## **CHEMISTRY**

### **Semester III**

#### **Learning Objectives:**

1. To infuse in the learner a spirit of inquiry into the fundamental aspects of the various core areas of Chemistry.
2. To make the learner proficient in analysing the various observations and chemical phenomena presented to him during the course.
3. To make the learner capable of solving problems in the various units of this course
4. To give the learner an opportunity to get hands on experience of the various concepts and processes in the various branches of chemistry
5. To impart various skills of handling chemicals, reagents, apparatus, instruments and the care and safety aspects involved in such handling
6. To make the learner capable of analysing and interpreting results of the experiments he conducts or performs
7. To make the learner capable of acquiring or pursuing a source of livelihood like jobs in chemical industry
8. To arouse the interest to pursue higher levels of learning in chemistry.

#### **Learning Outcomes:**

1. Learners will have a firm knowledge about the fundamentals and application of current chemical and scientific theories in Analytical, Inorganic, Organic and Physical Chemistries.
2. Learners will be skilled in problem solving, critical thinking and analytical reasoning as applied to scientific problems.
3. Learners will develop the skill of identifying the type of organic synthetic reactions.

## **BOTANY**

### **Semester III**

#### **Learning Objectives:**

1. To identify & classify the various groups of Algae, Bryophytes with the help of morphology, anatomy, life cycle and economic importance. To know the basics of systematics, Bentham and Hooker's system of Classification and Identifying an

Angiospermic families like Leguminosae, Asteraceae, Amaranthaceae & Palmae based on their morphological characters. To build a basic skill on modern techniques to study the plant diversity which includes preservation methods, microscopy, chromatography and electrophoresis.

2. To understand the Cell Biology & Cytogenetics with the help of structures and functions of various cell organelles, cell division, nucleic acid, chromosomal aberration, sex determination, organelle heredity. To learn mechanism of replication and transcription in prokaryotes and eukaryotes.
3. To understand the pharmacognosy and phytochemistry with the help of Indian herbal pharmacopoeia, Ayurvedic pharmacopoeia, monograph and adulterants. To understand the forestry and its economic importance. To learn the basic concept of aromatherapy, nutraceuticals, plant enzyme industry and biofuels.

#### **Learning Outcomes:**

1. Understand the differences & how to identify and classify *Sargassum* from Algae, *Anthoceros* & *Funaria* from Bryophyta, Systematics of families based on Bentham & Hooker's classification from Angiosperms along with the general characters, life cycles, economic importance & its significance in nature. Understand the basic concepts of preservation methods, microscopy, chromatography and electrophoresis.
2. Understand the basic concepts of structures and functions of various cell organelles, cell division, nucleic acid, chromosomal aberration, sex determination, organelle heredity, mechanism of replication and transcription in prokaryotes and eukaryotes.
3. Understand the basic concept pharmacopoeia, monograph, detection of adulterants, sources of plant product, aromatherapy, nutraceuticals, plant enzyme industry and biofuels.

### **ZOOLOGY** **Semester III**

#### **Learning Objectives:**

1. To introduce basic terms of genetics and to study Mendelian principles of inheritance and other forms pattern of inheritance.
2. To familiarize the learners with the structure, types and classification of chromosomes and to introduce the concept of sex determination and its types, sex influenced and sex limited genes.
3. To introduce to the learners the classical experiments proving DNA as the genetic material. To make the learner understand the structure of nucleic acids and the concept of central dogma of molecular biology. To familiarize the learner with the concept of gene regulation.

#### **Learning Outcomes:**

1. Understand and apply the principles of inheritance and the concept of multiple alleles, linkage and crossing over.
2. Learners would understand the structure and types of chromosomes also would understand mechanisms of sex determination. Learners would be able to correlate the disorders linked to a particular sex chromosome.
3. Learner would understand the importance of nucleic acids as genetic material. The learners would understand and appreciate the regulation of gene expressions.

### **Skill Enhancement Courses (SEC)**

### **Foundation Course –IV Contemporary Issues**

## Semester –IV:

### Learning Objective :

1. To provide a brief description on provisions governing consumer protection law. Learners would be aware of the rights of consumers and remedies in relation to unfair trade practices
2. To sensitise learners towards various ecological issues students would develop a deeper understanding of ecological issues and would motivate them to be a part of environmental conservation.
3. To introduce various technologies used in day to day life. Learners would develop curiosity in the application of science in everyday life.
4. To provide necessary life skills such as time management, goal setting etc. The topics would equip them with necessary life skills.

### Learning Outcome:

1. Learners would be aware of the rights of consumers and remedies in relation to unfair trade practices.
2. Learners would be responsible towards various ecological issues and develop a deeper understanding of ecological issues and would motivate them to be a part of environmental conservation. **Being in science stream they would be able to relate them to soil, climate and water easily. Oxygen which is precious commodity in pandemic would be useful in understanding and explaining others.**
3. Technology is the need of the hour and knowledge will help them use at the right time for the right cause.
4. To provide necessary soft life skills such as time management, goal setting, motivation etc. which would equip them with necessary life skills.
5. They would be keen to take competitive examinations.

