GDC Memorial College, Bahal (Bhiwani)

NAAC Accredited Grade "B" (Second Cycle) and Recognized under the Sections 2(f) & 12B of the UGC Act, 1956
Affiliated to Ch. Bansi Lal University, Bhiwani

Department of Life Sciences (2025-26)

Program Learning Outcomes (PLOs)

Life Sciences curriculum is designed to equip students with subject domain knowledge and technical skills pertaining to science in a holistic manner. It aims to train the students in all the areas of sciences with interdisciplinary components. Students have exposure to cutting-edge technologies that are currently used in the subject. They are made aware about the social and environmental issues, significance of plants and their relevance to the national economy.

PLO1. To develop skills in graduate students to be able to acquire theoretical and practical knowledge in fundamentals of biology in respective disciplines of plants, animals, microbes and environment.

PLO2. Think logically and organize tasks into a structured form.

PLO3.. To inculcate ability to critically evaluate problems and apply lateral thinking and analytical skills for professional development.

PLO4. Use of IT (word-processing, use of internet, statistical packages and databases). Communication of scientific ideas in writing and orally. Ability to work as part of a team. Ability to use library resources.

PLO5. Apply the knowledge of basic science, life sciences and fundamental process of plants to study and analyze any plant form.

PLO6. Transferofappropriateknowledgeandmethodsfromonetopictoanotherwithinthe subject.

PLO7. Assimilate knowledge and ideas based on wide reading and through the internet.

PLO8. Understand the impact of the plant diversity in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PLO9. Apply ethical principles and commit to environmental ethics and responsibilities and norms of the biodiversity conservation.

Program Specific Learning Outcomes (PSLOs)

Students who successfully complete this course will be able to:

PSLO1: Understand and analyze fundamental biological concepts while merging perspectives from several domains related to modern biology**.**

PSLO2: Expand professional studies and research in disciplines such as neurology, genetics, cell biology, physiology, biochemistry, immunology, developmental biology, ecology, and biotechnology.

PSLO3: Understand and apply information from a variety of scientific resources; assess and interpret graphical data; develop reliable hypotheses, plan experiments, and observational techniques in a laboratory setting; demonstrate problem-solving abilities; and present results from science in verbal and written form.

PSLO4: Demonstrate expertise in scientific subjects such as biostatistics, bioinformatics, and analytical procedures required for productive biological research; understand biotechnological processes utilized in business; and anticipate need-based entrepreneurial opportunities in all areas of biology.

PSLO5: Engage as a team, establish interpersonal communication skills, and get the confidence to pursue a career in any field of choice.

B.Sc. (Life Sciences) 1st Sem

Subject: Diversity of Microbes, Algae, Fungi & Archegoniates **Subject Code: 24UN-BOT-101**

Course Learning Outcomes (CLOs)

The specific objectives of this course are to expose students to the following topics:

CLO1: Characteristics of bacteria, actinobacteria, viruses and fungi.
CLO2: Students will develop a conceptual understanding of Phycology.
CLO3: Students will gain knowledge on the concepts of Biology.
CLO4: Basic understanding of the biology of pteridophytes will be developed by the students.
CLO5: Students will gain the knowledge of practical aspects of microorganisms, algae, fungi, lichens, bryophytes.

Subject: Animal Diversity of Non-Chordates **Subject Code: 24UN-ZOO-101**

Course Learning Outcomes (CLOs)

The specific objectives of this course are to expose students to the following topics:

CLO1: Student will be able to describe unique characters and recognize life forms of phylum Protozoa and Porifera.
CLO2: Student will be able to describe unique character sand recognize life forms of phylum

Coelenterate and Helminthes.

CLO3: Student will be able to describe unique characters and recognize life forms of phylum Annelida and Arthropoda.

CLO4: Student will be able to describe unique characters and recognize life forms of phylum Mollusca, Echinodermata and Hemichordata.

