

**RAJKIYA SNATKOTTAR MAHAVIDHYALAYA, JOSHIMATH (CHAMOLI)**  
**DEPARTMENT OF PHYSICS**

**PROGRAM SPECIFIC OUTCOMES**

**1. CERTIFICATE IN INTRODUCTORY PHYSICS (First Year)**

Certificate in Introductory Physics will give the student basic knowledge of theories and laws of physics such as Newton's law motion, Vector algebra, Gravitation field and potential, Conservation Laws, Dynamics of rigid body, Moment of Inertia, Waves and Oscillations etc.

After the completion of certificate course in physics, the students-

- Acquired the basic knowledge of Mechanics, Electricity and Magnetism.
- Hands-on experience to apply the theoretical knowledge to solve practical problems of basic physical phenomena. He should be able to carry out experiments to understand the laws and concepts of Physics.
- An insight in understanding electrical circuits and in handling electrical instruments.

**2. DIPLOMA IN APPLIED PHYSICS, (Second year)**

After completing this diploma course, the student should have

- Knowledge of different concepts in Thermodynamics, Statistical Physics and Optics.
- Knowledge of different aspects of Thermal Physics which serves as a basis for many physical systems used in industrial applications and deals with the physics and technology of Engines and Refrigerators.
- A deeper insight in Optics to understand the Physics of many optical instruments which are widely used in research and Industry, Optoelectronics, IT and communication devices, and in industrial instrumentation.
- Knowledge of basic concepts of optical instruments with their applications in technology.

**3. DEGREE IN BACHLOR OF SCIENCE (Third Year)**

After completing this degree course, the student should have:

- Knowledge of Mechanics and basic properties of matter. The course will empower him to apply his theoretical knowledge in various physical phenomena that occur in day-to-day life and he can use this scientific knowledge for the betterment of the society.
- Understanding of basic concepts related to Electricity and Magnetism. He should

be proficient in designing and handling different electrical circuits.

- Expertise in different aspects of Thermal and Statistical Physics which serves as a basis for many physical systems used in industrial applications and deals with the physics and technology of Engines and Refrigerators.
- Proficient in the field of Optics which will increase his demand in research and industrial establishments engaged in activities involving optical instruments.
- Basic knowledge in the field of Modern physics, which have utmost importance at both undergraduate and graduate level.
- Comprehensive knowledge of Analog & Digital Principles and Applications.
- Learn the integrated approach to analog electronic circuitry and digital electronics for R&D.



Dr. Naveen Kohli

In- charge

Department of physics

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**PROGRAM OUTCOMES**

The Program Outcomes of UG in Physics are:

After the end of the program the students will be able

- To develop scientific thinking and to solve problems utilizing scientific reasoning and quantitative techniques.
- To understand basic laws of nature and their interrelations.
- To apply physical theories in a vast domain ranging from very small to vary large distances.
- To understand importance of experiments in scientific theories sand laws and a working knowledge of various instruments for measurement of physical quantities.
- To communicate scientific ideas clearly and effectively.
- Pursue higher studies in research area of physics.



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**COURSE OUTCOMES**

**Semester-1 Paper-1(Theory)**

**Course Title: Mechanics**

**Course Outcomes**

- Understanding of Vector Algebra and Vector Calculus.
- Understand the physical interpretation of gradient, divergence and curl.
- Study of gravitational field and potential and understanding of Kepler's laws of Planetary motion.
- Understanding of different frames of references and conservation laws.
- Understand the dynamics of rigid body and concept of moment of inertia.
- Study of moment of inertia of different bodies and its applications.
- Study the properties of matter, response of the classical systems to external forces and their elastic deformation and its applications.
- Comprehend the dynamics of Fluid and concept of viscosity and surface tension along with its applications.
- Understanding the basic idea of waves and oscillations through Simple harmonic motion.

**Semester-1 Paper -II (Practical's)**

**Course Title: Mechanical Properties of matter**

**Course Outcomes**

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

**Lab Experiments**

1. To study the Motion of Spring and calculate (a) Spring constant, (b)  $g$  and (c) Modulus of rigidity.
2. To determine the Moment of Inertia of a Flywheel.
3. To determine the Moment of Inertia of a Inertia table.
4. To determine  $g$  and velocity for a freely falling body using Digital Timing Technique.
5. To determine Coefficient of Viscosity of water by Capillary Flow Method (Poiseuille's method).
6. To determine the Young's Modulus of a Wire by Optical Lever Method.
7. To determine the Young's Modulus by bending of beam.
8. To determine the Modulus of Rigidity of a Wire by Maxwell's needle.
9. To determine the elastic Constants of a wire by Searle's method.
10. To determine the value of  $g$  using Bar Pendulum.
11. To determine the value of  $g$  using Kater's Pendulum.
12. To determine Surface Tension.
13. To determine the modulus of rigidity by Barton's apparatus (Horizontal/Vertical).

