**BACHELOR OF SCIENCE (PHYSICS)**

**SEMESTER – I**

**CORE COURSE - I: PROPERTIES OF MATTER AND ACOUSTICS (21UPH01)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Students understand the behaviour and properties of solids and fluids.

**CO2:** Students will be able to acquire knowledge about viscosity and lubrication.

**CO3:** Students will have a strong knowledge of surface tension.

**CO4:** Students will get an overview of the fundamental principles of waves and oscillations.

**CO5:** To study and apply the knowledge of acoustic aspects of halls and auditoriums and understand ultrasonics and its application in various fields.

**ALLIED COURSE: MATHEMATICS, –I:  (21UMAA01)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Know the application of relations between the roots and coefficients of an equation and diminishing the roots of an equation.

**CO2:** Ability to solve the consistency of linear equations and application of the Cayley-Hamilton theorem.

**CO3:** Understanding the concepts of Cartesian coordinates, parametric coordinates, and polar coordinates

**CO4:** Understand the basic properties of PDE.

**CO5:** Gain the skill to solve problems.

**ENGLISH:    PROFESSIONAL ENGLISH-1  (21UPEN01)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Recognise their own ability to improve their own competence in using the language.

**CO2:** Use language to speak with confidence in an intelligible and acceptable manner.

**CO3:** Understand the importance of reading for life.

**CO4:** Read independently unfamiliar texts with comprehension.

**CO5:** Understand the importance of writing in academic life.

**SEMESTER-II**

**CORE COURSE -II :  MECHANICS(21UPH02)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Relative motion. Inertial and non-inertial reference frames

**CO2:** Parameters defining the motion of mechanical systems and their degrees of freedom

**CO3:** Study of the interaction of forces between solids in mechanical systems

**CO4:** centre of mass and inertia tensor of mechanical systems

**CO5:** Application of the vector theorems of mechanics

**PROFESSIONAL ENGLISH II  (21UPEN02)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Attend interviews with boldness and confidence.

**CO2:** Adapt easily into the workplace context, having become communicatively competent.

**CO3:** Apply to the research and development organisations or sections of companies and offices winning proposals.

**CO4:** Develop their competence in the use of English, with particular reference to the workplace situation.

**CO5:** Enhance the creativity of the students; enable them to think of innovative ways to solve issues in the workplace.

**ALLIED COURSE: ALLIED MATHEMATICS -11(21UMAA02)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Understanding the concepts of maxima and minima

**CO2:** Developing knowledge in numerical methods for problem solving.

**CO3:** Understanding second-order differential equations with constant coefficients

**CO4:** Understand the basic properties of Laplace transforms.

**CO5:** Solving the simple problems of inverse Laplace and its applications

**CORE COURSE: CORE PRACTICAL – I    (21UPHP01)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Apply knowledge of mathematics and physics fundamentals and instrumentation to arrive.

**CO2:** A solution for various problems

**CO3:** Understand the usage of basic laws and theories to determine the various properties of the materials given.

**CO4:** Understand the application side of the experiments.

**CO5:** Understand the elasticity of the given beam.

**ALLIED PRACTICAL –I  : ALLIED MATHEMATICS   (21UMAAP01)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Gain the skill to solve the problems in matrices.

**CO2:** Gain knowledge to solve the problems of partial differentiation.

**CO3:** Gain knowledge on the concepts of divergence, curl, and integration of vector point functions.

**CO4:** Acquire knowledge about matrices and the Cayley-Hamilton theorem.

**CO5:** Understand the concepts of differentiation and vector point functions.

**SEMESTER –III**

**CORE COURSE –III**: **THERMAL AND STATISTICAL PHYSICS (21UPH03)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** The course makes the students able to understand the basic physics of heat and temperature and their relation to energy, work, radiation, and matter.

**CO2:** The students also learn how the laws of thermodynamics are used in a heat engine to transform heat into work. The course contains the study of the laws of thermodynamics.

**CO3:** Thermodynamic description of systems, thermodynamic potentials, kinetic theory of gases, theory of radiation, and statistical mechanics

**CO4:** To acquire knowledge in heat transfer, entropy, production of low-temperature and liquefaction gases, thermal radiation, and statistical thermodynamics.

**CO5:** The course also covers efficiency and working for the petrol and diesel engines.

**ALLIED COURSE –III:  ALLIED CHEMISTRY (21UCHAA01)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:**To know the types of bonding—ionic bond, covalent bond, and coordinate bond molecular orbital theory—bonding, antibonding, and nonbonding orbitals.

**CO2:** Gain knowledge of m.o. diagrams of hydrogen, helium, and nitrogen; discussion of bond order and magnetic properties of natural radioactivity-radioactive series, including neptunium series-group displacement law.

**CO3:** Gain knowledge of nuclear binding energy and mass defect calculations. Covalent bond-orbital overlap-hybridization: geometry of organic molecules methane, ethylene and acetylene electron displacement effects

**CO4:** To know the aromatic compounds-aromaticity-huckel's rule 4.2 electrophilic substitution in benzene-mechanism of nitration, halogenation-alkylation.