CLO5: Students will be capable of identifying the characters and classification of Non-Chordates.

Subject: Chemistry-I **Subject Code: 24UN-CHE-101**

Course Learning Outcomes (CLOs)

After successful completion of the course, the student is expected to:

CLO1: Enable to understand the basis of quantum mechanics and structural idea and relevance in describing shapes of s, p and d orbitals.

CLO2: To learn about role of temperature and pressure to establish the state of gases and describe the concept of critical constants of real gases.

CLO3: Get knowledge about the electrophile/nucleophile and its role in mechanism of preparation of organic compounds.

CLO4: To know the physical properties, morphology and crystalline study of liquid and different type of solids.

CLO5: Hand on practice in preparation of solutions, compounds, estimation and determination of physical properties of some compounds

Subject: Personal finance **Subject Code: 24UN-BBA-MDC-101**

Course Learning Outcomes (CLOs)

After completing this course, the learner will be able to:

CLO1: Understand the basics of personal finance and personal planning.

CLO2: Gain the knowledge of investment and different investment avenues available for managing finance.

CLO3: Understand the relationship between investment risk and return and the role of regulatory environment in managing personal finance.

CLO4: Do insurance planning, tax and estate plan and retirement planning.

Subject: Basic IT Tools **Subject Code: 24UN-ICT-SEC103**

Course Learning Outcomes (CLOs)

After successful completion of the course, the student is expected to:

CLO1: Understand the concept of input and output devices of Computers and how it works.

CLO2: Understand the concepts, structure, types and design of operating Systems.

CLO3: Realise the importance of managing information technology to achieve bottom line business results.

CLO4: Understand computer network, and browse the internet, content search, email and collaborate with peers.

CLO5: Understand evolution of internet, its application and its basic services.

CLO6: Create and design a word document for general office use

CLO7: Students will have a working knowledge of paragraph formatting, macro and mail merge in MS-Word.

CLO8: Use e-Governance applications; and use computer to improve existing skills and learn new skills.

Subject: Human Values and Ethics **Subject Code: 24UN-PSY-VAC101**

Course Learning Outcome (CLOs):

After completing this course, the learner will be able to:

CLO1: Recognize the core ideas of human values and their importance in life.

CLO2: Examine the connection between ethics and values and how it affects how decisions are made.

CLO3: Recognize and put into practice fundamental human qualities like empathy and honesty in everyday circumstances.

CLO4: Learn about different ethical theories and how they apply to real-world situations.

CLO5: Gain the capacity to analyze moral conundrums critically utilizing various ethical frameworks.

Subject: Basics of Computer Science **Subject Code: 24UN-ICT-103**

Course Learning Outcome (CLOs):

After completing this course, the learner will be able to:

CLO1: To introduce to the students, the basic understanding of the working of a computer science.

CLO2: To familiarize the students with concept of algorithma and flowchart.

CLO3: To familiarize the students with various types of software.

CLO4: To make the students familiar with the basic internet technology and concepts.

B.Sc. (Life Sciences) 2nd Sem

Subject: Cell Biology and Genetics **Subject Code: 24UN-BOT-201**

Course Learning Outcomes (CLOs)

The specific objectives of this course are to expose students to the following topics:

CLO1: Students will acquire the knowledge of cell envelope and organelles.

CLO2: Students will acquire knowledge shout cell cycles and chromosomal abnormalities.
CLO3: Students will acquire knowledge about genetic inheritance.
CLO4: Students will develop an understanding of extra chromosomal inheritance.
CLO5: Students will acquire the detail knowledge of cell, cell structure and also about principles, mechanisms, and applications of genetics, and to prepare them for further study or careers in genetics.

