GDC Memorial College

Bahal (Bhiwani)-127028

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

Name of Programme: B.Sc (Physical Science) **Session:** 2025-26

PROGRAMME SPECIFIC LEARNING OUTCOMES (PSLOs)

❖ Understand the fundamental principles and laws of physical sciences, including concepts from physics, chemistry, and related interdisciplinary fields.

❖ Explain the nature and significance of physical phenomena in areas such as mechanics, thermodynamics, optics, electricity, magnetism, and material science.

❖ Develop the ability to design and perform experiments, analyze data, and interpret results using scientific methods.

❖ Apply theoretical knowledge to solve real-world problems in areas like energy, environment, technology, and everyday physical processes.

❖ Acquire strong analytical, mathematical, and technical problem-solving skills relevant to physical sciences.

❖ Gain proficiency in laboratory techniques, including measurement, error analysis, data recording, and use of scientific instruments with an emphasis on accuracy and precision.

❖ Develop interdisciplinary understanding, integrating concepts from physics, chemistry, and environmental science.

❖ Enhance critical thinking, scientific reasoning, and research-oriented approach.

❖ Improve communication skills, teamwork, and the ability to present scientific ideas effectively.

❖ Build personal and professional skills that promote ethical responsibility and contribute to society as informed and responsible citizens.

❖ Prepare graduates for higher studies, research, industry, and leadership roles in science and technology sectors.

❖ Equip students to contribute effectively to a rapidly evolving global scientific and technological community.

Course Learning Outcomes (CLOs)

B.Sc.(Physical Science)1st Semester

Subject: Mechanics **Subject Code: 24UN-PHY-101**

Course Learning Outcomes (CLO)

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

CLO1: Understand the dynamics of system of particles, conservation of energy & momentum application of both translational & rotational dynamics motion simultaneously in analyzing rolling with slipping.

CLO2: Differentiate between elastic and plastic body. Elastic constants, determination & their physical significance, Torque & its significance.

CLO 3: Knowledge of special theory of relativity & its applications, Michelson's Morley experiments & its findings.

CLO 4: Gain the knowledge of two body central force problem & its applications.

CLO 5: Learn to represent the observation, results analysis & different concepts related to experiments of Mechanics.

Course Learning Outcomes (CLOs)

B.Sc.(Physical Science)1stSemester

Subject: Chemistry-I **Subject Code: 20UNCHE101**

Course Learning Outcomes (CLO)

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

Course Learning Outcomes (CLOs)

B.Sc.(Physical Science)1stSemester

Subject: Minor Chemistry **Subject Code: 20UN-CHE-103**

Course Learning Outcomes (CLO)

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

CLO1: To understand the basics of Covalent bonding in simple molecules.

CLO2: To get the basics of rates of chemical reactions and factors affecting it.
CLO3: To learn about the nomenclature, classification and methods of preparation of alkenes.
CLO4: To learn about qualitative knowledge of conductors, semiconductors and insulates.

Course Learning Outcomes (CLOs)

B.Sc.(Physical Science)1st Semester

Subject: Calculus **Subject Code: 24UN-MTH-101**

Course Learning Outcomes (CLO)

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

CLO1. Gain knowledge of the Concepts and theory of limit, Continuity and differentiability of functions. Attain skills of calculating the limit of functions and examining the Continuity and differentiability of different types of functions, and perform successive differentiation of functions. To apply the procedural knowledge to obtain the series expansions of functions which find multidisciplinary application.

CLO2. Understand Concepts of asymptotes and curvature, the geometrical meaning of these terms and to have procedural knowledge to solve related problems.

CLO3. Determine singular points of a curve and classify them. Understand the Concept of rectification of curves and derive the reduction formulae.

CLO4. Have theoretical knowledge and practical skills to evaluate the area bounded by the curves, and volume and surface area of solids formed by revolution of curves.

CLO5. Attain Cognitive and technical skills required for solving different problems of calculus associated with tracing of curves, determination of curvature, and rectification of curves, volume and surface area of solids of revolution. Have technical and practical skills of solving calculus problems related to differentiation and integration of functions by using MAXIMA software.

Course Learning Outcomes (CLOs)

B.Sc.(Physical Science)1st Semester

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

Course Learning Outcomes (CLO)

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

CLO 1: Understand the basics of personal finance and personal planning.

CLO 2: Gain the knowledge of investment and different investment avenues available for managing finance.

CLO 3: Understand the relationship between investment risk and return and the role of regulatory environment in managing personal finance.

