

GOVT. SHIVALIK COLLEGE NAYA NANGAL

DEPARTMENT OF PHYSICS

PROGRAMME B.Sc. PHYSICS

PROGRAMME CODE – SCIB03PUP

PROGRAMME OUT COME:

Course: Physics

At the completion of B. Sc. in Physics, students are able to:

- Demonstrate a rigorous understanding of the core theories & principles of physics, which includes mechanics, electromagnetism, thermodynamics, & quantum mechanics introduced at degree level in order to understand nature at atomic levels.
- Provide knowledge about material properties and its application for developing technology to ease the problems related to the society.
- Understand the set of physical laws, describing the motion of bodies, under the influence of system of forces.
- Understand the relationship between particles & atom, as well as their creation & decay. Relate the structure of atoms & subatomic particles understand physical properties of molecule the chemical bonds between atom as well as molecular dynamics.
- Analyse the applications of mathematics to the problems in physics & develop suitable mathematical method for such application & for formulation of physical theories.

Programme Specific Outcomes

- Students get acquainted with techniques which are useful in industry.
- Students get conceptual knowledge of entrepreneurships through the co-curricular activities.
- Learn the organizational skills and working in group.
- Students will be well versed with use of computers.

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COURSE SPECIFIC OUTCOME

B.Sc. 1st Semester

S.NO	COURSE/ CODE	OUTCOME
1.	Mechanics-I SCIB1104T	<ul style="list-style-type: none">➤ Application of Newton's laws of motion to solve various problems related to day today life.➤ To learn motion of bodies and to acquire basic knowledge of mechanics, properties of matter and gravitation.➤ Understand Collisions in one and two dimensions.➤ Derive Kepler's laws, Coriolis force and its expressions
2.	Vibration and waves-I SCIB1105T	<ul style="list-style-type: none">➤ Understand the concepts of mechanics, acoustics and the properties of matter.➤ Understand physical characteristics of SHM and obtaining solution of the oscillator using differential equations.➤ Calculate logarithmic decrement relaxation factor and quality factor of a harmonic oscillator.
3.	Electricity and magnetism-I SCIB1106T	<ul style="list-style-type: none">➤ Gain Knowledge on the basic concepts of electric and magnetic fields.➤ Understand the concept of conductors, dielectrics, inductance and capacitance.➤ Gain knowledge on the nature of magnetic materials.➤ Understand the concept of static and time varying fields.
4.	Practical SCIB1107L	<ul style="list-style-type: none">➤ Will be able to determine Poisson's ratio for rubber.➤ Understand the working of energy meter and differentiate between AC and DC currents.➤ Students establish relation between torque and angular acceleration using flywheel and also improve their calculation ability and graphical skill.➤ By performing the collision experiment students differentiate between 1-D and 2-D.

B.Sc. 2nd Semester

S.NO	COURSE/ CODE	OUTCOME
1.	Mechanics-II SCIB1204T	<ul style="list-style-type: none">➤ Understand the relation between scattering cross section and impact parameter.➤ Understand the properties of materials.➤ Identify and apply the laws of mechanics along with the necessary mathematics for solving numerical.➤ Gain knowledge on Central forces – definition and examples, Conservative nature of central forces, Conservative force as a negative gradient of potential energy, Equation of motion under acentral force.
2.	Vibration and waves-II SCIB1205T	<ul style="list-style-type: none">➤ Use Lissajous figures to understand simple harmonic vibrations of same frequency and different frequencies.➤ Solve wave equation and understand significance of transverse waves.➤ Solve wave equation of a longitudinal vibration in bars free at one end and also fixed at both the ends.➤ Gain knowledge on applications of transverse and longitudinal waves.
3.	Electricity and magnetism-II	<ul style="list-style-type: none">➤ Understand the basic mathematical concepts related to electromagnetic vector fields.➤ Apply the principles of electrostatics to the solutions of problems relating to electric

	SCIB1206T	<p>field and electric potential, boundary conditions and electric energy density.</p> <ul style="list-style-type: none"> ➤ Apply the principles of magneto statics to the solutions of problems relating to magnetic field and magnetic potential, boundary conditions and magnetic energy density. ➤ Understand the concepts related to Faraday's law, induced emf and Maxwell's equations. ➤ Apply Maxwell's equations to solutions of problems relating to transmission lines and uniform plane wave propagation.
4.	Practical SCIB1207L	<ul style="list-style-type: none"> ➤ Students know about how to find acceleration due to gravity by different methods. ➤ Students know about capacitance and also understand the use of capacitor in different equipments. ➤ Students differentiate between logarithmic decrement, co-efficient of damping relaxation time and quality factor.

