Government Post Graduate College Thalisain, Pauri Garhwal
Department of Physics

B.Sc. Physics
Programme Outcomes

Students having Degree in B.Sc. (with Physics) should have knowledge of different concepts and fundamentals of Physics and ability to apply this knowledge in various fields of academics and industry. They may pursue their future career in the field of academics, research, and industry.

1. Competence in the methods and techniques of calculations using Mechanics. Students are expected to have hands-on experience to apply the theoretical knowledge to solve practical problems
2. Students are expected to have a deep understanding of electricity and magnetism. Students should be able to make basic electrical circuits and handle electrical instruments.
3. Competence in the concepts of Thermodynamics and Statistical Physics. Students are expected to have hands-on experience in Thermal Physics and Statistical Physics Experiments.
4. Knowledge of different concepts in Optics. Students are expected to have hands-on experience in Experiments on Optics
5. Knowledge of basic concepts of Solid-State Physics with their applications Students are expected to have an insight into handling electronic instruments.
6. Comprehensive knowledge of Analog & Digital Principles and Applications. Learn the integrated approach to analog electronic circuitry and digital electronics for R&D

Course Outcomes

Course Title: Mechanics
Semester: First

After successful completion of this course, students will develop the following understandings:

1. Understanding of Vector Algebra and Vector Calculus.
2. Understand the physical interpretation of gradient, divergence, and curl.
3. Study of the gravitational field and potential and understanding of Kepler's laws of Planetary motion.
4. Understanding of different frames of reference and conservation laws.
5. Understand the dynamic of a rigid body and the moment of inertia. Study of the moment of inertia of different bodies and its applications.
6. Study the properties of matter, the response of the classical systems to external forces and

their elastic deformation and its applications.
7. Comprehend the dynamics of Fluid and the concept of viscosity and surface tension along with its applications.
8. Measurement precision and perfection is achieved through Lab Experiments.

Course Title: Practicals
Semester: First

1. Experimental physics has the most striking impact on the industry wherever the instruments are used to study and determine mechanical properties.
2. Measurement precision and perfection is achieved through Lab Experiments.

Course Title: Electricity and Magnetism
Semester: Second

After successful completion of this course students will develop the following understandings:

1. Understanding of Electric Field and Potential. Evaluation of Electric Field and Potential for different
types of charge distributions.
2. Study of Electric and Magnetic Fields in Matter. Understand the concept of polarizability, Magnetization
and Electric Displacement Vector.
3. Study of Steady and Varying electric currents.
4. Understanding of different aspects of alternating currents and their applications.
5. Understand the Magnetostatics, Lorentz Force, and Energy stored in a magnetic Field.
6. Comprehend the different aspects of Electromagnetic induction and its applications.

Course Title: Practicals
Semester: Second

1. Experimental physics has the most striking impact on the industry wherever the instruments are used to study and determine the electric and magnetic properties.
2. Measurement precision and perfection is achieved through Lab Experiments.

Course Title: Thermal Physics and Statistical Mechanics
Year: Second

Completion of this course will enable students to

- Comprehend the basic laws and processes of thermodynamics.
- Understand the concept of thermodynamic potentials and their physical interpretation.
- Know the Joule-Thomson effect, Clausius-Clapeyron equation, heat engine, and their applications in various real-life problems.

- Understand the concept of the kinetic theory of gases and radiation.

Course Title: Optics
Year: Second

Upon completion of this course, learners will

- Have knowledge of eyepieces, bi-prism, and cardinal points of an optical system.
- Develop concepts regarding interference in thin films, zone plates, and their applications.
- Understand interferometers, diffraction through a slit, and polarimeters and demonstrate experiments related to them.
- Be able to describe the production and analysis of polarized light.

Course Title: Solid State Physics
Year: Second

After successful completion of this course, learners will be able to

- Illustrate the concepts of crystal structure, reciprocal lattice, Miller indices, and lattice vibrations.
- Distinguish between different types of magnetic materials, conductors, semiconductors, and insulators.
- Explain x-ray diffraction by crystals, the specific heat of solids, Hall effect, electrical conductivity, thermal conductivity, and their applications.

Course Title: Practicals
Year: Second

On completing this course learners will be able to

- Handle polarimeter, nodal slide, and spectrometer.
- Practically understand the concepts of diffraction by a slit, diffraction grating, dispersion by a prism, and interference in Newton's ring setup, resolving power of a telescope.
- Determine the thermal conductivity of a good and bad conductor using Searle's and Lee's apparatus.
- Understand the laws of probability and verify it experimentally.
- Measure Joule's constant by Joule's calorimeter and Calendar and Barne's method.
- Find Planck's constant using black body radiation.
- Verify Newton's law of cooling.

Course Title: Quantum Mechanics
Year: Third

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

- Know the genesis and formulation of quantum mechanics.
- Physically interpret and solve the time-dependent, time-independent Schrodinger equations.
- Identify potential barriers and find solutions by applying the Schrodinger wave equation.
- Formulate the Schrodinger equation and its solution of spherically symmetric systems.

Course Title: Modern Physics
Year: Third

On successful completion of this course students will

- Acquire an understanding of different atomic and nuclear models.
- Elaborate on the basics and applications of x-rays, LASERs and MASERs.
- Be able to develop an understanding of radioactivity, fission and fusion and their applications.

Course Title: Electronics
Year: Third

After completing this course successfully students will be able to

- Develop basic concepts of semiconductors and their applications in electronics.
- Have knowledge of different types of transistors and transistor-based devices.
- Illustrate logic gates, and applications of logic gates and perform Boolean algebra.

Course Title: Practicals
Year: Third

After completing this course students will have

- Comprehensive knowledge of p-n diode, Zener diode, bipolar transistors, JFET, MOSFET, UJT, and their properties.
- Ability to perform Frank-Hertz experiment and study of CRO.
- Hands-on experience in handling Wein bridge oscillators, CE amplifiers, and rectifiers.
- Insight into digital electronics i.e., basic logic gates, adders, and subtractors.
- Scientific knowledge of determining Planck’s constant, e/m by Thomson, Helical, and Magnetron methods.
- Proficiency in identifying different electronic components such as resistors, capacitors, transistors.