

Vasantdada Patil Arts, Commerce & Science College, Patoda. Dist. Beed

DEPARTMENT OF PHYSICS

PROGRAM OUTCOMES, PROGRAMME SPECIFIC OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOMES

- The B.Sc programme enabled the students to enhance their critical thinking, during the three year period of study and the curriculum stimulates the mental thoughts and assumptions of the students.
- This helps the students to take up practical work and compare the results with their assumptions, there by leading to accuracy and validity of the practical knowledge.
- This Analysis leads to take decisions at intellectual, organizational and personal from different perspectives of life.
- On successful completion of programme, students will develop a scientific temper, critical thinking, problem solving skills, and research attitude for the society.
- To enhance the student's academic abilities, personal qualities and transferable skills which will give them an opportunity to develop as responsible citizens
- To define the basic laws involved in Physics
- To understand the concepts and significance of the various physical phenomena.
- To carry out experiments to understand the laws and concepts of Physics.
- To apply the theories learnt and the skills acquired to solve real time problems.

PROGRAMME SPECIFIC OUTCOMES

- Capable of analyzing and solving problems using reasoning skills based on concepts of Physics.
- Know and demonstrate understanding of the concepts from different branches of Physics
- Develop the knowledge, skills and attitudes necessary to pursue further studies in Physics and research in Physics.
- Understand the diverse applications of various fields of basic science and carry the knowledge and applications of basic sciences to community
- Know & demonstrate understanding of the concepts from different branches of physics
- Understand core physical concepts, principles and theories along with their applications
- Develop proficiency in the analysis of complex physical problems and the use of

mathematical or other appropriate techniques to solve them.

- Demonstrate proficiency in problem-solving techniques using the computer

COURSE OUTCOMES

The students of B.Sc. Physics course will be covering Mechanics and Properties of matter and sound, Heat and Thermodynamics, Geometrical and Physical Optics, Electricity and Magnetism, Mathematical and statistical Physics Relativity, Modern and Nuclear Physics, General Electronics, Solid state Physics, Classical and Quantum mechanics, Electrodynamics, Atomic and Molecular Physics and LASERS, Non conventional energy sources and optical fibres and most of these courses they will have hands on practical's.

COURSE OUTCOMES

Paper No.I Mechanics and Properties of matter and sound

- To understand concept of gravitation, field, potential, different types of compound pendulum and to determine 'g'.
- To understand the elastic properties of matter and expression of bending beam with its application as a cantilever. Concept of Viscosity. Concept of fluid flow and pressure energy in fluids. To determine Bernoulli's Theorem and its applications: (i) Filter Pump (ii) law of Hydrostatic Pressure
- To design experiment to determine coefficient of viscosity by using Poiseuille's equation. Concept of surface tension and its relation with excess pressure and radius of curvature. To determine the surface tension by Jaeger's method from experiments.
- To understand generation of Ultrasonic waves. Piezo-electric effect, Magnetostriction Effect. Applications of Ultrasonic Waves: Depth of sea, Concept of sound waves. Reverberation, Propagation of sound.

Paper No. II: Heat and Thermodynamics

- Relating to thermodynamic knowledge the student gain the knowledge of refrigeration cooling technology

Paper No. IV: Geometrical and Physical Optics

- This course provides students with a working knowledge of optical physics, including diffraction, interference, and polarisation and laser physics.
- This paper aims to impart a detailed knowledge in Optics, fiber optics, holography, Basic ideas in image formation, as scientific assistant in space research and Progression to PG education in Physics

Paper No. V Electricity and Magnetism

- To understand basic concept of vector algebra. Triple product of Vectors and scalars.
- Apply techniques of vector analysis, such as gradient of scalar, divergence of vector, curl of vector. To understand line, surface and volume integrals, Gauss Divergence theorem and Stoke's Theorem.
- To understand concept of electric dipole, potential and field due to dipole, concept of dielectrics, relation between D,E,P.
- To understand the concept of magnetism and magnetic properties of materials. magnetic induction. Biot - Savart Law, Ampere Law. Construction and working of Moving coil Galvanometer

