SULLAMUSSALAM SCIENCE COLLEGE, AREEKODE

B Sc Physics

Programme Specific Outcomes:

PO1. Demonstrate a rigorous understanding of the core theories & principles of physics, which includes mechanics, electromagnetism, thermodynamics, & quantum mechanics.

PO2. Analyze the applications of mathematics to the problems in physics & develop suitable mathematical method for such application & for formulation of physical theories.

PO3. Learn the structure of solid materials & their different physical properties

PO4. Understand physical properties of molecule the chemical bonds between atom as well as molecular dynamics.

Course Outcomes:

PH1 B01-METHODOLOGY OF SCIENCE AND PHYSICS

(Credits 2-Total-Hours 36)

Outcomes

This course provides the student with

CO1: A general idea about what is science, what is scientific temper, history of science and scientific revolutions

CO2. Familiarity with the different steps involved in the scientific method with the help of a flow chart, explaining what is hypothesis and how they become scientific laws

CO3. Awareness of a brief history of physics, giving emphasis on the birth of quantum theory using black body radiation, photoelectric, X rays and DeBroglie waves and a general idea about theory of relativity

CO4: Introduction to mathematical methods physicists often use, including differential Calculus, The operator ∇- Gradient, Divergence, Curl, integral calculus, matrices and curvilinear coordinates.

PH2 B02-PROPERTIES OF MATTER, WAVES & ACOUSTICS

(Credits-2 Total Hours-36)

Outcomes

Co1: Learn the basics of properties of matter, how Young's modulus and rigidity modulus are defines and how they are evaluated for different shapes of practical relevance

Co2: Learn the fundamentals of harmonic oscillator model, including damped and forced oscillators and grasp the significance of terms like quality factor and damping coefficient

Co3.Study the general equation of wave motion in general and TM waves in stretched strings and longitudinal waves in gases

Co4.Familiarise with general terms in acoustics like intensity, loudness, reverberation etc, and study in detail about production, detection, properties and uses of ultrasonic waves.

PH3 B03-MECHANICS
(Credits 4-Total Hours 56)
Outcomes

CO1: Grasped the fundamentals of different types of frames of references and transformation laws-Both Galilean and Lorentz
CO2. Learned conservation laws of energy and linear and angular momentum and apply them to solve   problems
CO3. Learn the basics of potentials and fields, central forces and Kepler's laws
CO4.Familarise with Lagrangian and Hamiltonian formulations of classical mechanics
CO5. Fundamental ideas of special theory of relativity such as length contraction and time dilation and   mass –energy invariance

PH4B04-ELECTRODYNAMICS I
(Credits 4-Total Hours 54)
Outcomes
C01: Have gained elaborated knowledge about electrostatics and laws governing the charge distribution
C02:Have gained ability to apply Laplace equation for calculating potentials.
C03:Study in depth about Polarization, bound charges and boundary condition.
C04:To realize the importance of application of Biot Savarts Law and Amperes law.

C05:To understand the relevance of different magnetization and the boundary condition of magnetic
field.

PH5B06-ELECTRODYNAMICS II
(Credits 3-Total Hours 54)

Outcomes

C01: Be able to solve a variety of problems related to Faraday's law of induction and Maxwell's equations. Student is expected to explain term displacement current as well.

C02 : Understand the relevance of displacement current in the context of electromagnetic wave propagation.

C03: Study in depth the transient current response of CR, LC, CR and LCR circuits, which is essential in designing as well as understanding the working of electronic circuits.

C04: Solve complex problems involving linear electrical networks employing the symmetry concepts together with various network theorems

PH5 BO7-QUANTUM MECHANICS
(Credits 3-Total Hours 54)

Outcomes

C01: To become familiar with Blackbody radiation, Ultraviolet catastrophe, Photo Electric effect and Compton Effect and hence be aware how quantum theory emerged

C02: Have gained a clear knowledge about wave properties of particles, De Broglie waves and its implications on the uncertainty principle.

C03: Study the Bohr Atom model in detail and understand about atomic excitations

C04: Have grasped the idea of Wave Mechanics and gain the concept of eigen values, eigen functions
and learn the basic postulates of quantum mechanics

C05: To find solution to Schrödinger's equation for many systems such as particle in a box, Hydrogen Atom and familiarize with different quantum numbers.

PH5BO8-PHYSICAL OPTRICS AND MODERN OPTICS
(Credits 3-Total Hours 54)

Outcomes

C01. Understand the basics of the Matrix method to solve problems of geometrical optics

C02. Use the principles of wave motion and superposition to explain the physics of polarisation, interference and diffraction.

C03. Understand the basics of modern optics like Fiber optics and holographyC04. Solve problems in optics by selecting the appropriate equations and performing numerical or analytical calculations.

PH5BO9 - ELECTRONICS - ANALOG & DIGITAL
(Credits 4-Total Hours 72)

Outcomes

CO1have a basic knowledge of semiconductor physics
CO2 acquire knowledge about how a semiconductor diode rectifies an input ac signal
CO3 Learn how to construct a transistor amplifier and how its gain varies with frequency
CO4 know about various number systems and their applications, flip flops and counters

PH5B10-THERMAL AND STATISTICAL PHYSICS
(Credits 4-Total Hours 72)

Outcomes

C01: Become familiar with various thermodynamic process and work done in each of these process.
C02: Have a clear understanding about Reversible and irreversible process and also working of a Carnot engine, and knowledge of calculating change in entropy for various process.
C03: Realize the importance of Thermo dynamical functions and applications of Maxwell's relations.
C04: Familiarize in depth about statistical distribution and have basic Ideas about Maxwell boltzman, Bose-Einstein and Fermi Dirac Statistics and their applications

PH6B11-SOLID STATE PHYSICS, SPECTROSCOPY AND LASER PHYSICS
(Credits 4-Total Hours 72)

Outcomes

C01: Have a clear picture of crystal structures and a clear understanding about x-ray diffraction
C02: Expected to gain knowledge of super conductivity, its underlying principles and its applications in   modern world
C03: Become familiar with molecular spectroscopy and have gained basic ideas regarding microwave   spectroscopy, infrared spectroscopy and Raman Spectroscopy.
C04: Have gained basic knowledge of laser and working of different type of lasers

PH6B12- NUCLEAR PHYSICS, PARTICLE PHYSICS AND ASTROPHYSICS
(Credits 4-Total Hours 72)

Outcomes

C01:Gain a clear picture of nuclear composition and various nuclear models.
C02:Have a deep knowledge about Radio activity,nuclear Fission and Nuclear Fusion,the relevance of   nuclear transformation.

C03:Understand the working of nuclear detectors and counters,realize the importance of Cosmic rays   and its effects on earth.

C05:Become familiar with nuclear particles and different particle accelerators. Student is expected to   know the working of different accelerators.

C06:Have Peripheral ideas about astronomy and astrophysics.