Subject: Animal Diversity of Chordates **Subject Code: 24UNZOO201**

Course Learning Outcomes (CLOs)

The specific objectives of this course are to expose students to the following topics:

CLO1: Student will be able to describe unique characters and recognize life functions of Urochordates.
CLO2: Student will be able to describe unique characters and recognize life functions of Pisces.
CLO3: Student will be able to describe unique characters and recognize life functions of Amphibians & Reptiles.
CLO4: Student will be able to describe unique characters and recognize life functions of birds & Mammals.
CLO5: Students will be capable of identifying the characters and classification of Chordates

Subject: Chemistry-II **Subject Code: 24UN-CHE-201**

Course Learning Outcomes (CLOs)

After successful completion of the course, the student is expected to:

CLO1: Understand the theories which govern the shape, structure and ionic behavior, polarizability, ionic structures and concept of Lattice energy of crystals of molecules.
CLO2: To know the basics of rates of chemical reactions, the laws and solubility behavior of solutes in different compositions of solvents.
CLO3: To know about alkanes, alkene, cycloalkanes and their chemical reactions.
CLO4: To understand about weak interactions and bonding in metals.
CLO5: Hand on practice for estimation and determination of viscosity, specific refractivity properties of some compound
CLO6: Understand the preparation, properties and reactions of s and p block elements.

Subject: Introduction to Entrepreneurship Development **Subject Code: 24UN-BBA-MDC-102**

Course Learning Outcomes (CLOs)

After successful completion of the course, the student is expected to:

CLO1: Demonstrate an understanding of basic concepts of entrepreneurship.
CLO2: Exhibit practical knowledge required for being an entrepreneur.
CLO3: Link entrepreneurship to Economy.
CLO4: Understand and apply the process of entrepreneurship.
CLO5: Prepare a business plan that can be submitted to investor/lender.
CLO6: Appraise a business project.

Subject: Programming Methodologies **Subject Code: 24UN-ICT 203**

Course Learning Outcomes (CLOs)

After successful completion of the course, the student is expected to:

CLO1: To familiarize the students with the concept of problem solving using algorithm and flowcharts.
CLO2: To familiarize the students with the concept of problem and debugging.
CLO3: To make the students familiarize with the basic programming constructs.
CLO4: To understand various programming methodologies.
CLO5: To understand the various programming methodologies by implementing these practically.

Subject: Office and Spreadsheet Tool Learning **Subject Code: 25UN-ICT-SEC203**

Course Learning Outcomes (CLOs)

After successful completion of the course, the student is expected to:

CLO1: Understand the basic concept of operating system.
CLO2: Do the basic editing and editing and formatting in a document.
CLO3: Create basic spreadsheet for different purpose.
CLO4: Create basic presentation for different applications.
CLO5: To understand the working of operating system and various office tools practically.

B.Sc. (Life Sciences) 3rdSem

Subject: Gymnosperms and Plant Anatomy **Subject Code: 24UN-BOT-301**

Course Learning Outcomes (CLOs)

The specific objectives of this course are to expose students to the following topics:

CLO1: Students will gain knowledge of general characteristics of gymnosperms.
CLO2: Students will gain knowledge about comparison between gymnosperms and economic importance.
CLO3: Students will gain an understanding of various kind of tissue system in plants and secondary growth.
CLO4: Students will acquire knowledge about leaf and root, morphology and anatomy.
CLO5: Students will gain the knowledge of practical aspects of gymnosperms and plant anatomy.

Subject: Cell Biology and Animal Genetics **Subject Code: 24UNZOO301**

Course Learning Outcomes (CLOs)

The specific objectives of this course are to expose students to the following topics:

CLO1: Students will understand the nature and has concept of cell biology and genetics
CLO2: Studentswillbeabletoapplytheknowledgeofinternalstructureofcelland their role in many metabolic function of organism
CLO3: Students will have acquaintance with the basic causes associated with inborn errors and other genetic disorder and will be able to give counseling to general people
CLO4: Students will be able to explain the concept to gene interactions, Sex linked inheritance and their role in medical sciences.
CLO5:.Studentswillbeabletoconductthemorphomatricanalysisofchromosomesand demonstrate cell division

