**Course Outcomes**

**Subject: Botany (B.Sc.-I)**

**(Course Title: Microbiology & Plant Pathology)**

Course outcomes: After the completion of the course the students will be able to:

1. Develop understanding about the classification and diversity of different microbes including viruses, Algae, Fungi & Lichens & their economic importance.
2. Develop conceptual skill about identifying microbes, pathogens, biofertilizers & lichens.
3. Gain knowledge about developing commercial enterprise of microbial products.
4. Learn host –pathogen relationship and disease management.
5. Learn Presentation skills (oral & writing) in life sciences by usage of computer of computer & multimedia
6. Gain Knowledge about uses of microbes in various fields.
7. Understand the structure and reproduction of certain selected bacteria algae, fungi and lichens
8. Gain Knowledge about the economic values of this lower group of plant community.

**Course Title: Techniques in Microbiology &Plant Pathology**

**Course outcomes:** After the completion of the course the students will be able:

1. Understand the instruments, techniques ,lab etiquettes and good lab practices for working in a microbiology laboratory.
2. Develop skills for identifying microbes and using them for Industrial, Agriculture and Environment purposes.
3. Practical skills in the field and laboratory experiments in Microbiology &Pathology.
4. Learn to identify Algae, Lichens and plant pathogens along with their Symbiotic and Parasitic associations.
5. Can initiate his own Plant & Seed Diagnostic Clinic
6. Can start own enterprise on microbial products

**Course Title: Archegoniates and Plant Architecture**

**Course outcomes:** After the completion of the course the students will be able to:

1. Develop critical understanding on morphology, anatomy and reproduction of Bryophytes, Pteridophytes and Gymnosperms
2. Understanding of plant evolution and their transition to land habitat.
3. Understand morphology, anatomy, reproduction and developmental changes therein through typological study and create a knowledge base in understanding the basis of plant diversity, economic values & taxonomy of plants
4. Understand the details of external and internal structures of flowering plants.

**Course Title: Land Plants Architecture**

**Course outcomes:**

1. The students will be made aware of the group of plants that have given rise to land habit and the flowering plants. Through field study they will be able to see these plants grow in nature and become familiar with the biodiversity.
2. Students would learn to create their small digital reports where they can capture the zoomed in and zoomed out pictures as well as videos in case they are able to find some rare structure or phenomenon related to these plants.
3. Develop an understanding by observation and table study of representative members of phylogenetically important groups to learn the process of evolution in a broad sense.
4. Understand morphology, anatomy, reproduction and developmental changes therein through typological study and create a knowledge base in understanding plant diversity, economic values & taxonomy of lower group of plants
5. Understand the composition, modifications, internal structure & architecture of flowering plants for becoming a Botanist.

**Subject:Physics(B.Sc. I)**

**Course Title: Mathematical Physics & Newtonian Mechanics**

**Course outcomes:**

1. Recognize the difference between scalars, vectors, pseudo-scalars and pseudo-vectors.
2. Understand the physical interpretation of gradient, divergence and curl.
3. Comprehend the difference and connection between Cartesian, spherical and cylindrical coordinate systems.
4. Know the meaning of 4-vectors, Kronecker delta and Epsilon (Levi Civita) tensors.
5. Study the origin of pseudo forces in rotating frame.
6. Study the response of the classical systems to external forces and their elastic deformation.
7. Understand the dynamics of planetary motion and the working of Global Positioning System (GPS).
8. Comprehend the different features of Simple Harmonic Motion (SHM) and wave propagation.

**Course Title: Mechanical Properties of Matter**

**Course outcomes:**

Experimental physics has the most striking impact on the industry wherever the instruments are used to study and determine the mechanical properties. Measurement precision and perfection is achieved through Lab Experiments. Online Virtual Lab Experiments give an insight in simulation techniques and provide a basis for modeling.

**Course Title: Thermal Physics & Semiconductor Devices**

**Course outcomes:**

1. Recognize the difference between reversible and irreversible processes.
2. Understand the physical significance of thermodynamical potentials.
3. Comprehend the kinetic model of gases w.r.t. various gas laws.
4. Study the implementations and limitations of fundamental radiation laws.
5. Utility of AC bridges.
6. Recognize the basic components of electronic devices.
7. Design simple electronic circuits.
8. Understand the applications of various electronic instruments.

**Course Title: Thermal Properties of Matter & Electronic Circuits**

**Course outcomes:**

Experimental physics has the most striking impact on the industry wherever the instruments are used to study and determine the thermal and electronic properties. Measurement precision and perfection is achieved through Lab Experiments. Online Virtual Lab Experiments give an insight in simulation techniques and provide a basis for modeling.

