

<b>Programme Outcomes</b>	
At the end of the programme, student will be able to	
1	Acquire in-depth knowledge of fundamental principles and theories in physics, enabling the comprehension of natural phenomena.
2	Develop logical reasoning and the ability to approach problems systematically by applying physical concepts and mathematical methods.
3	Gain proficiency in designing and conducting experiments, as well as analyzing and interpreting data to validate physical theories.
4	Understand and use modern tools and techniques in physics, including computational methods and laboratory instrumentation.
5	Explore the interface of physics with other sciences, engineering, and technology to understand its relevance in multidisciplinary fields.
6	Build effective scientific communication skills for presenting ideas and findings through reports, presentations, and collaborative discussions.

<b>Programme Specific Outcomes</b>	
At the end of the programme, student will be able to	
1	Develop a strong understanding of fundamental physics concepts such as mechanics, electromagnetism, thermodynamics, optics, and quantum mechanics.
2	Enhance abilities to analyze physical problems and solve them using mathematical and computational tools.
3	Gain hands-on experience with laboratory experiments, instruments, and techniques essential for studying physical phenomena.
4	Cultivate a research-oriented mindset to explore advanced topics and contribute to innovative scientific developments.
5	Learn to apply physics principles to interdisciplinary fields such as material science, electronics, environmental science, and computational physics.
6	Become proficient in the use of modern tools and software for simulations, modeling, and data analysis.

<b>Course Outcomes</b>		
<b>Subject: Sociology</b>		
<b>BA: SEMESTER- I, III, V</b>		
<b>Class &amp; Paper</b>	<b>Course code &amp; course title</b>	At the end of the course, student will be able to
B.Sc. I Paper - I	SPHYCT1101: Fundamentals of Physics I	Students will be able to understand the fundamental nature of Physics.
		Students will be enabled to handle different types of problems and other advanced courses in Physics and Chemistry.
B.Sc. I SEC	SPHYSC1101 (Skill): Computational Physics	This course being pre requisite for many advance courses hence students will be able to learn hand on experiments, program designing.
		Students will be made aware with computer systems and its functioning.
B.Sc. I GE	SPHYGE1101 (Elective): Renewable Energy	After completing this course, the students will gain knowledge of various non-conventional energy sources.
		Students will be able to understand use of renewable energy sources in day to life.
		Hand on experiments will provide them an expertise to resolve the basic issues of functioning of renewable energy source.

		Students will be trained to harvest non-conventional energy sources and design their own gadgets to convert and use them for their household purposes.
B.Sc. I	SPHYCP1101: Practical- I (based on Fundamentals of Physics I)	Students will be able to understand different concepts and principles of Physical instrumentations. Student will learn about validity of concepts by doing the experiment.
B.Sc. II	SPHYCT1201 (Major-1): Mathematical Methods and Applications in Electricity and Magnetism - I	<p>Implementation of impedance and reactance of the ac circuit as a complex quantity.</p> <p>Utilization of concepts of complex algebra to solve the problems related to AC circuits.</p> <p>Implementation of different electric and magnetic entities as scalars and vectors.</p> <p>Utilization of concepts (grad, div. and curl) of vector analysis to resolve the laws of electrostatics and Magnetostatics.</p> <p>Utilization of grad, div and curl to derive the mathematical expressions of the applications of the laws of electrostatics and Magnetostatics.</p>
B.Sc. II	SPHYCT1202 (Major-2): Waves and Oscillations	<p>Understands the transfer of energy by means of progression of mechanical vibrations.</p> <p>Utilization of concepts of transverse waves along the string to understand the working of string instruments.</p> <p>Implementation of the knowledge of reverberation time and absorption coefficient in designing of the acoustically good auditoriums and halls.</p> <p>Utilization of concepts of ultrasonics in different applications such as SONAR.</p> <p>Knows the production ultrasonics with controlled frequency.</p>
B.Sc. II	SPHYCP1203 (Major-3): Practical-1	<p>Students will be able to understand different concepts and principles of Physical instrumentations.</p> <p>Student will learn about validity of concepts by doing the experiment.</p>
B.Sc. II	SPHYCP1204 (Major-4): Practical-2	<p>Students will be able to understand different concepts and principles of Physical instrumentations.</p> <p>Student will learn about validity of concepts by doing the experiment.</p>
B.Sc. II	SPHYMT1201 (Minor-1): General Properties of Matters	<p>Students will be able to understand the fundamental nature of Physics.</p> <p>Students will be enabled to handle different types of problems and other advanced courses in Physics and Chemistry.</p>
B.Sc. II	SPHYMP1201 (Minor-2): Practical	<p>Students will be able to understand different concepts and principles of Physical instrumentations.</p> <p>Student will learn about validity of concepts by doing the experiment.</p>
B.Sc. II	SPHYGE1201: Physics in Daily Life- I	<p>To calculate the length of objects in different system of units. To demonstrate the use of friction in daily life.</p> <p>To evaluate temperature in Celsius, kelvin and Fahrenheit scales.</p> <p>To acquire the knowledge of the working of various household equipment.</p> <p>To gain a systematic and coherent understanding of the basic concept of electricity, sound and light system.</p>
B.Sc. II	SPHYVSC1201 (Vocational): Domestic Wiring	<p>After completing this course, the students will gain knowledge of various electrical gadget installations at domestic levels. Students will be able to understand wiring systems and electrical connections of different phases at house hold appliances.</p> <p>Hand on experiments will provide them an expertise for electrical installations, maintenance and wiring repairs. Students will be trained</p>

