B.SC. PHYSICAL SCIENCE

PROGRAMME OUTCOMES

PO1: Learn and interpret the fundamental concepts of chemical bonding, molecular structure, p-block elements and acids and bases.

PO2: Understand how gases behave in diverse conditions through pertinent theories and models and grasp the importance of critical phenomena in phase transitions.

PO3: Analyse how the molecular structure influences reactivity in organic compounds and assess the impact of stereochemistry on the properties and behavior of organic molecules.

PO4: Create and carry out lab tests that explore the practical uses of refractometry, redox titrations and acid-base titrations in daily life.

PO5: Apply the knowledge of organic chemistry principles to prepare and purify organic compounds through crystallization techniques.

PO6: Understand the interactions in non-aqueous solvents and the unique properties of noble gases is crucial for a wide range of industrial, scientific and technological applications.

PO7: Illustrate the distinct laws of thermodynamics and their relevance by elucidating their applications predicting the feasibility, direction, extent of chemical reactions as well as everyday scenarios.

PO8: Demonstrate a comprehensive understanding of the chemistry of hydrocarbons, aromatic compounds and dienes.

PO9: Conduct a variety of titrations, such as redox, acid-base, iodometric and complexometric titrations.

PO10: Demonstrate the ability to set up and calibrate viscometer, stalagmometer and conductometer effectively for viscosity, surface tension and conductance measurements of the given liquids.

PO11: Have thorough understanding of transition element chemistry and effectively apply these concepts in practical scenarios.

PO12: Gain proficiency with alkyl and aryl halide chemistry and electrochemistry.

PO13: Gain the ability to synthesize, separate and characterize compounds using various laboratory and instrumentation techniques.

PO14: Acquire a deep understanding of coordination chemistry, magnetic properties and thermodynamic and kinetic aspects of transition metal complexes.

PO15: Understand and apply the principles of kinetics and chemical equilibrium as well as explore the chemistry of alcohols, phenols and ethers in various contexts.

PO16: Develop a deep understanding of organometallic chemistry, quantum mechanics, carbonyl compounds and synthetic dyes.

PO17: Explore the potential applications of chromatographic, pH metry and adsorption techniques across various scientific disciplines.

PO18: Acquire core competency of photochemistry, statistical thermodynamics, f-Block elements, UV and IR spectroscopy and bioinorganic chemistry.

PO19: Have systematic and coherent understanding of the fundamental concepts in inorganic chemistry, physical chemistry and organic chemistry.

PO20: Interpret analytical data for structure elucidation obtained using NMR, IR, UV, Mass and electronic spectroscopy.

PO21: Learn about the potential uses of electro analytical methods, group theory and symmetry.

PO22: Use the evidence based comparative chemistry approach to explain the chemical synthesis and analysis.

PO23: Demonstrate comprehensive knowledge about chemistry, current research, scholarly and professional literature of advanced learning areas of chemistry.

PO24: Understand new frontiers of knowledge in chemistry for professional development.

PO25: Apply the subject knowledge for solving societal problems related to application of chemistry in day-to-day life.

B.SC. PHYSICAL SCIENCE

1st SEMESTER

MAJOR	Functions and Algebra, Mechanics and Theory of Relativity, Fundamental Chemistry – I
Skill Enhancement Course	Mathematical Programming in C and Numerical Methods, Electrical Circuit & Instrumentation Skills, Role of Chemistry in Society
Ability Enhancement Course	English-I
Value Added Course	Environmental Science
MINOR	Introduction to Statistics, Fundamentals of computing and problem solving using C
Multi Disciplinary Course	Basic Statistics, Basics of Zoology-I, Fundamentals of Computing, Biotechnology for Society

Name of the Course- Functions and Algebra
Course Code- 23MAT501DS01

Course Outcomes-

CO1: Determine the type of matrices and compute the elementary operations on the matrices.

CO2: Compute the Eigen values, Eigen function, characteristic equation and minimal polynomial of a given matrix.

CO3: Use the concept of rank of matrices to solve systems of linear equations.

CO4: Familiar with transformation of equation which is very helpful to find the solution of the given problem.

CO5: Use the Descarte's rule of sign to find the nature of roots.