**Subject:Chemistry (B.Sc.I)**

**Course Title: Fundamentals of Chemistry**

Course outcomes: There is nothing more fundamental to chemistry than the chemical bond. Chemical bonding is the language of logic for chemists. Chemical bonding enables scientists to take the 100-plus elements of the periodic table and combine them in myriad ways to form chemical compounds and materials. Periodic trends, arising from the arrangement of the periodic table, provide chemists with an invaluable tool to quickly predict an element's properties. These trends exist because of the similar atomic structure of the elements within their respective group families or periods, and because of the periodic nature of the elements. Reaction mechanism gives the fundamental knowledge of carrying out an organic reaction in a step-by-step manner. This course will provide a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective. Students will gain an understanding of

1. Molecular geometries , physical and chemical properties of the molecules.
2. Current bonding models for simple inorganic and organic molecules in order to predict structures and important bonding parameters.
3. The chapter Recapitulation of basics of organic chemistry gives the most primary and utmost important knowledge and concepts of organic Chemistry.
4. This course gives a broader theoretical picture in multiple stages in an overall chemical reaction. It describes reactive intermediates , transition states and states of all the bonds broken and formed .It enables to understand the reactants, catalyst , steriochemistry and major and minor products of any organic reaction.
5. It describes the types of reactions and the Kinetic and thermodynamic aspects one should know for carrying out any reaction and the ways how the reaction mechanism can be determined.
6. The chapters Steriochemistry gives the clear picture of two-dimensional and three-dimensional structure of the molecules, and their role in reaction mechanism.

**Course Title: Quantitative Analysis**

**Course outcomes:** Upon completion of this course the students will have the knowledge and skills to: understand the laboratory methods and tests related to estimation of metals ions and estimation of acids and alkali contents in commercial products.

1. Potability tests of water samples.
2. Estimation of metal ions in samples
3. Estimation of alkali and acid contents in samples
4. Estimation of inorganic salts and hydrated water in samples

**Course Title: Bioorganic and Medicinal Chemistry**

**Course outcomes:** Biomolecules are important for the functioning of living organisms. These molecules perform or trigger important biochemical reactions in living organisms. When studying biomolecules, one can understand the physiological function that regulates the proper growth and development of a human body. This course aims to introduce the students with basic experimental understanding of carbohydrates, amino acids, proteins, nucleic acids and medicinal chemistry. Upon completion of this course students may get job opportunities in food, beverage and pharmaceutical industries.

**Course Title: Biochemical Analysis**

**Course outcomes:** This course will provide basic qualitative and quantitative experimental knowledge of biomolecules such as carbohydrates, proteins, amino acids, nucleic acids drug molecules. Upon successful completion of this course students may get job opportunities in food, beverage and pharmaceutical industries.

**Subject: Zoology (B.Sc.-I)**

**Course Title: Cytology, Genetics and Infectious Diseases**

**Course outcomes:** The student at the completion of the course will be able to:

1. Understand the structure and function of all the cell organelles.
2. Know about the chromatin structure and its location.
3. To be familiar with the basic principle of life, how a cell divides leading to the growth of an organism and also reproduces to form new organisms.
4. How one cell communicates with its neighboring cells?
5. Understand the basic principles of genetics and how genes (earlier called factors) are inherited from one generation to another.
6. Understand the Mendel’s laws and the deviations from conventional patterns of inheritance.
7. Comprehend how environment plays an important role by interacting with genetic factors.
8. How to detect chromosomal aberrations in humans and study the pattern of inheritance by pedigree analysis in families.

**Course Title: Cell Biology & Cytogenetics Lab**

**Course outcomes:**

At the completion of the course students will learn Hands-on:

1. To use simple and compound microscopes.
2. 2. To prepare slides and stain them to see the cell organelles.
3. To be familiar with the basic principle of life, how a cell divides leading to the growth of an organism and also reproduces to form new organisms.
4. The chromosomal aberrations by preparing karyotypes.
5. How chromosomal aberrations are inherited in humans by pedigree analysis in families.
6. The antigen-antibody reaction.

**Course Title: Biochemistry and Physiology**

**Course outcomes:**

The student at the completion of the course will learn:

* 1. To develop a deep understanding of structure of biomolecules like proteins, lipids and carbohydrates
  2. How simple molecules together form complex macromolecules.
  3. To understand the thermodynamics of enzyme catalyzed reactions.
  4. Mechanisms of energy production at cellular and molecular levels.
  5. To understand systems biology and various functional components of an organism.
  6. To explore the complex network of these functional components.
  7. To comprehend the regulatory mechanisms for maintenance of function in the body.

**Course Title: Physiological, Biochemical & Hematology Lab**

**Course outcomes:**

The student at the completion of the course will be able to:

* 1. Understand the structure of biomolecules like proteins, lipids and carbohydrates
  2. Perform basic hematological laboratory testing,
  3. Distinguish normal and abnormal hematological laboratory findings to predict the diagnosis of hematological disorders and diseases.