		<p>to take assignments of domestic electrical wirings and thereby it may generate the employment for them.</p>
B.Sc. II	Quantum Mechanics	<p>1. Fundamental Understanding Explain the fundamental principles of quantum mechanics, including wave-particle duality, the uncertainty principle, and the quantization of physical quantities.</p> <p>2. Schrödinger Equation Solve the time-dependent and time-independent Schrödinger equations for various potential problems (e.g., particle in a box, harmonic oscillator, hydrogen atom).</p> <p>3. Quantum States and Operators Analyze quantum states using Bra-Ket notation and understand the role of operators in representing physical observables.</p> <p>4. Wave Function Interpretation Interpret the physical significance of wave functions and probability densities in describing quantum systems.</p>
B.Sc. III Paper- XIII	Solid State Physics	<p>1. Crystal Structure and Bonding Understand crystal structures, types of crystal bonding, and their implications for material properties. Analyze X-ray diffraction patterns to determine crystal structures.</p> <p>2. Lattice Vibrations and Phonons Explain the concepts of lattice vibrations and their role in thermal properties of solids such as heat capacity and thermal conductivity. Apply the Debye and Einstein models to describe specific heat.</p> <p>3. Electronic Properties of Solids Understand the behavior of electrons in solids using free electron and band theories. Differentiate between conductors, semiconductors, and insulators based on band structure.</p> <p>4. Semiconductor Physics Explain intrinsic and extrinsic semiconductors, carrier generation, and recombination.</p>
B.Sc. III SEC III	Electrical Circuit Analysis Skill	<p>1. Understand Basic Concepts Explain the fundamental concepts of electric circuits such as current, voltage, power, energy, and resistance.</p> <p>2. Apply Ohm's and Kirchhoff's Laws Apply Ohm's law, Kirchhoff's Current Law (KCL), and Kirchhoff's Voltage Law (KVL) to analyze DC and AC circuits.</p> <p>3. Analyze Series and Parallel Circuits Analyze resistive, capacitive, and inductive circuits in series, parallel, and series-parallel configurations.</p> <p>4. Understand Network Theorems Use circuit theorems like Thevenin's, Norton's, Superposition, and Maximum Power Transfer theorem to simplify and solve circuits.</p>
B.Sc. III P-XVI	Practical based on theory courses (P-XII)	

B.Sc. III P-XVII	Practical based on elective course P-XIII	
<b>B.Sc.: SEMESTER- II, IV, VI</b>		
<b>Class &amp; Paper</b>	<b>Course code &amp; course title</b>	<b>At the end of the course, student will be able to</b>
B.Sc. I	SPHYCT1151: Fundamentals of Physics II	Students will be able to understand the fundamental nature of Physics. Students will be enabled to handle different types of problems and other advanced courses in Physics.
B.Sc. I SEC	SPHYSC1151 (Skill): Electrical Measurements	After completing this course, the students will gain knowledge of various electrical gadget installations at domestic levels. Students will be able to understand wiring systems and electrical connections of different phases at house hold appliances. Hand on experiments will provide them an expertise for electrical installations, maintenance and wiring repairs.
B.Sc. I GE	SPHYGE1151 (Elective): Wonders in the Sky	Identify the objects visible to the unaided eye in the night sky eclipse Explain the phenomenon like seasons on earth, solar and lunar eclipse Compare and contrast the terrestrial planets and the Jovian planets Explain the dynamics of planet in solar system, use the orbital properties to estimate mass of the sun
B.Sc. I	SPHYCP1151: Practical- II (based on Fundamentals of Physics II)	Students will be able to understand different concepts and principles of Physical instrumentations. Student will learn about validity of concepts by doing the experiment.
B.Sc. II	SPHYCT1251 (Major-05): Mathematical Methods and Applications in Electricity and Magnetism - II	To use advanced mathematical methods and theories on various mathematical and physics problems. To develop the skill of problem-solving ability. To understand electromagnetic theory with Vector Calculus.
B.Sc. II	SPHYCT1252 (Major-06): Optics and LASER	To better understanding of optics and Laser's phenomena in daily life. To develop the skill of problem-solving ability. To study the characteristics and uses of lasers. To study the fundamental physics behind Interference
B.Sc. II	SPHYCP1253 (Major-7): Practical-3	Students will be able to understand different concepts and principles of Physical instrumentations. Student will learn about validity of concepts by doing the experiment.
B.Sc. II	SPHYCP1254 (Major-8): Practical-4	Students will be able to understand different concepts and principles of Physical instrumentations. Student will learn about validity of concepts by doing the experiment.
B.Sc. II	SPHYMT1251 (Minor-3): Physics for Chemist and Biologist	Define and explain the laws of physics and chemistry. Apply the principles of optics to the biological instruments. Understand the basics of light propagation and light reflection. Apply the principles of thermodynamics to biological systems.
B.Sc. II	SPHYMP1252 (Minor-4): Practical	Students will be able to understand different concepts and principles of Physical instrumentations. Student will learn about validity of concepts by doing the experiment.

