

Program Specific Outcomes (PSO) of B.Sc. Physics

On successful completion of this course students will:

- Gain in depth knowledge of scientific and technological aspects of Physics
- Become familiarize with current and recent scientific and technological developments.
- Equip them with problem solving abilities, critical thinking and skills required for research, education and industry.
- Develop strong foundation for research and development in Electronics.
- Develop analytical abilities towards real world problems.
- Become motivated to build-up a progressive and successful career in Physics

Course outcomes (CO) of B.Sc. Physics

F.Y. B.Sc. Physics

Physics Paper I: Section I: Mechanics

Outcomes:

On successful completion of this course students will be able to do the following:

- Demonstrate an understanding of Newton's laws and applying them in calculations of the motion of simple systems.
- Use the free body diagrams to analyse the forces on the object.
- Understand the concepts of energy, work, power, the concepts of conservation of energy and be able to perform calculations using them.
- Understand the concepts of elasticity and be able to perform calculations using them.
- Understand the concepts of surface tension and viscosity and be able to perform calculations using them.
- Use of Bernoulli's theorem in real life problems.
- Demonstrate quantitative problem solving skills in all the topics covered.

Physics Paper I: Section II: Heat and Thermodynamics

Outcomes:

After successfully completing this course, the student will be able to do the following:

- Describe the properties of and relationships between the thermodynamic properties of a pure substance.
- Describe the ideal gas equation and its limitations.
- Describe the real gas equation.
- Apply the laws of thermodynamics to formulate the relations necessary to analyze a thermodynamic process.
- Analyze the heat engines and calculate thermal efficiency.
- Analyze the refrigerators, heat pumps and calculate coefficient of performance.
- Understand property 'entropy' and derive some thermo dynamical relations using entropy concept.
- Understand the types of thermometers and their usage.

F.Y. B.Sc. Physics

Physics Paper II: Section I: Physics Principles and Applications

Outcomes:

On successful completion of this course students will be able to do the following:

- To demonstrate an understanding of electromagnetic waves and its spectrum.
- Understand the types and sources of electromagnetic waves and applications.
- To understand the general structure of atom, spectrum of hydrogen atom.
- To understand the atomic excitation and LASER principles.
- To understand the bonding mechanism in molecules and rotational and vibrational energy levels of diatomic molecules.
- To demonstrate quantitative problem solving skills in all the topics covered.

Physics Paper II: Section II: Electromagnetics

Outcomes:

On successful completion of this course students will be able to do the following:

- Demonstrate an understanding of the electric force, field and potential, and related concepts, for stationary charges.
- Calculate electrostatic field and potential of simple charge distributions using Coulomb's law and Gauss's law.
- Demonstrate an understanding of the dielectric and effect on dielectric due to electric field.
- Demonstrate an understanding of the magnetic field for steady currents using Biot-Savart and Ampere's laws.
- Demonstrate an understanding of magnetization of materials.
- Demonstrate quantitative problem solving skills in all the topics covered.

Physics paper III: Practical

Outcomes:

After successfully completing this laboratory course, the students will be able to do the following:

- Acquire technical and manipulative skills in using laboratory equipment, tools, and materials.
- Demonstrate an ability to collect data through observation and/or experimentation and interpreting data.
- Demonstrate an understanding of laboratory procedures including safety, and scientific methods.
- Demonstrate a deeper understanding of abstract concepts and theories gained by experiencing and visualizing them as authentic phenomena.
- Acquire the complementary skills of collaborative learning and teamwork in laboratory settings.

S.Y. B.Sc. Sem-1 Physics

PH211: Mathematical Methods in Physics-I

Outcomes:

At the end of the course, the students will be able to understand

- The concept of complex algebra and use in Physics.
- The concept of partial differentiation.
- The role of partial differential equations in Physics.
- The concepts of vector algebra and use in Mathematics and Physics.
- The singular points of differential equation

PH212: Electronics

Outcomes:

At the end of the course, the students will be able to

- Apply laws of electrical circuits to different circuits.
- Understand the properties and working of transistors.
- Understand the function of operational amplifiers.
- Design circuits using transistors and operational amplifiers.
- Understand the Boolean algebra and logic circuits.

PH212: Instrumentation

Outcomes:

At the end of the course, the students will be able to

- Understand the functions of different instruments.
- Use different instruments for measurement of parameters.
- Design experiments using sensors.

