Bachelor of Science (Hons.) Biotechnology

[B.Sc. (Hons.) Biotechnology]

Programme Outcomes, Programme Specific Outcomes and Course Outcomes

Programme Outcomes (POs): Bachelor of Science (Hons.) Biotechnology-

Biotechnology is making immense contribution for the betterment of society. This professional course aims to provide experimental knowledge, analytical and conceptual skills to the learners in diverse areas like molecular biology, tissue culture, genetics, RDNA technology, cell and molecular biology, genomics, proteomics, bioinformatics, biochemistry, fermentation technology, immunology, microbial technology etc. The course opens many career options after its completion. Following are the various programme specific outcomes:

Programme specific outcome: B.Sc. (Hons.) Biotechnology-[

PSO1. Understanding theconcepts of biotechnology with reference to cell biology, genetics and molecular biology, immunology, microbiology, biochemistry, microbial technology, fermentation technology, enzyme technology, environment biotechnology, chemistry, biophysics, statistics to appreciate how diverse phenomena observed in nature and in daily life.

PSO2. Students will be able plan, conduct experiments, analyze and interpret data for investigating problems in Biotechnology and allied fields.

PSO3. Learn to carry out experiments in basic as well as certain advanced areas of biotechnology such as biochemistry, plant biotechnology, animal biotechnology, enzyme technology and Bioinformatics.

PSO4. Understand the basic concepts of certain sub fields such as biochemistry and Industrial biotechnology, molecular biotechnology, Environment biotechnology, Agri-biotechnology, general theory of Bioremediation and Fermentation.

PSO5. Gain hands on experience to work in applied fields of biological sciences. Learn different techniques pertaining to diverse field of biotechnology at theoretical and experimentation/practical level

PSO6. Gaining knowledge to transform theoretical concept to practical products/process and learning laws concerning to patents and IPR

PSO7. Gain a thorough Knowledge in the subject to be able to teach it at school level

PSO8. Relate the global scenario and interdisciplinary science areas and opportunity for development of technology in India abroad

PSO9. Viewing biotechnology as a tool the developing mind and critical attitude and the faculty of logical reasoning that is prepared to serve in diverse fields.

Semester-I

Course Name: Biochemistry & Metabolism

CO1 In this course students will study about the biomolecules including: Amino acids, Enzymes, Lipids, Carbohydrates, Nucleic acids and Proteins.

CO2 In this course students will understand the structure, function, classification, physical as well as chemical properties and forces stabilizing shape of the biomolecules.

CO3 This course also provides a basic knowledge about biological importance and types of enzymes as well as nucleic acid.

CO4 In this course students will learn the metabolism of carbohydrates to review the basic concept, how they are been broken down into simpler compounds in living organisms for utilization of energy.

Course Name: Cell Biology

CO1 This subject aims to give Students an overview about the basic introduction and classification of cell.

CO2 In particular, this subject focuses on identifying key components that is cellular organelles their function and structure constitute living cells.

CO3 This course discusses about the extracellular matrix and cancer related agents.

CO4 This course outcomes explains about the cellular and sub cellular specializations, and characteristics of higher tissue assemblies, will be studied to understand how cells contribute to the overall functioning of the organisms.

Course Name – Chemistry I

CO1. Students will understand the different principles of inorganic chemistry.

CO2. Students will get knowledge of optical activity.

CO3. Students will be able to perform analysis of ions from Group I & II.

Course Name-English

CO1. Definition of Science and its importance in human life, Scientific knowledge, benefits of adopting scientific point of view and how to make our life easier, Importance of tolerance, good temper and sympathy in one's life, Importance of Democracy, The Press and Media in one's life, motivation about achievements and failures, books description of their application in our life, scientific fiction stories to visualize the ideas, fictional stories related to science and its experiments and illustration of knowledge of the life and achievements of various scientists, mathematics and writer who have achieve new marks in success and set new examples for the world.

CO2. It gives an outline of knowledge of various characters and expression of their good and bad qualities, theme of marital affairs and how it changes one's life., materialistic things, money changes one's life and nature of people, superstitions prevalent in human life., Political understanding and gives the knowledge that one should avoid committing sins because nobody can escape from their punishments.

Course Name-Punjabi - I (Qualifying)

CO1. To create the Interest in literature, understand the aspect of life,To create the understanding relationship between literature and real life,To understand the realism,language learning,To develop the creativity,To give the moral value,To become a good citizen to student

CO2. To improve the speaking skill, reading skill, writing skill, listening skill

Semester-II

Course Name: Mammalian Physiology

CO1 This course outcome describes the students about the mechanism of digestion and exchange of gases occurring in mammals.

CO2 In This course outcome student will know about the blood cells, protein and mechanism of function of heart.

CO3 In This course outcome student will learn the mechanism of urine formation and the coordination between muscles and bones.

CO4 In this course students will understand control and coordination of neuroendocrine glands.

Course Name: Plant Anatomy and Physiology

CO1 In this course outcome students will have an understanding of basic plant chemistry and physiology.

CO2 In this course students will have an overview of photosynthesis, cellular respiration, and fermentation.

CO3 In this course outcome students will understand the basic parts of a plant cell and the distinction between different tissue types in plants.

CO4 In this course students will be familiar with the anatomical features of leaves, stems, and roots as well as flowers and fruits.

Course Name – Chemistry II

CO1. The students will develop curiosity and interest in chemistry.