## CHEMISTRY

### Semester IV

### Learning Objectives:

1. To infuse in the learner a spirit of inquiry into the fundamental aspects of the various core areas of Chemistry.
2. To make the learner proficient in analysing the various observations and chemical phenomena presented to him during the course.
3. To make the learner capable of solving problems in the various units of this course
4. To give the learner an opportunity to get hands on experience of the various concepts and processes in the various branches of chemistry
5. To impart various skills of handling chemicals, reagents, apparatus, instruments and the care and safety aspects involved in such handling
6. To make the learner capable of analysing and interpreting results of the experiments he conducts or performs
7. To make the learner capable of acquiring or pursuing a source of livelihood like jobs in chemical industry

8. To arouse the interest to pursue higher levels of learning in chemistry.

### **Learning Outcomes:**

1. Learners will have a firm knowledge about the fundamentals and application of current chemical and scientific theories in Analytical, Inorganic, Organic and Physical Chemistries.
2. Learners will be skilled in problem solving, critical thinking and analytical reasoning as applied to scientific problems.
3. Learners will develop the skill of identifying the type of organic synthetic reactions.

## **BOTANY**

### **Semester IV**

#### **Learning Objectives:**

1. To identify & classify the various groups of Fungi, Lichens, Pteridophytes and Gymnosperms with the help of morphology, anatomy, life cycle and economic importance.
2. To learn anatomical characters of stem, root, mechanical tissues and vascular bundles along with the basic concept of physiological pathways/ mechanisms occurring in plants and their biochemical interactions. To learn the ecological cycles, factors & communities.
3. To understand the Horticulture & Gardening, Biotechnology, Biostatistics & Bioinformatics with the help of garden types and locations, National Park, Botanical garden, laboratory techniques for plant tissue culture, recombinant DNA technology and solving problems based on Biostatistics & Bioinformatics.

#### **Learning Outcomes:**

1. Understand the differences & how to identify and classify *Erysiphe* & *Xylaria* from Ascomycetae, plant pathology, Lichens; *Selaginella* & *Rhynia* from Pteridophyta, *Pinus* & *Cordaites* from Gymnosperms & their significance in nature. Understand the ancient ecology and climate with the help of Geological time scale and fossil formation.
2. Understand the basic concepts of anatomical features, physiological mechanisms in plants, ecological aspects & their significances.
3. Understand the importance of garden designs, National Park, Botanical garden, techniques for plant tissue culture, application and solving problems of Biostatistics & Bioinformatics.

## **ZOOLOGY**

### **Semester IV**

#### **Learning Objectives:**

1. To impart scientific knowledge to the learner about how life originated and evolved on our planet.
2. To develop learner's knowledge and understanding of genetic variability within a population and how the change in the gene pool leads to evolution of species.
3. To inculcate scientific temperament in the learner.



**Learning Outcomes:**

1. Learner will gain insight about origin of life also the learner will know about the different theories of evolution.
2. Learner would understand the forces that cause evolutionary changes in natural populations. Learner would comprehend the mechanisms of speciation. Learner will be able to distinguish between microevolution, macroevolution and mega-evolution.
3. The learner will develop qualities such as critical thinking and analysis. The learner will develop the skills of scientific communication. Learner will understand the ethical aspects of research

**ZOOLOGY**  
**Semester V****Learning Objectives:**

1. To introduce the principles of taxonomy and modern system of classification in animal kingdom with evolution point of view.
2. To comprehend the general characters and classification of Kingdom Animalia from Porifera to Nematoda and specific characters of organisms belonging to these phyla.
3. To introduce basic concepts of classification up to class in animal kingdom from phylum Annelida to Hemichordata and to familiarize with their characters.
4. To acquaint learners with the details of Sepia as a representative of invertebrate animals.

**Learning Outcomes:**

1. Learners will apprehend the basis of classification and modern classification up to class of the lower invertebrate animals.
2. The learners will be familiarized with classification up to phylum Nematoda along with their examples.
3. Learners will get an idea of higher groups of invertebrate animal life, their classification and their peculiar aspects.
4. Learners will get an idea of general characteristics and details of invertebrate animal systems.

**ZOOLOGY**  
**Semester VI****Learning Objectives:**

1. To introduce basic concepts of modern Chordate classification with evolution point of view and to understand the concept of taxonomy in higher animal kingdom.
2. To introduce the learners to the distinguishing characters of classes Reptilia, Aves and Mammalia and their adaptive features with reference to their habitat.
3. To study in depth one vertebrate animal type i. e. general characteristics and salient features of animal type - shark.

**Learning Outcomes:**

1. Learners will get an idea of origin of Chordates, its taxonomy up to class with reference to phylogeny and their special features.

2. Learners will understand the characteristic features and examples of class of Reptilia, Aves and Mammalia.
3. Learners will get an idea of vertebrate animal life after studying one representative animal - shark.