	Theory
Total marks	100
End Semester Exam	60
Sessional	40
Credits	4.0

3	1	-	4.0

Note: Question paper is divided in to four sections A, B, C and D. Section A is compulsory and comprises of 12 questions of one mark each, 3 from each unit. The questions should not be direct having one word answer, fill in the blanks or multiple-choice questions. Section B comprises of 4 questions of 2 marks each, one from each unit. Section C comprises of 4 questions of 4 marks each, one from each unit (Each question shall have two alternatives, out of which student will be required to attempt one). Section D comprises of 4 questions of 6 marks each, one from each unit (Each question shall have two alternatives, out of which student will be required to attempt one). Duration of exam shall be 3 hours and maximum marks shall be 60.

Course objectives:

1. The aim of course is to provide students with basic and conceptual knowledge of biology.
2. Students should be able to explain and discuss the concept in biology, various biomolecules and their structures.
3. Students should be familiar with the DNA/RNA, chromosomes and cellular divisions.
4. Students should learn the basics of animal physiology, medical technology, applications of biotechnology.
5. Students should be able to write, search and explain the fundamentals of biology as subject.

Syllabus

UNIT- I

Fundamental concepts in Biology: Chemical foundations and basic chemistry of cell, Cell theory, Cell as a unit of life; Physical and chemical principles involved in cellular maintenance, Basic and ultra structure of cell, cell wall and cellular components, Taxonomy and Five kingdom classification.

UNIT- II

Biomolecules and biological processes: Carbohydrates, Lipids, Amino Acids, Proteins, Nucleic acids; Tissue and organ systems in animal and plants, Functioning of bio-membranes (Diffusion, Absorption, Osmoregulation), Basic catabolic and anabolic processes of cell including photosynthesis and cellular respiration.

UNIT- III

Genetic material: Structure and types of DNA & RNA, Gene, Genetic code, Central dogma, Chromosomes (morphology and types), Cell cycle and phases; Mitosis and meiosis; Mutations (cause, types and effects on species), transposons, Experimental evidences for DNA as genetic material.

UNIT- IV

Bio-instrumentation and biotechnological applications: Microscopy and types, Spectroscopy, Diagnostic imaging, Scope and applications of plant, animal, industrial and medical biotechnology 21st century, Prospective role of biotechnology in achieving UN Sustainable Development Goals (good health and well being, clean water, energy and environment).

Course outcomes:

This subject contributes to the development of following learning outcomes:

1. Understanding of the nature, practice and application of the basic subject biology.
2. After completion of the course, students will be able to write, explain and discuss the concept of biology, various biomolecules and their structures.
3. Students will be able to understand the nucleic acid structures, chromosomes and cellular divisions.
4. Students should learn the basics of animal physiology and medical technology.
5. Students should be able to write, search and explain the fundamentals of biology as subject.
6. Student will be able to elaborate studies on various physiological processes, role and applications of biotechnology for human welfare.

Books recommended:

- Cell Biology, 3rd Edition (2018), Powar CB: Himalaya Publishing House, Mumbai
- Elementary Biology, Vol 1 & 2, Bhatia KN and Tyagi MP (Jan, 2023): Truman Book Company, New Delhi
- Cell and Molecular Biology, 8th Edition (2022) De Robertis: Saurders, Pholadelphia
- A Textbook of Biology Vol. 1 & 2, Dhami PS, Srivastava HN and Chopra G (2022): Pradeep Publications