Name of the Course- Mechanics and Theory of Relativity
Course Code- 24PHYM401DS01

Course Outcomes-

CO1: Understand the dynamics of system of particles, conservation of energy and momentum application of both translational and rotational dynamics motions simultaneously in analysing rolling with slipping

CO2: Differentiate between elastic and plastic body. Elastic constants, determination and their physical significance. Torque and its significance.

CO3: Familiar about the special theory of relativity and its applications. Michelson's Morley experiments and its finding.

Name of the Course- Fundamental Chemistry-I
Course Code- 24CHEM401DS01

Course Outcomes-

CO1: Develop the ability to predict and explain the shapes of simple inorganic molecules and ions using the hybridization, VB and MO theories.

CO2: Demonstrate problem-solving skills related to ionic bonding, including the calculation of percentage ionic character from dipole moment and electronegativity difference.

CO3: Discuss the structure, bonding, and properties of important compounds and complexes of p-block elements.

CO4: Understand the concept of acid-base reactions in aqueous and non-aqueous solvents.

CO5: Derive mathematical expressions for different properties of real and ideal gases and also understand their physical significance.

CO6: Explain the behaviour of real gases and the concept of gas equations.

CO7: Understand and explain the different nature and behavior of organic compounds based on fundamental concepts learnt.

CO8: Understand the fundamental concepts of stereochemistry.

Name of the Course- Mathematical Programming in C and Numerical Methods
Skill Enhancement Course(SEC)
Course Code- 23MAT501SE01

Course Outcomes-

CO1: Develop C programs and execute them.

CO2: Write the C code for a given algorithm.

CO3: Learn conditional statements, logical statements and their programs along with array implementation.

CO4: Use structures effectively in C, including arrays of structures and nested structures.

CO5: Apply numerical methods using C language..

Name of the Course- Electrical Circuit & Instrumentation Skills
Skill Enhancement Course(SEC)
Course Code- 24PHY401SE01

Course Outcomes-

CO1: understand basic physics and applications of CRO

CO2: understand working and usage of digital multimeter, LCR meter, CRO and ac voltammeter

CO3: Appreciate and learn importance of specifications of various measuring instruments

CO4: understand working and operational aspects of Signal Generators

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Name of the Course- Role of Chemistry in Society
Skill Enhancement Course(SEC)
Course Code- 24CHE401SE01

Course Outcomes-

CO1: Demonstrate proficiency in analysing soil and water samples, including pH measurement and estimation of ions.

CO2: Handle analytical data.

CO3: Learn basic of cosmetics, various cosmetic formulation, ingredients and their roles in cosmetic products.

CO4: Learn the use of safe, economic and body-friendly cosmetics.

CO5: Gain knowledge of pesticides and their synthesis methods.

CO6: Learn about the basic role of pesticide in everyday life, various ingredients and their role in controlling the pest.

CO7: Introduce various measurement techniques used in different experiments including techniques for measuring pH, conductivity and electrode potential.

CO8: Understand the concept of buffer solutions, their actions and measurement of their pH values.

Name of the Course- Environmental Science
Value Added Course(VAC)
Course Code- 23EVSX01VA01

Course Outcomes-

CO1: Gain in-depth knowledge on natural processes and resources that sustain life and govern economy.

CO2: Understand the consequences of human actions on the web of life, global economy, and quality of human life.

CO3: Develop critical thinking for shaping strategies (scientific, social, economic, administrative, and legal) for environmental protection, conservation of biodiversity, environmental equity, and sustainable development.

CO4: Acquire values and attitudes towards understanding complex environmental economic- social challenges, and active participation in solving current environmental problems and preventing the future ones.

CO5: Adopt sustainability as a practice in life, society, and industry.

Name of the Course- English-I
Ability Enhancement Courses(AEC)
Course Code- 23ENGX01AE01

Course Outcomes-

CO1: To introduce basic concepts of phonetics and train them to transcribe speech sounds using the symbols given in OALD (Oxford Advanced Learner's Dictionary).

CO2: To enable students understand basic grammar and vocabulary so that they can use it for their everyday communication.

CO3: To build elementary level Reading skills of the students to enable them to read and speak sentences frequently .