**CO5:** Preparation, properties, and uses of poly olefins: polythene, puffer, freons, pvc, polypropylene, and polystyrene.

**SBEC -COURSE -1: CARRIER COMPETENCY SKILLS- I (21UPHS01)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** To impart knowledge on preparing a resume and group discussion.

**CO2:** To develop personality traits and interview skills.

**CO3:** Obtain knowledge of resume formats.

**CO4:** Know how to lead a group.

**CO5:** Know how to face an interview.

**SEMESTER -IV**

**CORE COURSE -IV: OPTICS AND SPECTROSCOPY (21UPH04)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Understand the natural behaviour of aberration in lenses.

**CO2:** Study the theory and experiment with interference using an air wedge, Newton’s rings, and a Michelson interferometer.

**CO3:** Study the theory and experimental past of diffraction by Fresnel and Fraunhofer methods.

**CO4:** Study the theories for the production of the polarisation of light.

**CO5:** Understand the theory and application of microwave, infrared, and Raman spectroscopy.

**ALLIED COURSE –IV: ALLIED CHEMISTRY (21UCHA02)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** To know Sedgwick’s theory-effective atomic number concept, Pauling’s theory postulates application to octahedral, square planar, and tetrahedral complexes.

**CO2:** Gain knowledge about carbohydrates: classification, preparation, and properties of glucose, fructose, starch, cellulose, and derivatives of cellulose.

**CO3:** To know the interconversion of glucose to fructose and vice versa. Chemotherapy: preparation, uses, and mode of action of sulfa drugs (prontosil, sulphadiazine, and sulphafurazole)

**CO4:** To know photochemistry: grotthus-draper law and stark-einstien’s law of photochemical equivalence

**CO5:** Gain knowledge about kohlrausch law—measurement of conductance, ph determination.

**SBEC -COURSE –II: CARRIER COMPETENCY SKILL II  (21UPHS02)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** To motivate undergraduate students of physics to develop their aptitude and reasoning skills for competitive examinations.

**CO2:** Obtain knowledge on shortcuts to calculate number series.

**CO3:** Understand the core concepts of permutations and combinations.

**CO4:** Carry out mathematical calculations using shortcuts.

**CO5:** Perform new methods for aptitude calculations.

**CORE PRACTICAL-II: PHYSICS PRACTICAL (21UPHP02)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Develop their competence in the use of English with particular reference to the workplace situation.

**CO2:** Enhance the creativity of the students, which will enable them to think of innovative ways to solve issues in the workplace.

**CO3:** To understand and apply the principle of physics by doing related experiments in properties of matter.

**CO4:** To know the properties of optics, electricity, electromagnetism, and basic electronics.

**CO5:** To gain knowledge about the practical course.

**ALLIED PRACTICAL –II ALLIED CHEMISTRY I (21UCHAP01)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Impart first-hand knowledge and experience on the estimation of an ion, acid, and base.

**CO2:** Provide the student with knowledge on the analysis of an unknown organic substance using preliminary and confirmation tests.

**CO3:** Make the student skilled enough and prepare for a position in an analytical laboratory or a company.

**CO4:** Estimate the amount of ion present in the given solution through volumetric analysis.

**CO5:** Find the groups, elements, and characters present in the given organic substance through qualitative analysis.

**SEMESTER-V**

**CORE COURSE - V: ELECTRICITY AND MAGNETISM (21UPH05)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Recognise basic terms in electricity and magnetism.

**CO2:** Understand the laws of electrostatics and magnetostatics.

**CO3:** Apply theorems to construct and solve electrical circuits.

**CO4:** Ability to design and conduct experiments as well as to analyse and interpret data

**CO5:** Build up strong problem-solving skills by effectively formulating a circuit problem into a mathematical problem using circuit laws and theorems.

**CORE COURSE - VI SOLID STATE PHYSICS   (21UPH06)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Outline the importance of solid-state physics in modern society.

**CO2:** Explore the relationships between chemical bonding and crystal structure and their defects.

**CO3:** Understand the basic properties of metals, insulators, and semiconductors and their technological applications.

**CO4:** Extend their knowledge of the theoretical fundamentals of electron theory and superconductivity.

**CO5:** To gain knowledge about crystals and their properties.

**CORE COURSE – VII ANALOG AND DIGITAL ELECTRONICS (21UPH07)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Understand the implications of the characteristics of special diodes.

**CO2:** Understand the implications of the characteristics of transistors.

**CO3:** Gain knowledge on feet, mosfet, ujt, and scr.

**CO4:** Know the operating characteristics of a transistor amplifier.

**CO5:** Gain an understanding of multivibrators, operational amplifiers, and their applications.

**ELECTIVE COURSE –I: MATERIAL SCIENCE (21UPHE01)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** It deals with the testing methods to know their properties for suitable applications.

