



**PROGRAMME OUTCOMES  
&  
COURSE OUTCOMES**

**GDC  
AMRABAD/PCO/PHY**

**PROGRAMME NAME - B.Sc (Bachelor of Science)**

**After the successful completion of the 3 years course, the students will be able to**

**SEMESTER - I**

**COURSE CODE: BS/P1/BS105      COURSE NAME: MECHANICS & OSCILLATIONS**

CO1: Good knowledge and understanding of major concepts, theoretical principles and experimental findings in Physics and its different subfields like Astrophysics and Cosmology, Material science, Nuclear and Particle Physics, Condensed matter Physics, Atomic and Molecular Physics.

CO2: Ability to transmit complex technical information relating all areas in Physics in a clear and concise manner in writing and oral ability to present complex and technical concepts in a simple language for better understanding.

CO3: Ability to employ critical thinking and efficient problem-solving skills in all the basic areas of Physics.

CO4: Capable of working effectively in diverse teams in both classroom, laboratory, Physics workshop and in industry and field-based situations.

CO5: Demonstrate Physics-related technological skills that are relevant to Physics-related job trades and employment opportunities.

**SEMESTER - II**

**COURSE CODE: BS/P2/BS205      COURSE NAME: THERMAL PHYSICS**

CO1: Comprehend the basic concepts of thermodynamics, the first and the second law of thermodynamics, the concept of entropy and the associated theorems, the thermodynamic potentials and their physical interpretations.

CO2: Understand the basic aspects of kinetic theory of gases, Maxwell-Boltzman distribution law, equitation of energies, mean free path of molecular collisions, viscosity, thermal conductivity, diffusion and Brownian motion.



CO3: Learn the concepts of Kinetic theory of Gases and properties of matter & to apply them to problems.

CO4: The student can able to understand situations in low temperature.

CO5: The students are expected to learn some mathematical techniques which will be useful for understanding the physical phenomena and get exposure to important ideas of statistical mechanics.

### SEMESTER - III

#### **COURSE CODE: BS/P3/305    COURSE NAME: ELECTROMAGNETIC THEORY**

CO1: Achieve an understanding of the Maxwell's equations, role of displacement current, gauge transformations, scalar and vector potentials, Coulomb and Lorentz gauge, boundary conditions at the interface between different media.

CO2: Understand the linear, circular and elliptical polarisations of EM waves. Production as well as detection of waves in laboratory.

CO3: Understand propagation of EM waves in anisotropic media, uni-axial and biaxial crystals phase retardation plates and their uses.

CO4: Understand the fundamentals of propagation of electromagnetic waves through optical fibres and calculate numerical apertures for step and graded indices and transmission losses.

CO5: In the laboratory course, the student gets an opportunity to perform experiments Demonstrating principles of Interference, Refraction and diffraction of light using monochromatic sources of light and also able to demonstrate interference, Refraction and Diffraction using microwaves.

### SEMESTER - IV

#### **COURSE CODE: BS/P4/405**

#### **COURSE NAME: OPTICS**

CO1: Understand the basic concepts of Principles of Superposition and Interference and their applications.

CO2: Understand the diffraction and polarization processes and applications of them in physical situations.

CO3: Understand the applications of interference in design and working of interferometers.

CO4: Understand the resolving power of different optical instruments Like Michelson Interferometer.



CO5: Understand the working of selected optical instruments like biprism, interferometer, diffraction grating, and holograms.

CO6: Practically student will gain hands-on experience of using various optical instruments and making finer measurements of wavelength of light using Newton Rings experiment, Fresnel Biprism etc. Resolving power of optical equipment can be learnt first-hand.

### SEMESTER - V

**COURSE CODE: BS/P5/505**

**COURSE NAME: MODERN PHYSICS**

CO1: Understand the central concepts of quantum mechanics: wave functions, momentum and energy operator, the Schrodinger equation, time dependent and time independent cases, probability density and the normalization techniques, skill development on problem solving Example like one dimensional rigid box, tunneling through potential barrier, step potential, rectangular barrier.

CO2: Know main aspects of the inadequacies of classical mechanics and understand historical development of quantum mechanics and ability to discuss and interpret experiments that reveal the dual nature of matter.

CO3: Understanding the properties of nuclei like density, size, binding energy, nuclear forces and structure of atomic nucleus, liquid drop model and nuclear shell model and mass formula. Ability to calculate the decay rates and lifetime of radioactive decays like alpha, beta, gamma decay. Neutrinos and its properties and role in theory of beta decay.

CO4: Understand various interactions of electromagnetic radiation with matter. Electron positron pair creation.

CO5: During the laboratory course, the students will get opportunity to perform the experiments like Measurement of Planck's constant and Verification of the photoelectric effect and determination of the work Function of a metal.

### SEMESTER - VI

**COURSE CODE: BS/P6/605**

**COURSE NAME: ELECTRONICS**

CO1: Understand the core concepts of Semiconductor devices and their applications and identify the different electronics components used in electronic circuits.

CO2: Understand the working of solid-state Semiconductor devices used in the circuit.

CO3: Understand the basic concepts of operational amplifier: its prototype and applications as instrumentation amplifier, active filters, comparators and waveform generation.



CO4: Understand the basic electronic circuits for universal logic building blocks and basic concepts of digital communication.

CO5: Understand the basic working of different logic gates and laws of Boolean algebra, De Morgan theorem, NOR & NAND logic for simplification of circuits.

CO6: Understand the concepts of K-maps and designing of logic circuits and understand and design different controlling circuits used in digital electronics.

After the successful completion of the B.Sc (Bachelor of Science) Graduate will able to

## PROGRAMME OUTCOMES

<b>P01</b>	Understanding of the academic field of Physics, its different learning areas and applications in basic Physics like Material science, Nuclear and Particle Physics, Condensed matter Physics, Atomic and Molecular Physics, Mathematical Physics.
<b>P02</b>	The course builds a foundation of various applied field in science; especially in the field of mechanical core subjects. The course comprises of the study vectors, laws of motion, momentum, energy, rotational motion, gravitation, fluids, elasticity and special relativity.
<b>P03</b>	The course makes the students able to understand the basic physics of heat and temperature and their relation with energy, work, radiation and matter. The students also learn how laws of thermodynamics are used in a heat engine to transform heat into work.
<b>P04</b>	The course comprises of the study of superposition of harmonic oscillations, waves motion (general), oscillators, sound, wave optics, interference, diffraction, polarization. The course is important for the students to make their career in various branches of science and engineering, especially in the field of photonics.
<b>P05</b>	In this course students would be able to understand Basic experiments of modern physics such as: Determination of Plank's and Boltzmann's constants, Determination of ionization potential, Wavelength of Hydrogen-spectrum, Single and double slit diffraction, Photo electric effect and determination of $e/m$
<b>P06</b>	The students would gain the knowledge of Basic Electronics circuits, network theorems and measuring instruments: They would know about common solid-state devices: Semiconductor diodes and transistors. The topics also include the Rectifiers, Filters and their applications, number systems and logic gates which are foundation blocks of digital electronics.
<b>P07</b>	Use modern tools and Software for understanding the basic concepts of Physics and derive the solutions for futuristic models for better functioning of the real-world applications.
<b>P08</b>	Serve the society with a good heart when a Physics with computer knowledge person is required.