CO2. The student will acquire an ability to think rationally and critically.

CO3. The student will learn ionic solids, solutions and chemical kinetics.

CO4. The students will learn about Colligative properties.

CO5. The subject will provide details about benzene and its derivatives

Course outcome – English II

CO1. To gain the knowledge of Social issues related to daily life, famous personalities like APJ Abdul Kalam, Globalization, Urban Chaos and Woman status.

CO2. Enhancement of vocabulary, Single words at the place of One sentence which saves times, knowledge of antonyms and synonyms.

CO3. Knowledge of various current affairs prevailing in the today's world, day to day issues, 3. Improvement of writing skills of the students.

CO4. Knowledge of Tenses which is an important part of grammar, various rules of grammar for the enhancement of composition skills and sentence patterns to write English properly.

Course Name-Punjabi - II (Qualifying)

CO1. To create the Interest in literature, understand the aspect of life,To create the understanding relationship between literature and real life,To understand the realism,language learning,To develop the creativity,To give the moral value,To become a good citizen to student

CO2. To improve the speaking skill, reading skill, writing skill, listening skill

Semester-III

Course Name: Genetics

CO1. This course helps students to enliststhe history of gene structure of animals which are used in various genetic experiments.
CO2. Students will be able to learn about the various stages of cell division- meiosis as well as mitosis, which occurs in cell cycle progression.
CO3. This course describes students the Mendel's experiments and statements of Mendel's laws which describe the inheritance of characters from one generation to next.
CO4. Students will come to know about the genome of virus and prokaryotic organisms
CO5. Students can easily distinguish the types of chromosomes from karyotype
CO6. This course describes the causes and occurrence of variations and mutations in chromosomes due to duplication, deletion, translocation etc.

Course Name: General Microbiology

CO1. In this course students will know the history, microbial taxonomy, phylogeny and structure of prokaryotes, eukaryotes and viruses.
CO2. In this course students will understand techniques of cultivation and maintenance microbes.
CO3. In this course students will learn microbial growth and mode of reproduction in Bacteria.
CO4. In this course students will study and outlines methods of microbial control, Water and Food Microbiology.

Course Name: Enzymology

CO1. In this course students will study the basic extraction, purification and outlines the concept of enzyme in detail to carryout enzyme reactions
CO2. In this course students will learn about multi-substrate reaction of enzymes along withit's mechanism of action and enzyme regulation.
CO3. In this course students will learn enzymes with special references of allosteric enzymes, isoenzymes and multienzyme complexes.
CO4. In this course students will understand the practical applications of the enzymes for the welfare of humans as immobilized enzymes, enzyme engineering, protein sequencing etc.

Course Name: Environmental Biotechnology

CO1. In this course students will study the basic physiology of a microorganism and how their structure reveals their function in the environment
CO2. In this course students will understand the bases for microbial metabolism of contaminants present in the environment.

CO3. In this course students will study different techniques for the modification and augmentation of microorganisms in the laboratory and environment.
CO4. In this course students will learn the principles of bioremediation, phytoremediation, bioleaching and waste water treatment.

Course Name – Chemistry III

CO1. Students will learn the laboratory skills.
CO2. Students will acquire the knowledge of alcohols, aldehydes and ketones.
CO3. Students will understand the basic concepts of thermodynamics and Chemical equilibrium

Semester-IV

Course Name: Molecular Biology

CO1. This course helps the students to understand the knowledge of molecular machinery of living cells.
CO2. This course describes the process of DNA replication of all eukaryotic and Prokaryotic cells along with the structure of genetic material.
CO3. This course enlists the types of DNA damage and also its repair mechanisms to overcome gene mutation.
CO4. This course describes the process of transcription, translation and regulation of gene expression in prokaryotes and eukaryotes.

Course Name: Immunology

CO1. In this course the students will be able to identify the cellular and molecular basis of immune responsiveness.
CO2. This course describes the roles of the immune system in both maintaining health and contributing to disease.
CO3. This course describes immunological response and how it is triggered and regulated.
CO4. In this course the students will be able to discuss a capacity for problem-solving about immune responsiveness.
CO5. This course students will be able to transfer knowledge of immunology into clinical decision making through case studies presented in class.

Course Name: Industrial Fermentations

CO1 This course is an interdisciplinary approach that applies principles associated withbiology and engineering.
CO2 In this course students will learn microbiology and biochemistry from biological aspect.
CO3 In this course students will understand the commercial exploitation of microorganisms on a large scale.
CO4 This course describes the knowledge of basic principle of fermentation process, which helpstudents to design, develop and operate industrial level fermentation process.
CO5 This course discusses fundamental knowledge is essential for Students to make their career in industry basedon bioprocess.

Course Name: IPR, Entrepreneurship, Bioethics & Biosafety

CO1. This course equips the student with the basic knowledge relating to the ethical behavior in science discipline.

CO2. In this course the students understand the rules and regulation relating to Intellectual Property Rights (Patents, Copyrights, and Trademarks).

CO3. This course is intended to familiarize students with the concept of Biosafety, Biohazards and their increasing awareness in the world.

CO4. This course is to identify the level of protection extended to IPRs under national and international legislation.

Course Name – Chemistry IV

CO1. The students will develop curiosity and interest in chemistry.

CO2. The student will acquire knowledge of acid and bases, carboxylic acids and its derivatives.

CO3. The student will learn concepts of phase equilibrium, fats & oils and electrochemistry.