S.Y. B.Sc. Sem-2 Physics

PH221: Oscillations, waves and sound

Outcomes:

At the end of the course, the students will be able to

- Understand the Physics and Mathematics of simple harmonic, damped and forced oscillations.
- Understand the properties of travelling and standing waves.
- Analyze quality of a sound in terms of pitch, intensity and tones
- Understand the change in frequency of sound due to Doppler effect

PH222: Optics

Outcomes:

At the end of the course, the students will be able to

- Acquire the basic concepts of wave optics.
- Describe how light can constructively and destructively interfere.
- Explain why a light beam spreads out after passing through an aperture
- Summarize the polarization characteristics of electromagnetic waves
- Understand optical phenomenon such as polarization, interference, diffraction and birefringence in terms of wave model.
- Understand the working and use of different optical instruments.

PH223: Practical Course (Sem1 + Sem 2)

Outcomes:

After completing this practical course students will be able to

- Use various instruments and equipment.
- Design experiments to test a hypothesis and/or determine the value of an unknown quantity.
- Investigate the theoretical background to an experiment.
- Set up experimental equipment to implement an experimental approach.
- Analyse data, plot appropriate graphs and reach conclusions from your data analysis.
- Work in a group to plan, implement and report on a project/experiment.
- Keep a well-maintained and instructive laboratory logbook.

T.Y. B.Sc. Physics

PH331: Mathematical Methods in Physics-II

Outcomes:

At the end of the course, the students will be able to understand

- The basic concepts in different co-ordinate systems.
- The use of different mathematical methods to solve differential equations related to Physics problems.
- The special theory of relativity.

PH332: Solid State Physics

Outcome:

At the end of the course, the students will be able to understand the

- Basic concepts on structures and properties of materials.
- Phenomenon of superconductivity and its properties.
- Different experimental techniques used for characterization of materials.

PH333: Classical Mechanics

Outcomes:

At the end of the course, the students will be able to understand

- The basic concepts in Classical Mechanics.
- The comprehensive idea on the Lagrangian and Hamiltonian formulation.
- The dynamics of scattering process and planetary motion.

PH334: Atomic and Molecular Physics

Outcomes:

At the end of the course, the students will be able to understand

- Origin of atomic and molecular spectra.
- Basic concepts and use of different spectroscopy.
- Differences among different spectroscopic techniques.

PH335: Computational Physics

Outcomes:

At the end of the course, the students will be able to understand

- The procedure to develop the flowchart and algorithm.
- The basic concepts of C programming.
- The different numerical methods used to solve Physics problems.

PH336 Elective I (B): Elements of Materials Science

Outcomes:

At the end of the course, the students will be able to understand

- Various methods involved in material synthesis and characterization.
- Importance of use of different instruments for material study.
- The basic concepts about the thin film technology
- The importance of use of thin films in different application and research.

PH341: Classical Electrodynamics

Outcomes:

At the end of the course, the students will be able to understand

- The concepts of electrostatics and magnetostatics.
- The basics of electrodynamics.
- The production and propagation of electromagnetic waves.

PH342: Quantum Mechanics

Outcomes:

At the end of the course, the students will be able to understand

- The basic concepts of quantum mechanics.
- The use of quantum mechanics to understand different physical system.

PH343: Thermodynamics and Statistical Physics

Outcomes:

At the end of the course, the students will be able to understand the

- Fundamentals laws of thermodynamics.
- Basics of kinetic theory of gases
- Fundamentals of statistical mechanics.
- To understand the quantum laws governing different particles.

PH344: Nuclear Physics

Outcomes:

At the end of the course, the students will be able to understand the

- The basic concepts nucleus and its properties and nuclear forces.
- The working and use of particle accelerators and detectors.
- The concepts of radioactivity and nuclear reactions.
- The basic concepts of energy generation using nuclear fuel.

PH345: Electronics

Outcome:

At the end of the course, the students will be able to understand the

- Fundamentals of working of semiconductor and special devices made out of it.
- The characteristics of special semiconductor devices
- Basics logic gates and Boolean algebra to understand digital electronics.
- Applications of electronic devices for daily use.

PH346 Elective II (H): Physics of Nanomaterials

Outcome:

At the end of the course, the students will be able to understand

- The basic concepts about the Nano materials.
- Different techniques to synthesize nano materials.
- Different characterization techniques to study nano materials.
- The use of nano materials in design and synthesis of novel materials.