Subject: Chemistry-III **Subject Code: 24UN-CHE-301**

Course Learning Outcomes (CLOs)

After successful completion of the course, the student is expected to:

CLO1: To learn about the structure of S and P-block elements, their properties and discuss their use in daily life as well as industrial applications.
CLO2: To understand about various laws and theories related to electrochemistry-I and know about their thermodynamic properties.
CLO3:.To understands about variation of conductance studies with concentration and explain with many phenomenon.
CLO4: The fundamental properties, structures and reactivity of organic compounds such alkenes, alkynes arenas, alkyl and aryl halide etc.

CLO5: Learning about reaction mechanism and predict the outcome of the reactions.
CLO6: How to distinguish between the organic compounds by use of different chemical tests.

Subject: Operating system **Subject Code: 24UN-ICT-301**

Course Learning Outcomes (CLOs)

After successful completion of the course, the student is expected to:

CLO1: Gain in depth knowledge about the structures of the operating system, different types of operating system and functions performed by modern operating system.
CLO2: Identify and apply knowledge of various software and hardware synchronization tools for solving critical section problem in concurrent processes.
CLO3: Understand and apply process management and memory management concepts to solve various hardware and software problems.

Subject: Advance IT Skills **Subject Code: 24UN-ICT-SEC301**

Course Learning Outcomes (CLOs)

After successful completion of the course, the student is expected to:

CLO1: Use E-governance applications; and use computer to improve existing skill and learn new skill.
CLO2: Using internet for digital financial services.
CLO3: Understand the concept of Cyber Security and issues and challenges associated with it.
CLO4:-Develop knowledge about future skills.

B.Sc. (Life Sciences) 4thSem

Subject: Plant Systematic and Embryology **Subject Code: 24UN-BOT-401**

Course Learning Outcomes (CLOs)

The specific objectives of this course are to expose students to the following topics:

CLO1: Students will gain knowledge about taxonomy, including the rules of nomenclature and other essential aspects.
CLO2: Students will acquire a conceptual understanding of angiosperm classification systems and the diversity of families within them.
CLO3: Students will acquire knowledge about structural organization of flower and pollination.
CLO4: Students will develop an understanding of fertilization, embryo and endosperm development.
CLO5: Students will acquire the knowledge of experimentation performed for Plant

Systematic and Embryology**.**

Subject: Biomolecules and Mammalian Physiology Subject Code: 24UN-ZOO-401

Course Learning Outcomes (CLOs)

The specific objectives of this course are to expose students to the following topics:

CLO1: Students will be able to understand and explain the mechanism that works to keep the human body functioning
CLO2: Students will be able to explain the interaction and interdependence of physiological and biochemical processes
CLO3: It will make the students understand the appropriate functioning of each body system in animals and mechanism of working.
CLO4: Students will be able to explain the mechanism of action of hormones and related molecules involved in various physiological processes
CLO5: Students will be able to understand and perform biological and analytical techniques in labs to explain biological activities

Subject: Sustainable Development Goals Subject Code: 24UN-ECOVAC301/401

Course Learning Outcomes (CLOs)

After completing this course, the learner will be able to:

CLO1: Get basic understanding of the concept of SDGs.
CLO2: Acquainted with the social dimensions of sustainability.
CLO3: Understand the economic dimension of sustainability.
CLO4: Understand the environmental dimensions of sustainability

Subject: Chemistry-IV Subject Code: 24UN-CHE-401

Course Learning Outcomes (CLOs)

After successful completion of the course, the student is expected to:

CLO1: Classify d block and f block elements and also know their properties.
CLO2: Learn about the basic idea of analysis with respect to qualitative as well as quanititative measures.
CLO3:.Know about the first and second law of thermodynamics and also their implications and also know about the concept of equilibrium.
CLO4: Know about the alcohol, phenol, aldehydes and ketones with respect to their characteristics and their important reactions.
CLO5: To get knowledge about identification and confirmation of acidic and basic radicals in a given inorganic salts/mixtures.

