

Department of Physics

Course outcome of all the papers of B.Sc. I, II & III Year Classes

Class: B.Sc. Ist Year Physics, Semester-I & II

Mechanics and Properties of Matter Paper - I

Course Outcome:

Apply knowledge of the properties of matter, thermodynamics, and atomic and nuclear physics to explain natural physical processes and related technological advances.

Use an understanding of elementary mathematics along with physical principles to effectively solve problems encountered in everyday life, further study in science, and in the professional world.

Design experiments and acquire data in order to explore physical principles, effectively communicate results, and critically evaluate related scientific studies.

Assess the contributions of physics to our evolving understanding of global change and sustainability while placing the development of physics in its historical and cultural context

Title of the Course: Mathematical Methods in Physics CCP I - (Section B) P-II

Course Outcomes:

After completion of this course students will be able to apply the concept of vectors and complex variables to various physical quantities. This course will also enable the students to solve the problems related to partial differentiation. Fourier analysis unit will enable the students to analyze the periodic functions.

Heat and Thermodynamics Paper - III

Course Outcome:

Students understand the workings of various types of thermometers and the various temperature scales they employ.

Students clarify the relationship of molecular motion to temperature.

Students understand heat as energy

Students distinguish between the concepts of heat and temperature

Students define several heat units such as calories, kilocalories, British thermal units and to relate them to other energy units.

Students state the first Law of Thermodynamics and understand its implications.

Students describe heat engines.

Students state the Second Law of Thermodynamics and understand its implications.

Title of the Course: Electricity and Magnetism CCP II - (Section B) P-IV

Course Outcome

Upon successful completion of this course, students will be able to:

1. Understand the characteristics and properties of electric and magnetic fields.
2. Experiences electricity & magnetism in practice mode and students enable to understand the role of electricity in day to day life.
3. Students also understand the working principles and applications of various electrical components
4. The properties of static electric and magnetic fields and how they arise
5. The properties of simple, time-dependent electric and magnetic fields and what kind of physical phenomena they generate

Students develop an appreciation of the concepts of order, disorder and entropy.

Class: B.Sc. II Year Physics, Semester-III& IV

CCP III - (Section A) P-VI Core Paper: Waves and Oscillations

Course Outcomes:

On successful completion of this course students will:

1. Understand the concepts of mechanics, acoustics
2. Understand physical characteristics of SHM and obtaining solution of the oscillator using differential equations
3. Calculate logarithmic decrement relaxation factor and quality factor of a harmonic oscillator
4. Use Lissajous figures to understand simple harmonic vibrations of same frequency and different frequencies
5. Solve wave equation and understand significance of transverse waves
6. Solve wave equation of a longitudinal vibration in bars free at one end and also fixed at both the ends

CCP III - (Section B) P-VII Core Paper: Statistical Physics, Electromagnetics and Theory of Relativity

Course Outcomes:

1. After taking this course students are able to determine the probability of any type of events.
2. They are able to interpret different types of events.
3. Students have understood the concept of phase space and its volume.
4. They can easily distinguish between different types of particles and statistics and can easily distribute bosons, fermions and classical particles among energy levels.
5. After studying Fermi Dirac statistics, students have learn to deal with many electron system in real life.
6. Understand the relation in between Electromagnetic theory.
7. Explain various phenomenon in light of maxwell equations.
8. Establish the non-existence of the hypothesized stationary ether through the null result of Michelson-Morley experiments with interferometer.
9. The students shall be familiar with the fundamental principles of the general theory of relativity.

10. Explain the true nature of Newtonian mechanics and Lorentz Transformation equations.
11. Understand the concept of constant relative motion of different bodies in different frames of references.
12. They shall know the meaning of basic concepts like the equivalence principles, inertial frames and time dilation.

CCP IV - (Section A) P-VIII Core Paper: Optics and Lasers

Course Outcomes:

1. Gain knowledge on various theories of light
2. Acquire skills to identify and apply formulas of optics and wave physics
3. Understand the properties of light like reflection, refraction, interference, diffraction etc
4. Understand the applications of diffraction and polarization.
5. Understand the applications of interference in design and working of interferometers.
6. Understand the resolving power of different optical instruments.
7. Gain knowledge in lasers and optical fiber and their applications in communication

Basic Electronics Paper - IX

Course Outcome:

After completing this course students will be able to

1. Identify and understand construction and properties of different types of P-N junction diodes.
2. Apply knowledge of semiconductor devices to use them in different combinations to see their applications as amplifiers and oscillators.
3. Design different circuits using semiconductor devices and demonstrate their usage.

Class: B.Sc. IIIrd Year Physics, Semester-V&VI

P-XII DSEP I (Section A) - Discipline Specific Compulsory Paper: Quantum Mechanics

Course Outcome

After completing this course:

- 1) You will be familiar with the main aspects of the historical development of quantum mechanics and be able to discuss and interpret experiments that reveal the wave properties of matter, as well as how this motivates replacing classical mechanics with a wave equation.
- 2) You will understand the central concepts and principles in quantum mechanics, such as the Schrödinger equation, the wave function and its interpretation, the uncertainty principle, the relation between quantum mechanics and linear algebra. This includes an understanding of elementary concepts in statistics, such as expectation values and variance.
- 3) You will be able to solve the Schrödinger equation on your own for simple systems in one to three dimensions, both analytically and by using robust numerical methods.
- 4) You will have developed an understanding of why both analytic and numerical solutions are important in quantum mechanics, and have acquired experience in using both types of methods on quantum mechanical problems.
- 5) You will be familiar with the wave mechanics.
- 6) The student has gained knowledge about the time-dependent and time-independent Schrödinger equation for simple potentials like for instance the harmonic oscillator and hydrogen like atoms.

P-XIII A - DSEP I (Section B) – Discipline Specific Elective Paper: A. Solid State Physics

Course Outcome:

At the end of this course

1. Students will be able to classify the materials in different classes based on their physical, thermal, electrical, and magnetic properties
2. Students will be able to analyze different types of matter depending on nature of chemical bonds and their properties
3. Students will be able analyze the crystal structures by applying crystallographic parameters.

4. Students will be able to determine the crystal structure by analysis of XRD data
5. Students will be able to evaluate and analyze the electrical and thermal properties of solids
6. Students will be able to analyze electron transport and energy related problems by applying quantum mechanical principles

P-XIV DSCP II (Section A) - Discipline Specific Compulsory Paper: Atomic, Molecular & Nuclear Physics

Course Outcome:

After the completion of the course, Students will be able to

- 1) Describe theories explaining the structure of atoms and the origin of the observed spectra.
- 2) Identify atomic effect such as Zeeman Effect and Stark Effect.
- 3) Explain the observed dependence of atomic spectral lines on externally applied electric and magnetic fields.
- 4) Solved the fundamental puzzle of the existence of strong nuclear force. Nuclear Physics include various interesting branches such as radioactivity, fission and fusion reactions nuclear reactors etc. that has huge applications for the benefits of society.
- 5) Understand the nature of approximations made on the quantum description of atomic and molecular systems.

P-XV A - DSEP II (Section B) - Discipline Specific Elective Paper A. Digital and Communication Electronics

Course Outcome:

1. After completion of this course students will be in a position to know the Principle, working and importance of communication systems i.e., modulators, demodulators, transmitters and receivers, etc.
2. Analyze generation and detection of AM & FM signal
3. Identify different radio receiver circuits and role of AGC.
4. Importance of the different types of the number systems, different types of the Logic gates, Boolean laws and K-map in the branch of digital electronics.