**CO2:** Understand the mechanical properties of materials.

**CO3: Familiarise yourself** with its optical properties.

**CO4:** Understand the basics of nonlinear optics.

**CO5:** Explore the knowledge of modern engineering materials.

**SBEC COURSE   –III: COMPUTATIONAL METHOD AND PROGRAMMING C  (21UPHS03)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Will provide the basics of the C programming language.

**CO2:** The student will be acquainted with the importance of errors in computing.

**CO3:** The student will understand the various types of errors and their propagation in computing.

**CO4:** Will acquire knowledge of iterative techniques for a nonlinear function.

**CO5:** Get exposure to the basics of the C programming language.

**SBEC-COURSE –IV INSTRUMENTATION (21UPHS04)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** To provide a good foundation in measurements.

**CO2:** To inspire interest in the knowledge of concepts regarding measurements.

**CO3:** Acquire knowledge of the characteristics of an instrumentation system.

**CO4:** Understand the functions of electrical, digital, medical, and pollution monitoring instruments.

**CO5:** Know the various applications of the instruments.

**SEMESTER-VI**

**CORE COURSE –VIII ATOMIC PHYSICS (21UPH08)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Acquire knowledge of the fundamental physics underpinning atomic and nuclear physics.

**CO2:** Understand the concepts and potential applications of atomic and nuclear physics.

**CO3:** Apply general considerations of quantum physics to atomic and nuclear systems.

**CO4:** Analyse production and decay reactions for fundamental particles.

**CO5:** Expand and evaluate the theoretical predictions for nuclear reactions.

**CORE COURSE-IX: NUCLEAR PHYSICS (21UPH09)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Understand the properties of x-ray verification.

**CO2:** Analyse the basics of the nucleus and their energy.

**CO3:** Perform the procedures for nuclear fission and fusion. In this course, students will learn about the general properties of nuclei, nuclear forces and detectors, radioactive decay, and nuclear reactions.

**CO4:** The course expands the knowledge of students, especially about the various applications of nuclear physics. The course builds a foundation for the students to carry out research in the fields of nuclear physics, high-energy physics, nuclear astrophysics, nuclear reactions, and applied nuclear physics.

**CO5:** Analyse the relationship between various types of couplings.

**CORE COURSE –X** **QUANTUM MECHANICS AND RELATIVITY (21UPH10)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Recognise basic terms in quantum mechanics.

**CO2:** Understand the basic principles of quantum particles.

**CO3: Apply the** basics to construct and solve one particle equation.

**CO4:** Ability to design and construct particle equations in the free and bound states as well as to analyse and interpret the results.

**CO5:** To understand the fundamentals and concepts of operator formalism.

**ELECTIVE COURSE –II: ELECTRONICS COMMUNICATIONS (21UPHE03)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Design system components that meet the requirements of public safety and offer solutions.

Apply research-based knowledge to design and conduct experiments, analyse, and synthesise.

**CO2:** Interpret the data pertaining to electronics and arrive at valid conclusions.

**CO3:** Construct, choose, and apply the techniques, resources, and modern tools required for electronics applications.

**CO4:** Examine the impact of electronics solutions in global and environmental contexts and utilise the knowledge for sustained development.

**CO5:** Develop consciousness of professional, ethical, and social responsibilities as experts in the field of electronics.

**SBEC - COURSE –V: HARDWARE SKILLS (21UP HS05)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Setup and configure a new computer.

**CO2:** Given a scenario, select the appropriate components for a custom PC configuration to meet customer specifications or needs. Install or upgrade the operating system.

**CO3:** Install, configure, and manage common peripheral devices and multifunction devices/printers.

**CO4:** Troubleshoot common problems related to internal components.

**CO5:** such as motherboards, RAM, CPUs, and power with appropriate tools.

**SBEC-COURSE-VI: MICROPROCESSOR AND ITS APPLICATION (21UPHS06)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Basic ideas on microprocessors, memory, and I/O devices

**CO2:** Be familiar with the basic concepts of microprocessor architecture and interfacing.

**CO3:** To impart skills in the programming instruction sets of microprocessors.

**CO4:** Apply the programming instructions to perform simple programmes using microprocessors.

**CO5:** Finding solutions for real-time applications

**CORE PRACTICAL –III: PHYSICS PRACTICAL (21UPHP03)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Understand basic laws and theories involving diodes, transistors, solar cells, etc.,

**CO2:** Understand the given concepts and their physical significance.

**CO3:** Apply the theory to design the basic electrical circuits.

**CO4:** Use these basic circuits to create amplifier circuits, oscillator circuits, regulated power supplies, etc.

**CO5:** The concepts that are learned in the lecture sessions will be translated to the laboratory sessions, thus providing a hands-on learning experience to design the circuits.

**CORE PRACTICAL –IV:  PHYSICS PRACTICAL (21UPHP04)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Define the primary functions of 8085 alp and the basic principles of C programming.

**CO2:** Understand the theoretical concepts and their physical significance.

**CO3:** Apply the theory to find the solutions to practical problems.

**CO4:** Analyse the problem studied through analytical calculation.

**CO5:** Acquire problem-solving skills and create more problems based on physical concepts.