Program outcome of the undergraduate course in Physics:

The course helps in understanding the fundamental concepts and significance of the different physical phenomena. The hands-on experiments in the course help students understand different theoretical ideas of physics better, engaging students with critical thinking and strongly motivates to understand the physics behind nature closely. The students are trained with knowledge through theory, and the technical and analytical skills in solving problems help them easily tackle real-life issues beyond physics. This course helps students acquire advanced academic abilities, presentation and communication expertise, and skills to transfer knowledge. The students learn quantitative reasoning and competencies of leadership in science.

Detailed Version:

This course provides a comprehensive understanding of the fundamental concepts and significance of various physical phenomena. It aims to equip students with the necessary knowledge and skills to analyze and interpret the laws governing the natural world.

One of the key features of this course is the inclusion of hands-on experiments that help students better comprehend the theoretical ideas of physics. These experiments enable students to engage with critical thinking and promote a deeper understanding of the physics behind the natural world. Through these practical exercises, students can develop the ability to apply theoretical concepts to real-world scenarios and gain a more comprehensive understanding of how physics impacts our everyday lives.

Furthermore, this course emphasizes the development of technical and analytical skills that enable students to solve complex problems both within and beyond the realm of physics. The course materials include a mix of theoretical and practical exercises that provide students with a well-rounded education, equipping them with the skills to tackle real-life issues in various fields.

Additionally, this course helps students acquire advanced academic abilities such as presentation and communication expertise. These skills are essential in today's fast-paced world, where effective communication is key to success in any field. The course also provides opportunities for students to transfer knowledge by allowing them to develop and deliver presentations to their peers.

Finally, the course fosters the development of quantitative reasoning and leadership competencies in science. These skills are essential for students who wish to pursue careers in scientific research and development. Overall, this course provides an excellent foundation for students to pursue further studies in physics and other related fields.

Samapti Pal
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HEAD
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COURSE OUTCOMES :

After completion of all the courses in B.Sc. Physics (H) program the students will be able to

CO 1 : connect mathematics to physical phenomena, describe how a top spins , how a pendulum swings etc. and defines normal intuition, revels the hidden intricacies of relativity and quantum theory.

CO 2 : explore concepts such as kinematics; Newton's laws of motion; work,energy and power; systems of particles and and linear momentum ; rotation; oscillations ; gravitation and fluid motion. Also able to do hands on laboratory work and in-class activities to investigate phenomena.

CO 3 : apply knowledge of electricity and magnetism to explain natural physical processes and related technological advances, use an understanding of calculus along with physical principles to effectively solve problems encountered in every day life, design experiments and acquire data in order to explore physical principles.

CO 4 : acquire skills to identify and apply formulas of optics and wave physics; identify and illustrate physical concepts and terminology used in optics and to be able to explain them in appropriate detail.

CO 5 : identify the relationship and correct usage of work, energy, heat capacity,specific heat latent heat and enthalpy; compute entropy for simple systems; identify the physical phenomena related to condition of heat and explain some natural events and physical facts using kinetic theory of gases.

CO 6 : understand blackbody radiation, De Broglie wave length; apply the theoretical knowledge related to radiation in experiments; know the basic concepts of quantum mechanics and it's applications; know nuclear structure and interaction with and within nucleus, radio activity; understand concept and operation of laser; know special theory of relativity.

CO 7 : use LATEX for scientific writing's such as articles,research papers, reports etc.

CO 8 : design and analyse circuits and networks with semiconductor diodes, CE,CB,CC amplifiers,FET,regulated power supply, amplifiers,feed back amplifiers and OPAMP, multivibrator and oscillators.

CO 9 : have the knowledge and skills to identify and understand the kinds of experimental results which are incompatible with classical physics and which required the development of quantum theory of matter and light; interpret the wave function and apply operators; solve the Schroedinger equation; understand the role of uncertainty in quantum physics; know about generalised angular moments and spin; spectra of hydrogen atom and atoms in electric and magnetic fields.

CO 10 : acquire skills to use Arduino programming in LED blinking and fading, measurement of voltages, interfacing 7 segment display etc.

CO 11 : understand the basic mathematical concepts related to electromagnetic vector fields; know Maxwell equations; EN wave propagation in bounded and unbounded media and concept of polarization and it's applications.

CO 12 : clarify the properties of matter in aggregate in terms of physical laws governing atomic motion; develop the phenomenological results of thermodynamics from a probabilistic examination of the underlying microscopic systems; distinguish classical and quantum statistics and apply the statistical distribution functions to solve problems.

CO 13 : know basic properties of laser, it's types and uses; also know the characteristics and applications of fiber optics and holography; get the concept of nonlinear optics.

CO 14 : understand nuclear reactions, interaction of nuclear radiation with matter; know about detectors for nuclear radiations, particle accelerators and gain basic concepts of particle physics with fundamental particles and quark structure.

CO 15 : understand and implement integrated circuit, number system, digital circuits, sequential circuits, registers and counters, data conversion.

CO 16 : acquire knowledge on theoretical description of crystal and electronic structure, lattice dynamics and optical properties of different materials (metals, semiconductors, dielectrics, magnetic materials and superconductors) based on the classical and quantum physics principles and perform experiments on the physical phenomena involving solid state physics.

CO 17 : understand nanoscale systems, synthesis of nanostructure materials, optical properties, electron transport and applications of nanomaterials.

CO 18 : learn and understand statistical mechanics in advanced level starting with review of classical statistical mechanics; learn quantum statistical mechanics; ideal Bose system and Fermi system, using model and non equilibrium statistical mechanics.

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