Paper No.VII Mathematical and statistical Physics Relativity

- Enable the students to have understanding of statistical ideas, diff.equations

Paper No. VIII Modern and Nuclear Physics

- To understand concept of Photoelectric effect. To study different methods to determine photoelectrons, Lenards method to study e/m , Richardson and Compton expt. To study various types of photoelectric cells and their applications.
- To understand the Origin and nature of x-ray. To study various experimental methods such as Laue, powder crystal methods. To understand Bragg's law and Bragg's spectrophotometer. Characteristic x-ray spectra, continuous X- ray spectra.
- To understand nuclear compositions and Elementary particles, charge symmetry and ~~independence~~ spin dependence of nuclear force. To state Law of radioactive decay and its application.
- To distinguish between Types of nuclear models: Single particle shell model and Liquid drop model. To understand nuclear reactions and conservation laws, nuclear fission on the basis of liquid drop model and nuclear fusion. To understand basic principles and classification of Nuclear Reactor. To learn types of detectors and classification of accelerators.

Paper No. XI General Electronics

- To study construction, I/O characteristics and working of various semiconductor devices such as diode, transistor, FET and MOSFET.
- To study various biasing methods of transistor biasing, stability factors, Q point.
- To study various amplifier circuits using transistor. To study noise and feedback in amplifiers. To study OPAMP, its characteristics, configuration and applications as a adder and subtractor. Oscillators and multivibrators. H parameters, various oscillator circuits.
- To understand concept of Modulation and Demodulation. Types of modulations FM, AM and PM Advantages of modulation.

Paper No.XII Solid state Physics

- Enable the students to have a physical understanding of matter from an atomic view point. Topics covered include the Crystal structure, bonding and electrical conductivity

Paper No.XV Classical and Quantum mechanics

- Recognize basic terms and principles of Quantum mechanics , to design and construct particle equation in free and bound state and to solve equation

Paper No. XVI Electrodynamics

- To state Gauss law and its application to obtain electric field for different cases.
- Describe and explain the relationship between the electric field and the electrostatic potential. Understand the relation between Electric displacement vector D , Susceptibility, Permittivity, Dielectric constant.
- To understand Faradays laws of EM induction. To understand the concept of electromagnetic induction, self induction of solenoid, mutual induction.
- Understand origin of Maxwell's equations in magnetic and dielectric media, Write down and derive Maxwell's equations in linear, isotropic, homogeneous media
- To derive continuity conditions on electromagnetic fields at boundaries transport of energy and Poynting vector. Polarization of EM waves.

Paper No.XIX Atomic and Molecular Physics and LASERS

- To explain Thomson atom model, Rutherford Nuclear model. Bohr's atom model, Bohr's theory of spectral lines. Diagrammatic representation of Hydrogen atom spectra.
- State and explain the key properties of vector atom model and the importance of the Pauli Exclusion Principle.
- To state and justify the selection rules for various optical spectroscopies in terms of the symmetries of molecular vibrations. List different types of atomic and molecular spectra and related instrumentation.
- To understand molecular spectra, Rayleigh scattering. To understand Raman Effect, applications of Raman Effect. To understand nature of liquids, Crystal Physics, nuclear physics.
- To understand LASER, various emissions involved in lasing action, properties of LASER, pumping schemes. To study types of LASERs. To study application of LASERs.

Paper No.XX Non conventional energy sources and optical fibres

- Understanding of Importance and need of Non conventional energy sources, their merits and demerits and technical details.
- Fabrication of optical fibres and their use in communication systems.

Laboratory Course

- To develop basic skills to perform experiments to understand the concept from existing theories of Basic physics
- Students would perform basic experiments related to the subject. Students would gain practical knowledge about the course.
- Various practical problem solving methods. Various practical problem related to applications