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B.Sc. (Medical) 5th SEM

Subject: Economic Botany and Biotechnology-I **Subject Code: 20UBOT501A**

Learning Outcomes (LOs)

The specific objectives of this course are to expose students to the following topics:

LO1: This course provides information about the origin of agriculture &its economic importance.
LO2: It also deals with the principles and methods of plant tissue culture.
LO3: Explain the theory and practice of recombinant DNA technology.
LO4: Analyze morphological description, brief idea of cultivation and economic uses of medicinal plants.
LO5: Study origin, distribution, botanical description, brief idea of cultivation and economic uses of pulses

Subject: Economic Botany and Biotechnology-II **Subject Code: 20UBOT501B**

Learning Outcomes (LOs)

The specific objectives of this course are to expose students to the following topics:

LO1: Investigate utilization and domestification of crop plant throughout history;
LO2: Study botanical description, processing and uses of beverages, sugar, tea and coffee.
LO3: Grow, maintain and propagate specific plant and animal cell types in a sterile environment.
LO4: Select and apply experimental procedures to the spectrum of fields making use of biotechnology.

Subject: Immunology **Subject Code: 24UNZOO501**

Learning Outcomes (LOs)

The specific objectives of this course are to expose students to the following topics:

LO1: Describe the components of the immune system: Account for the different hematopoietic cells, tissues (primary and secondary lymphoid organs).

LO2: Differentiate between innate and adaptive immunity.

LO3: Explain the molecular basis of immunity

LO4: Understand immune system disorders.

Subject: Public Health and Hygiene **Subject Code: 20USECZ507**

Learning Outcomes (LOs)

The specific objectives of this course are to expose students to the following topics:

LO1: Understanding Health Concepts
LO2: Disease Prevention and Control.
LO3: Hygiene and Sanitation Knowledge: Understand and apply emerging concepts and issues related to environmental health.
LO4: Specific learning outcomes typically include: Community Health Assessment.

Subject: Animal Biotechnology **Subject Code: 20UNZOO502**

Learning Outcomes (LOs)

The specific objectives of this course are to expose students to the following topics:

LO1: Theoretical Knowledge and Understanding: Genetic Engineering.
LO2: Animal Cell Culture: Understand the basic concepts, terminology, and techniques of animal cell and tissue culture.
LO3: Molecular Diagnostics & Therapeutics: Gain knowledge of molecular methods for diagnosing genetic diseases

Subject: Chemistry of Heterocyclic Compounds **Subject Code: 20UCHE-501**

Learning Outcomes (LOs)

After successful completion of the course, the student is expected to:

LO1: Learn about the synthesis and properties of different heterocyclic compounds.

LO2: Understand the preparation and reactions of five and six membered heterocycles.

LO3: Learn about organic synthesis via enolates.

LO4: Understand the mechanism of polymerization of different synthetic groups.

LO5: Learn about the different amino acids, proteins and peptides.

Subject: Organic spectroscopy-1 **Subject Code: 20UCHE-502**

Learning Outcomes (LOs)

The specific objectives of this course are to expose students to the following topics:

LO1: Learn about the basic concepts of spectroscopy.

LO2: Understand the transitions in electronic and UV-Visible Spectroscopy

LO3: Understand the vibrational and rotational spectrum of the molecules.

LO4: Learn to determine molecular structure with the help NMR spectroscopy.

LO5: Spectral studies of organic compounds and functional groups.

B.Sc. (Medical) 6th SEM

Subject: Environmental Biology-I **Subject Code: 20UBOT602A**

Learning Outcomes (LOs)

The specific objectives of this course are to expose students to the following topics:

LO1: This course deals with various ecological components & its management. It also deals with biogeochemical cycles, biodiversity & its conservation.