MINOR SUBJECTS IN B.SC. PHYSICAL SCIENCE

(1st Semester)

Name of the Course- Introduction to Statistics
Course Code- 24STA401MI01

Course Outcomes-

CO1: Students Acquired the Knowledge of Statistics and Importance in Various Areas

CO2: Students Acquired the Knowledge to Represent Data in Tables and Graphs

CO3: Students Acquired the Knowledge of Various Types of Data, Measures of Central Tendency and Dispersion

CO4: Students Acquired the Knowledge of Correlation, Regression Diagnostics, Partial and Multiple Correlations

CO5: Students Acquired the Knowledge of Independence and Association between Two Attributes

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Name of the Course- Fundamentals of Computing & Problem Solving using C
Course Code- 24CSC401MI01

Course Outcomes-

CO1: Gain knowledge of essential computing concepts and its applications in various fields.

CO2: Develop proficiency in writing, debugging, and executing C programs to efficiently solve computational problems.

CO3: Demonstrate an understanding of data types, control structures, functions, arrays, and pointers.

CO4: Cultivate problem-solving skills through algorithmic thinking and programming techniques in C.

CO5: Apply modular programming principles to effectively organize and structure code for improved maintainability, scalability, and code reuse in C programming projects.

MDC SUBJECTS IN B.SC. PHYSICAL SCIENCE

1st Semester

Name of the Course- Basics of Zoology-I
Course Code- 24ZOOX01MD01

Course Outcomes-

CO1: Student will be able to learn about Kingdom Animalia

CO2: Student will be able to learn about Chordates

CO3: Student will be able to describe unique characters and recognize life functions of phylum Annelida and Arthropoda

CO4: Student will be able to describe unique characters and recognize life functions of phylum Mollusca, CO1: Echinodermata and Hemichordates

CO5: Students will be capable understand the role of non chordates in their surroundings

Name of the Course- Basic Statistics
Course Code- 24STAX01MD01

Course Outcomes-

CO1: Students acquainted with Knowledge of Statistics and It's Importance.

CO2: Students acquainted with Knowledge of Various Types of Data, Measures of Central Tendency and Dispersion

CO3: Students acquainted with Knowledge about the Graphical Presentation of Data.

CO4: Students acquainted with Knowledge about the Graphical Presentation of Data.

CO5: Students acquainted with Knowledge of the Concepts of Regression Analysis.

Name of the Course- Fundamentals of Computing
Course Code- 24CSCX01MD01

Course Outcomes-

CO1: Learn the fundamental concepts of Computers and understand various input and output devices.

CO2: Understand the concept of memory and its types.

CO3: Learn about the role of operating system and its functions.

CO4. Understand the concept of data communication, networking and Internet.
CO5: Know about E-Mail and the concepts related to Business data processing

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Name of the Course- Biotechnology for Society
Course Code- 24CBTX01MD01

Course Outcomes-

CO1: Provide students with a foundational understanding of biotechnology, and its historical development.

CO2: Provide students with the significance of biotechnology in various fields such as medicine, agriculture, and the environment

CO3: Provide students with the significance and relevance of biotechnology in daily life.

CO4: Exploration of public perceptions of biotechnology and the challenges of communicating complex scientific concepts to the general public.

B.SC. PHYSICAL SCIENCE

2nd SEMESTER

MAJOR	Fundamental Chemistry – II, Electricity and Magnetism, Calculus
Skill Enhancement Course	Fuel Chemistry, Computational Techniques in Physics, Numerical Analysis
Value Added Course	Digital and Technological Solutions
Multi-disciplinary Course	Statistics in Everyday Life
MINOR	Elementary Probability Theory

Name of the Course- Fundamental Chemistry – II
Course Code- 24CHEM402DS01

Course Outcomes-

CO1: Understand the basic characteristics and reactions in non-aqueous solvents.

CO2: Learn about the structure of noble gases, their properties and discuss their use in daily life as well as industrial applications.

CO3: Derive the expressions of various thermodynamic potentials for ideal and real gases under different conditions.

CO4: Understand the concept of entropy and change in entropy by changing different thermodynamic variables.

CO5: Understand basic chemistry of alkanes and alkenes and alkynes.

CO6: Describe the structure of alkenes, including the concept of cis-trans isomerism and geometric isomerism.

CO7: Define and explain the concept of aromaticity and apply Huckel's rule to determine the aromatic character of various compounds.

CO6: Learn and identify many organic reaction mechanisms including free radical substitution, electrophilic addition and electrophilic aromatic substitution.