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B.Sc. ^{3rd} Semester

S.NO	COURSE/ CODE	OUTCOME
1.	Statistical Physics and Thermodynamics-I SCIB2304	<ul style="list-style-type: none">➤ Various thermodynamic laws gives the knowledge of Carnot cycle heat engine also explains the various thermodynamic scale of temperature and knowledge of entropy.➤ Maxwell's thermodynamic relations and their applications also explains about triple point, Joule-Thomson effect and about blackbody radiation.➤ Study about M.B, B.E, F.D Statistics and their comparison.➤ Students understand distribution of n-particle into compartments and cells.
2.	Optics SCIB2305	<ul style="list-style-type: none">➤ To develop and understanding of Principles of Optics.➤ Understand the basic concept of Physical Optics and Wave Optics.➤ To develop an ability to compute basic quantities in Optics.➤ Observe principles of optics in daily life
3.	Quantum Mechanics-I SCIB2306	<ul style="list-style-type: none">➤ Understand the intuitive ideas of the Quantum physics and Nuclear physics.➤ Derive Schrodinger time dependent and time independent wave equations.➤ To understand dual nature of matter.➤ Gain knowledge on classification of various crystal systems.
4.	Practical SCIB2307	<ul style="list-style-type: none">➤ Understand the concept of probability.➤ Student know that how to use spectrometer to find resolving power and refractive index.➤ Learn to find plank's constant value.➤ Students will also learn how to use measuring instruments and minimize errors, compare results with standard results

B.Sc. ^{4th} Semester

S.NO	COURSE/ CODE	OUTCOME
1.	Statistical Physics and Thermodynamics-II SCIB2404	<ul style="list-style-type: none">➤ Students study thermodynamic potentials, enthalpy, Helmholtz free energy, Gibb's free energy and phase transitions relating to physical systems.➤ Students study Maxwell relations and its applications, adiabatic demagnetization and low temperature physics.➤ Students study Maxwell's law of distribution of velocities, mean free path, transport phenomena and learn to solve the problems.➤ Students study real gasses and behavior of real gases, Vander Waal's equation of state, Low temperature physics and its related applications.

2.	Lasers SCIB2405	<ul style="list-style-type: none"> ➤ In This course the students would gain the knowledge basic principles. ➤ Studied the various types of lasers, Laser spectroscopy and their applications in science and technology. ➤ To know theory of laser, its basic properties. ➤ To learn about resonators, transient effect, many laser systems and practical use of laser.
3.	Quantum Mechanics-II SCIB2406	<ul style="list-style-type: none"> ➤ To know generalized angular momenta, Electron's magnetic moment, Energy of a magnetic dipole, Stern-Gerlach experiment. ➤ To study Fine structure of hydrogen atoms, atoms in presence of electric and magnetic fields- application of Quantum mechanics for atomic systems. ➤ To learn Many electron atoms, identical particles, Pauli principle.
4.	Practical SCIB2407	<ul style="list-style-type: none"> ➤ Understand how to measure height of an building, mountain by new apparatus sextant. ➤ Know about variation of wavelength with frequency. ➤ Difference between galvanometer and voltmeter. ➤ Develop a basis for future learning and work experience.

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B.Sc. 5th Semester

S.NO	COURSE/ CODE	OUTCOME
1.	Condensed Matter Physics-I SCIB3504	<ul style="list-style-type: none">➤ To learn crystal structure, lattice dynamics.➤ To understand quantum properties of matter like magnetic property, dielectric property.➤ To understand elementary band theory.➤ Superconductivity – one of major breakthrough in modern science.➤ Studied about SC, BCC, FCC and Reciprocal lattice.
2.	Electronics-I SCIB3505	<ul style="list-style-type: none">➤ Knowledge about semiconductors since it is a basic materials used in many electronic components like diode, transistors FET, JFET, MOSFET etc.➤ Characteristics and working of operational amplifiers which are useful in various medical and scientific investigations to amplify the signals.➤ Generation of high frequency signals using oscillator circuits and transistors and their types CB,CE,CC etc.➤ Concepts of regulated power supply, rectifiers, filters and regulator.
3.	Nuclear and Radiation Physics SCIB3506	<ul style="list-style-type: none">➤ To learn general properties of nuclei, various nuclear models, radioactivity.➤ To understand nuclear reactions and interaction of nuclear radiation with matter.➤ To know about the detectors for nuclear radiations and particle accelerators.➤ To learn and understand fundamentals of particle physics.
4.	Practical SCIB3507	<ul style="list-style-type: none">➤ Clear concept of diodes, transistor, FET.➤ Understand the concept of half wave and full wave rectifier. ➤ Studied about working of thermistor.➤ Students will learn to do practical's as an application of what they study in theory.

B.Sc. 6th Semester

S.NO	COURSE/ CODE	OUTCOME
1.	Condensed Matter Physics-II SCIB3604	<ul style="list-style-type: none">➤ To study about lattice vibrations, Einstein and Debye model of specific heat.➤ To learn about free electron, Fermi gas and Fermi energy.➤ Band theory, Kronig-Penney model, Semi conductors.➤ Superconductivity and BCS theory.
2.	Electronics-II SCIB3605	<ul style="list-style-type: none">➤ Understand about topics Thyristor SCR, TRIAC, DIAC and their difference.➤ Types, construction, characteristics, uses, advantages of thermistor.➤ IMPATT and TRAPATT Devices.➤ Understand about Transistor biasing, amplifier, FET, diodes.
3.	Nuclear and Particle Physics SCIB3606	<ul style="list-style-type: none">➤ To learn about energy loss, cyclotron, betatron, synchrotron.➤ To understand ionization chamber, Proportional counter, GM counter, scintillation counter.➤ To learn about detectors and elementary particles.➤ Quark model and their qualitative discussion.
4.	Practical SCIB3607	<ul style="list-style-type: none">➤ Working of GM counter understand by the student while performing the experiment.➤ Studied about working of thermistor.➤ Study about characteristics of transistor.➤ Students will apply various methods of calculations such as graphical etc.

Department of Physics**1. Sunita Saini****2. Balwinder Kaur**