CLO 4: Do insurance planning, tax and estate planning and retirement planning.

Course Learning Outcomes (CLOs)

B.Sc.(Physical Science)1st Semester

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

Course Learning Outcomes (CLO)

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

CO1: Understand the concept of input and output devices of Computers and how it works.

CO2: Understand the concepts, structure, types and design of operating Systems.

CO3: Realise the importance of managing information technology to achieve bottom line business results.

CO4: Understand computer network, and browse the internet, content search, email and collaborate with peers.

CO5: Understand evolution of internet, its application and its basic services.

CO6: Create and design a word document for general office use

CO7: Students will have a working knowledge of paragraph formatting, macro and mail merge in MS-Word.

CO8: Use e-Governance applications; and use computer to improve existing skills and learn new skills.

Course Learning Outcomes (CLOs)

B.Sc.(Physical Science)1st Semester

Subject: Problem Solving Through C **Subject Code: 24UN-ICT-101**

Course Learning Outcomes (CLO)

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

CO1- Read, understand and trace the execution of programs written in C language.
CO2- Write the C code for a given algorithm.
CO3- Write programs that perform operations using derived data types.
CO4- Implement Programs with pointers and arrays, perform pointer arithmetic, and use the pre-processor.
CO5- Understand Opening/Closing a file, Reading from and writing to a file.

Course Learning Outcomes (CLOs)

B.Sc.(Physical Science)2st Semester

Subject: Elementary Electricity, Magnetism & EM-Theory **Subject Code: 24UN-PHY-202**

Course Learning Outcomes (CLO)

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

CLO 1: Learn to explain & differentiate the vector and scalar formalisms of electrostatics, able to apply the Gauss's Divergence & Stokes Theorem to solve the problems in electrostatics.
CLO 2: Describe the magnetic materials & properties of magnetic field also learn about the properties & electronic theories of dia, para & ferromagnetic materials, B-H loop.
CLO 3: Knowledge of Maxwell's Equations their physical significance, boundary conditions, students are able to learn the basic idea about the propagation of electromagnetic waves.
CLO 4: Analysis of Ac, Dc circuits consisting of parallel or series combinations of voltage sources & resistors, also learn about the graphical relation of resistance, capacitor & inductor.
CLO 5: Gain the knowledge to represent the findings, results, analusis & different concepts related to experiments of Electricity & Magnetism.

Course Learning Outcomes (CLOs)

B.Sc.(Physical Science)2nd Semester

Subject: Algebra and Number Theory Subject Code: 24UN-MTH-201

Course Learning Outcomes (CLO)

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

CLO 1. Gain knowledge of the Concepts of symmetric, skew-symmetric, Hermitian, skew-Hermitian, Orthogonal and Unitary matrices, Linear dependence and independence of rows and Columns of a matrix. Have knowledge of procedure and Cognitive skills used in calculating rank of a matrix, Eigen values, characteristic equation, minimal polynomial of a matrix and technical skills used in solving problems based on Cayley- Hamilton theorem.

CLO2. Have knowledge of the Concepts used in solving problems based on relations between the roots and Coefficients of general polynomial equation in one variable, solutions of polynomial equations having Conditions on roots, Common roots and multiple roots. Understand Descarte's rule of signs and learn Cognitive and technical skills required in assessing nature of the roots of an equation and solving problems based on these.

CLO3. Have deeper and procedural knowledge required for solving cubic and biquadratic equations used in Mathematics as well as many other learning fields of study. To understand the basic Concepts of number theory and their applications in problem solving and life- long learning.

CLO4. Have knowledge of Concepts, facts, principles and theories of Linear Congruences, Fermat's theorem, Euler's theorem, Wilson's theorem and its Converse, Chinese Remainder theorem. Attain Cognitive skills used in solving linear Diophantine equations in two variables.

CLO5. Attain Cognitive and technical skills required to formulate and solve practical problems involving rank of a matrix, inverse of a matrix, Cordon's method, Ferrari's method, Descarte's method, Cayley-Hamilton theorem, Euler's theorem and Chinese Remainder theorem. Have technical and practical skills required for solving algebraic equations, finding inverse and Eigen values of matrices by using built in functions of MAXIMA software.

Course Learning Outcomes (CLOs)

B.Sc.(Physical Science)2nd Semester

Subject: Chemistry-II **Subject Code: 20UN-CHE-201**

Course Learning Outcomes (CLO)

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

CLO1: Able to 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 compounds.