## **Semester-II Paper -I (Theory)**

### **Course Title: Electricity and Magnetism**

#### **Course Outcomes**

- Understanding of Electric Field and Potential. Evaluation of Electric Field and Potential for different types of charge distributions.
- Study of Electric and Magnetic Fields in matter. Understand the concept of polarizability, Magnetization and Electric Displacement Vector.
- Study of Steady and Varying electric currents.
- Understanding of different aspects of alternating currents and its applications.
- Understand the Magnetostatics, Lorentz Force and Energy stored in magnetic Field.
- Comprehend the different aspects of Electromagnetic induction and its applications.
- Understanding the relation between electricity and magnetism.

## **Semester-1 Paper -II (Practical's)**

### **Course Title: Demonstrative Aspects of Electricity & Magnetism (Practical)**

#### **Course Outcomes**

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

#### **Lab Experiments.**

- Frequency of A.C. Mains.
- Mede's Experiment.
- Calibration of Voltmeter by potentiometer.
- Calibration of ammeter by potentiometer.
- Specific resistance determination by Carey Foster bridge.
- Conversion of a Galvanometer into a Voltmeter.
- Conversion of a Galvanometer into Ammeter.
- Variation of magnetic field along the axis of a current carrying circular coil.
- Electrochemical equivalent.
- De Sauty's bridge- C1/ C2.
- R1/R2 by potentiometer.
- Study of R-C, L-C-R circuits.
- Determination of self-inductance, mutual inductance.
- Magnetic field determination by search coil and ballistic galvanometer.
- Sonometer.

## **B. Sc. (Year-II) Paper-I(Theory)**

### **Course Title: Thermal Physics and Statistical Mechanics**

After Successful completion of this course, students will be able to:

- Understand the concept of temperature. Know about laws of thermodynamics.
- State first and second laws of thermodynamics in precise mathematical forms.
- Understand concept of entropy and its importance
- Study relations between different thermo dynamical variables and potentials.
- Understand radiation and derive Planck radiation formula.
- Learn basic postulates of statistical mechanics
- Know about Maxwell distribution law for velocities and speeds.
- Understand transport phenomena

## **Paper- II**

### **Course Title: Optics**

After Successful completion of this course, students will be able to:

- Know about nature of light and Fermat's principle of least time.
- Know about construction and working of different optical instruments.
- Understand concept of superposition of waves and interference.
- Understand phenomena of diffraction and its applications in optical instruments.
- To know about polarization of light.

## **Paper- III**

### **Course Title: Solid State Physics**

After Successful completion of this course, students will be able to:

- Define lattice and translational vectors.
- Understand the concept of reciprocal lattice and its application in crystal structure.
- Understand different methods to establish crystal structure.
- Understand elementary lattice dynamics.
- Explain the fundamental concepts of free electron theory.
- To understand band theory of solids and its application in semiconductor physics.

### **Course Title: Practical's**

After Successful completion of this course, students will be able to:

- Determine thermal conductivity of materials.
- Determine mechanical equivalent of heat using Joule's calorimeter.
- Determine mechanical equivalent of heat by Callender and Barne's method.
- Study statistical distribution using given data.
- Determine wavelength of light by Newton's rings.
- Determine wavelength of light using a biprism.
- Determine refractive index of material of prism.
- Measure wavelength of light using diffraction grating.
- To measure specific rotation of cane sugar.
- Determine resolving power of telescope.

## **B. Sc. (Year-III) Paper-1(Theory)**

### **Course Title: Quantum Mechanics**

After Successful completion of this course, students will be able to:

- Know the basic concepts of quantum theory.
- Understand mathematical formulation of quantum mechanics.
- Explain eigen functions and eigen values.
- Study one dimensional problems of a particle in a box and potential steps.
- Explain barrier penetration.
- Solve problem of hydrogen atom.

### **Paper- II**

#### **Course Title: Modern Physics**

After Successful completion of this course, students will be able to:

- Understand different models of atomic structure.
- Know about atomic spectra and theories about their origin.
- Know about theory and working of LASERS.
- Know about structure of atomic nucleus and semi empirical mass formula.
- Understand radioactivity and nuclear energy.
- Explain nuclear fission and fusion.

### **Paper- III**

#### **Course Title: Basic Electronics**

After Successful completion of this course, students will be able to:

- Know about semiconductor diodes and optoelectronic devices.
- Understand working of power supplies and voltage regulator.
- Know about amplifiers and field FET.
- Explain negative feedback and self-sustained oscillations.
- Know about multivibrators.
- Understand Boolean algebra and basics of digital circuits.

#### **Course Title: Practical's**

After Successful completion of this course, students will be able to:

- Perform Franck-Hertz experiment.
- Determine  $e/m$  by Thomson method.
- Verify truth table for different gates.
- Study I-V characteristics of diode.
- Study I-V characteristics of Zener diode.
- Study p-n-p transistor in CE configuration.
- Study n-p-n transistor in CE configuration.
- Determine Rydberg constant.
- Find band gap of a semiconductor.
- Determine Planck's constant.



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