B.Sc. II	SPHYGE1251: Physics in Daily Life-II	To facilitate the students to achieve a clear conceptual understanding of technical aspects of Physics in daily life. Discuss how changes in pressure, temperature, and density affect atmospheric properties and behavior.
B.Sc. II SEC	SPHYVSC1251 (Vocational): Home appliances	After completing this course, the students will gain knowledge of various electrical gadget installations at domestic levels. Students will be able to understand wiring systems and electrical connections of different house hold appliances. Hand on experiments will provide them an expertise for electrical installations, maintenance and wiring repairs.
B.Sc. III Paper-XIV	Atomic, Molecular & Nuclear Physics	<p>1. Atomic Structure and Spectra Understand the quantum mechanical description of atomic structure, including electron configurations and energy levels. Analyze atomic spectra and the transitions leading to spectral lines using selection rules.</p> <p>2. Spin and Fine Structure Explain the concepts of electron spin, fine structure splitting, and the influence of spin-orbit coupling on atomic spectra.</p> <p>3. Zeeman and Stark Effects Understand the Zeeman and Stark effects and their applications in splitting spectral lines in magnetic and electric fields.</p> <p>4. Molecular Structure and Bonding Describe molecular bonding using quantum mechanical models, including covalent and ionic bonding. Apply the Born-Oppenheimer approximation to molecular systems.</p>
B.Sc. III Paper-XV	Digital and Communication Electronics	<p>1. Understand Communication Systems Describe the basic elements and types of communication systems: analog, digital, wired, and wireless.</p> <p>2. Analyze Modulation Techniques Explain and compare different analog modulation techniques like Amplitude Modulation (AM), Frequency Modulation (FM), and Phase Modulation (PM).</p> <p>3. Study Transmitters and Receivers Understand the working of AM/FM transmitters and superheterodyne receivers.</p> <p>4. Number Systems and Logic Gates Convert between binary, decimal, octal, and hexadecimal systems and implement logic functions using basic logic gates (AND, OR, NOT, NAND, NOR, XOR).</p> <p>5. Boolean Algebra and Logic Simplification Apply Boolean algebra to simplify digital circuits using Karnaugh Maps (K-maps) and De Morgan's Theorems.</p> <p>6. Combinational Circuits Design and analyze combinational logic circuits like adders, subtractors, multiplexers, demultiplexers, encoders, and decoders.</p>
B.Sc. III SEC IV	Semiconductor Devices Application Skill	<p>1. Understand Semiconductor Physics Explain the properties of intrinsic and extrinsic semiconductors, and the concept of charge carriers.</p> <p>2. Study Diode Characteristics and Applications Understand the working, VI characteristics, and applications of PN junction diodes, Zener diodes, and Light Emitting Diodes (LEDs).</p>

		<p>3. Rectifiers and Power Supplies Analyze half-wave, full-wave, and bridge rectifiers, including filtering, voltage regulation, and the use of Zener diodes for regulation.</p> <p>4. Bipolar Junction Transistor (BJT) Understand the construction, working, and configurations (CE, CB, CC) of BJTs and their applications as switches and amplifiers.</p>
B.Sc. III P-XVI	Practical based on theory courses P-XIV	
B.Sc. III P-XVII	Practical based on elective papers P-XV	