CLO6: Understand the preparation, properties and reactions of s and p block elements.

Course Learning Outcomes (CLOs)

B.Sc.(Physical Science)2nd Semester

Subject: Minor Chemistry-II **Subject Code:** 20UN-CHE-203

Course Learning Outcomes (CLO)

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

CLO1: To know the basics of periodic properties and hybridization.
CLO2: To learn about the Ionics solids.
CLO3: Understand about the semiconductors and metallic bonds.
CLO4: Get the knowledge of stereo chemistry of simple organic molecules.

Course Learning Outcomes (CLOs)

B.Sc. (Physical Science) 2stSemester

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

Course Learning Outcomes (CLO)

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

CLO 1- To familiarize the students with the concept of problem solving using algorithm and flowcharts.
CLO 2- To familiarize the students with the concept of problem and debugging.
CLO 3- To make the students familiarize with the basic programming constructs.
CLO 4- To understand various programming methodologies.
CLO 5- To understand the various programming methodologies by implementing these practically.

Course Learning Outcomes (CLOs)

B.Sc. (Physical Science) 2nd Semester

Subject: Web development **Subject Code: 24UN-ICT-201**

Course Learning Outcomes (CLO)

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

CLO 1- Learn the basic of Web development.

CLO 2- Understand different types of web page & websites.

CLO 3- Implement HTML & CSS for web page designing.

CLO 4- Understand the design of web crawlers & search engines.

CLO 5- To implement the programs based on various web development concepts.

Course Learning Outcomes (CLOs)

B.Sc. (Physical Science) 2nd Semester

Subject: Environmental Studies **Subject Code:** 24UN-BOT-VAC101

Course Learning Outcomes (CLO)

After successful completion of the course, the student is expected to:
CLO1: Gain in-depth knowledge on natural processes and resources that sustain life and govern economy.
CLO2: Acquire values and attitudes towards understanding complex environmental economic-social challenges, and active participation in solving current environmental problems and preventing the future ones.
CLO3: Adopt sustainability as a practice in life, society, and industry.
CLO4: Develop critical thinking for shaping strategies (scientific, social, economic, administrative, and legal) for environmental protection, conservation of biodiversity, environmental equity, and sustainable development.
CLO5: Sustainable use of resources.

Course Learning Outcomes (CLOs)

B.Sc.(Physical Science)2nd Semester

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

Course Learning Outcomes (CLO)

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: Distinguish the pros and cons of various government schemes with reference to a particular business venture.
CLO6: Prepare a business plan that can be submitted to investor/lender.
CLO7: Appraise a business project.

Course Learning Outcomes (CLOs)

B.Sc.(Physical Science)3rd Semester

Subject: Thermodynamics & Statistical Physics Subject Code: 24UN-PHY-301

Course Learning Outcomes (CLO)

After successful completion of the course, the student is expected to:
CLO1: Understand and describe the basic concepts and laws of thermodynamics.

CLO2: Apply the laws of thermodynamics to develop Maxwell's thermodynamic relations be able to understand their physical interpretations.

CLO 3: Knowledge of cellular nature of phase space & having better knowledge of classical statistics which would result in greater insight into solutions of various complex problems

CLO 4: Have better understanding of quantum statistics & are in a position to extend the treatment to the analysis of complex problems

CLO 5: Learn to represent the observation, results analysis & different concepts related to experiments of Thermodynamics & Statistical Physics.

Course Learning Outcomes (CLOs)

B.Sc.(Physical Science)3rd Semester

Subject: Chemistry-III **Subject Code:** 20UN-CHE-301

Course Learning Outcomes (CLO)

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 understand about variation of conductance studies with concentration and explain with many phenomenon.

CLO4: The fundamental properties, structures and reactivity of organic compounds such alkene, alkyne arenes, 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.

Course Learning Outcomes (CLOs)

B.Sc.(Physical Science)3rd Semester

Subject: Differential Equations-1 **Subject Code: 24UN-MTH-301**

Course Learning Outcomes (CLO)

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

CLO1. Gain knowledge of the basic Concepts of ordinary differential equations and learn various techniques of finding exact solutions of certain solvable first order differential equations.

CLO2. Have procedural knowledge and Cognitive and technical skills of solving homogeneous and non homogeneous second order linear ordinary differential equations with Constant Coefficients and with variable Coefficients.