Name of the Course- Electricity and Magnetism
Course Code- 24PHY402DS01

Course Outcomes-

CO1: Develop an understanding of the basic concepts of electricity and magnetism; including electric and magnetic fields and their effects on matter.

CO2: Demonstrate the ability to successfully apply a conceptual understanding to specific problems in electricity and magnetism.

CO3: Apply problem-solving strategies to problems electricity and magnetism

CO4: Demonstrate the ability to perform mathematical analyses of problems in electricity and magnetism

CO5: Understand and communicate the role electricity and magnetism play daily life and in commonly used technologies.

Name of the Course- Calculus
Course Code- 24MATM402DS01

Course Outcomes-

CO1: Understand the method of successive differentiation and Taylor series expansions.

CO2: Be familiar with concepts of asymptotes, curvature and singular points.

CO3: Apply the concepts of calculus for tracing and rectification of the curves in cartesian, parametric and polar coordinates.

CO4: Understand the concepts of functions of several variables, their continuity and various properties.

Name of the Course- Fuel Chemistry
SKILL ENHANCEMENT COURSE
Course Code- 24CHE402SE01

Course Outcomes-

CO1: Define what constitutes a fuel and differentiate between different types of fuels.

CO2: Understand the fundamental principles of fuel chemistry.

CO3: Familiar with the processes involved in the production and refining of various fuels, including extraction, distillation, cracking, and blending.

CO4: Apply thermodynamic principles to analyse combustion processes including calculating enthalpy changes, heat of combustion, and efficiency of combustion systems.

CO5: Learn about the chemical composition, physical properties and characteristics of various fuels.

CO6: Understand the importance of fuel quality standards and regulations.

CO7: Determine safety protocols for handling, storing and transporting fuels.

Name of the Course- Computational Techniques in Physics
SKILL ENHANCEMENT COURSE
Course Code- 24PHY402SE01

Course Outcomes-

CO1: Understand the programming language and their use in various applications

CO2: Solve difficult integrals using numerical methods

CO3: Fit experimental data to different types of curves and interpolate the data

CO4: Students would be able to design Fortran/Python programs to solve numerical computationally.

Name of the Course- Numerical Analysis
SKILL ENHANCEMENT COURSE
Course Code- 24MAT402SE01

Course Outcomes-

CO1: Learn about interpolation with equal and unequal intervals.

CO2: Apply forward, backward, central and divided difference formulae for interpolation.

CO3: Apply standard probability distributions to the concerned problems.

CO4: Understand the method of numerical differentiation and various methods for finding solution of eigen value problems..

CO5: Know how to solve integration and ordinary differential equation using numerical data

Name of the Course- Digital and Technological Solutions
Value Added Course(VAC)
Course Code- 23CSAX01VA01

Course Outcomes-

CO1: Knowledge about digital paradigm.

CO2: Realization of importance of digital technology, digital financial tools, e-commerce.

CO3: Know-how of communication and networks.

CO4: Familiarity with the e-governance and Digital India initiatives

CO5: An understanding of use & applications of digital technology.

CO6: Basic knowledge of all machine learning and big data

MDC SUBJECT IN B.SC. PHYSICAL SCIENCE

2nd SEMESTER

Name of the Course- Statistics in Everyday Life
Course Code- 24STAX02MD01

Course Outcomes-
CO1:Students will achieve Knowledge of Various Types of Data.
CO2:Students will achieve Computational Skill for Identifying Random Variables and It's Applications
CO3:Students will achieve Knowledge about the Measures of Central Tendency and Dispersion.
CO4:Students will achieve The Skill to Use Probability Distributions in Everyday Life.
CO5:Students will achieve The Knowledge About the Techniques to Test the Hypothesis Based on Real Life Phenomena.

MINOR SUBJECT IN B.SC. PHYSICAL SCIENCE

2nd SEMESTER

Name of the Course- Elementary Probability Theory
Course Code- 24STA402MI01

Course Outcomes-
CO1: Students Acquainted with the Basic Concepts of Probability Theory
CO2: Students Acquainted with the Methods to Determine Probabilities of Occurring of the Events in Random Experiments
CO3: Students Acquainted with Idea of Random Variables and the Concept of Expectation
CO4: Students Acquainted with the Knowledge about Probability Mass Function and Density Function
CO5: Students Acquainted with the Knowledge to Understand Probability Distributions and It's Applications.