LO2: Italso deals with biogeochemical cycles, biodiversity & its conservation.

LO3: Produce a culminating/multi-scale piece of work demonstrating the ability to synthesize concepts and methods to make a contribution to environmental solutions.

LO4: Apply proficiency in analytical methods, critical thinking, communication, and leadership skills sufficient to make a contribution in environmental and related fields.

Subject: Environmental Biology-II **Subject Code: 20UBOT602B**

Learning Outcomes (LOs)

The specific objectives of this course are to expose students to the following topics:

LO1: This course would deals with the different types environmental pollutions, global environmental issues and their solution.

LO2: Appreciate that one can apply systems concepts and methodologies to analyze and understand interactions between social and environmental processes.

LO3: Acquire values and attitudes towards understanding complex environmental economic-social challenges, and active participation in solving current environmental problems and preventing the future ones.

LO4: Develop critical thinking for shaping strategies (scientific, social, economic, administrative, and legal) for environmental protection, conservation of biodiversity, environmental equity, and sustainable development.

Subject: Mushroom Culture Technology **Subject Code: 20SECB604**

Learning Outcomes (LOs)

The specific objectives of this course are to expose students to the following topics:

LO1: This course will help in increasing the understanding of the students about the technologies related to practices of mushroom culture.
LO2: To provide basic knowledge in cultivation of mushrooms.
LO3: Sustainable use of resources.
LO4: To promote self-employment
LO5: Able to grow mushrooms in a natural way.

Subject: Applied Zoology **Subject Code: 20UZOO601**

Learning Outcomes (LOs)

Thespecificobjectivesofthiscoursearetoexposestudentstothefollowingtopics:

LO1: Understand the scope and importance of applied zoology in daily life, medicine, and agriculture.
LO2: Describe the biology and life cycles of economically important animals, such as silkworms (Bombyxmori), honeybees, and pearl oysters.
LO3: Identify and classify various insects of medical importance (e.g., Anopheles, Aedes) and economic importance (e.g., agricultural pests).
LO4: Gain knowledge regarding vector-borne diseases, their pathology, transmission routes, prevention, and control measures.
LO5: Understand the principles of management and breeding for commercially important animals like poultry and cattle, including artificial insemination concepts.

Subject: Insect, Vector and Diseases **Subject Code: 20UZOO602**

Learning Outcomes (LOs)

The specific objectives of this course are to expose students to the following topics:

LO1: Understand the principles of management and breeding for commercially important animals like poultry and cattle, including artificial insemination concepts.
LO2: Understand the principles of management and breeding for commercially important animals like poultry and cattle, including artificial insemination concepts.
LO3: Identify and classify various insects of medical importance (e.g., Anopheles, Aedes) and economic importance (e.g., agricultural pests).
LO4: Gain knowledge regarding vector-borne diseases, their pathology, transmission routes, prevention, and control measures
LO5: Understand the principles of management and breeding for commercially important animals like poultry and cattle, including artificial insemination concepts

Subject: Organic Spectroscopy - II **Subject Code: 20UCHE-601**

Learning Outcomes (LOs)

After successful completion of the course, the student is expected to:

LO1: Learn about the principle of NMR spectroscopy.

LO2: Understand the PMR spectra of different molecules.

LO3: Learn about the classification and nomenclature of carbohydrates.

LO4: Learn about the disaccharides and polysaccharides.

LO5: learn about the different organ metallic compounds and their synthesis.

Subject: Quantum mechanics and molecular spectroscopy Subject Code: 20UCHE-602

Learning Outcomes (LOs)

After successful completion of the course, the student is expected to:

LO1: Learn about the electronic spectrum of the molecules and Franck- Condon principle.

LO2: Understand the basic concepts of spectroscopy

LO3: Learn about different concept of quantum mechanics

LO4: Understand the different type of spectroscopy like rotational, vibrational etc.

LO5: Able to determine molecular structure.