CLO 3. Gain knowledge of theory of total differential equations and basic Concepts of partial differential equations. To learn methods and techniques for solving linear PDEs of first order and to acquire technical skills for accomplishing assigned tasks relating to formulation and solution of PDEs in broad multidisciplinary Contexts.

CLO 4. Have knowledge of Concepts and theories of second order PDEs and to apply theory of PDEs to determine integral surfaces through a given curve and to find orthogonal surfaces. To understand Compatible systems and to learn Cognitive and technical skills required for selecting and using relevant Charpit method, Jacobi method methods to assess the appropriateness of approaches for solving PDEs.

CLO5. To attain Cognitive and technical skills required for selecting and using relevant methods and techniques to assess the appropriateness of approaches to solving problems associated with the differential equations. To attain technical skill of solving differential equations by using built in functions of MAXIMA software.

Course Learning Outcomes (CLOs)

B.Sc.(Physical Science)3rd Semester

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

Course Learning Outcomes (CLO)

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

CO1-Gain in depth knowledge about the structures of the operating system, different types of operating system and functions performed by modern operating system.
CO2-Identify and apply knowledge of various software and hardware synchronization tools for solving critical section problem in concurrent processes.
CO3- Understand and apply process management and memory management concepts to solve various hardware and software problems.

Course Learning Outcomes (CLOs)

B.Sc.(Physical Science)3rd Semester

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

Course Learning Outcomes (CLO)

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.

Course Learning Outcomes (CLOs)

B.Sc.(Physical Science)4th Semester

Subject: Waves & Optics **Subject Code:** 24UN-PHY-401

Course Learning Outcomes (CLO)

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

CLO 1: Learn to explain the phenomena of Interference: Division of Wave Front, Division of Amplitude & Interference due to transmitted light & reflected light.
CLO 2: Describe the Huygens-Fresnel's theory, diffraction at a straight edge & at a circular aperture, diffraction due to a narrow slit, narrow wire, understanding of Fraunhoffer diffraction, dispersive power of grating, Rayleigh's criterion & resolving power of telescope & grating.

CLO 3: Knowledge of laws of polarization along with understanding of the production & detection of plane polarized light, circularly polarized light & elliptically polarized light.

CLO 4: Gain the knowledge of the applications of laser in developing LED, Holography, in materials processing, in Medicine, Industry & Military, having the basic ideas of optical fibres their properties & principle of propagation of E-M Waves through Optical Fibres.

CLO 5: Learn to represent the observation, results analysis & different concepts related to experiments of Waves & Optics.

Course Learning Outcomes (CLOs)

B.Sc.(Physical Science)4th Semester

Subject: Analytical Geometry & Vector Calculus **Subject Code: 24UN-MTH-401**

Course Learning Outcomes (CLO)

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

CLO1. Gain knowledge of the Concept of different Conic sections, their classification and properties. Understand various terms related to Conic sections and gain skills to use them in problem solving.

CLO2. Have knowledge of general form of equation of a sphere and attain procedural knowledge required for solving problems related to intersection of spheres, tangent plane and line, orthogonality, length of tangent and Co-axial system of spheres. Learn about equations of Cones and apply knowledge for problem solving.

CLO3. Have deeper knowledge and understanding of cylinder, enveloping cylinder, Concepts of Conicoids, tangent plane, director sphere, normal, envelope and to make further use thereof.

CLO 4. Understand and solve problems related to scalar and vector product of vectors, vector differentiation, directional derivatives, gradient, divergence and curl operators. Have deeper understanding of line, surface and volume integrals, their evaluation, proof of Gauss Divergence, Green's and Stoke's theorems and gain theoretical and technical knowledge in Computing different surface flux integrals, volume integrals and line integrals used in other disciplines also.

CLO5. Attain Cognitive and technical skills required for solving practical problems related to assessing nature of Conicoid, their characteristics. Learn skills to formulate and solve real life practical problems on sphere, Cone and cylinder; to generate solutions of practical problems involving Complex line, surface and volume integral using Gauss Divergence theorem, Stoke's theorem, Green's theorem in a very easy manner.

Course Learning Outcomes (CLO)

B.Sc. (Physical Science) 4th Semester

Subject: Database Management with DBMS **Subject Code: 24UN-ICT-401**

Course Learning Outcomes (CLO)

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

CLO 1- Learn basic concept of Database long with its function and components.
CLO 2- Understand data models.
CLO 3- Understand SQL as a query language & learn the concept of relational algebra & calculus.
CLO 4- Acquire knowledge of advanced concepts of DBMS
CLO 5- Implement the queries based on database management.