

Programme Specific Outcome

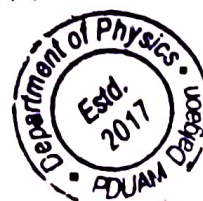
Department of PHYSICS

PDUAM, Dalgaon, Darrang:784116

After graduating with a degree in physics, the students in general are expected to develop a scientific temperament in different spheres of their lives. They will be able to decipher the logical and scientific basis behind any physical phenomena commonly seen in the nature around. The physicists will develop an optimistic mindset and contemplate on the laws governing the universe. They could figure out their own role in the society as a responsible citizen. The students of Physics could acquire certain soft skills which will make them fit in different situations and places. The knowledge acquired in the practical laboratory of Physics make the students more adoptable in various practical as well as skill based field which structured them to be capable of meeting the challenges of life in better perspective and logical way. Besides these the students graduating with a degree in Physics can discover a number of viable ways to move forward and excel in their carrier. Also with a degree in physics they can

1. Opt of higher education and research in different sub fields of Physics.
2. Look for avenues in academia or even industry.
3. Realize own ways of entrepreneurship in education sector by means of e-learning technologies.
4. Able to work in various technical lines with the knowledge of basic physics instruments and experimental skills as well.
5. With the knowledge of computer languages such as C, Python, Matlab etc, the also stand a chance in IT sector.

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(HOD)



Course outcome:
Department of PHYSICS
PDUAM, Dalgaon, Darrang:784116

B.Sc. Physics (Honours, CBCS)

List of Papers offered till Date.

Honours Core Papers

1. PHY-HC-1016 : Mathematical Physics I
2. PHY-HC-1026 : Mechanics
3. PHY-HC-2016 : Electricity & Magnetism
4. PHY-HC-2026 : Waves & Optics
5. PHY-HC-3016 : Mathematical Physics II
6. PHY-HC-3026 : Thermal Physics
7. PHY-HC-3036 : Digital Systems & Applications
8. PHY-HC-4016 : Mathematical Physics III
9. PHY-HC-4026 : Elements of Modern Physics
10. PHY-HC-4036 : Analog Systems & Applications
11. PHY-HC-5016 : Quantum Mechanics & Applications
12. PHY-HC-5026 : Solid State Physics
13. PHY-HC-6016 : Electromagnetic Theory
14. PHY-HC-6026 : Statistical Mechanics

Discipline Specific Elective (DSE) Papers

1. PHY-HE-5046 : Physics of Devices and Instruments
2. PHY-HE-6036 : Advanced Mathematical Physics II
3. PHY-HE-6056 : Classical Dynamics

Generic Elective (GE) Papers for other Disciplines

1. PHY-HG-1016 : Mechanics
2. PHY-HG-2016 : Electricity & Magnetism
3. PHY-HG-3016 : Thermal Physics & Statistical Mechanics
4. PHY-HG-4016 : Waves & Optics

Skill Enhancement (SE) Papers

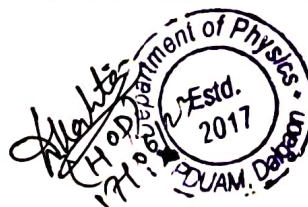
1. PHY-SE-3014 : Physics Workshop Skills
2. PHY-SE-4014 : Basic Instrumentation Skills

Add on course papers:

1. PHY-ADC-01
2. PHY-ADC-02

Course Outcome:

Semester	Paper and Code	Course Outcome
1 st	PHY-HC-1016 Mathematical Physics I	Successful students should be able to understand vector and its applications in various fields, differential equations and its applications, different coordinate systems, concept of probability and error.
	PHY-HC-1026 Mechanics	On successful completion of the course students should be able understand Inertial and non inertial reference frames, Newtonian motion, Galilean transformations, projectile motion, work and energy, Elastic and inelastic



1 st		collisions, motion under central force, simple harmonic oscillations, special theory of relativity.
	PHY-HG-1016 Mechanics	Upon completion of this course, students are expected to understand the role of vectors and coordinate systems in Physics, solve Ordinary Differential Equations, laws of motion and their application to various dynamical situations, Inertial reference frames their transformations, concept of conservation of energy, momentum, angular momentum and apply them to basic problems, phenomenon of simple harmonic motion, motion under central force, concept of time dilation, Length contraction using special theory of relativity. In the laboratory course, after acquiring knowledge of how to handle measuring instruments (like screw gauge, Vernier calipers, travelling microscope) student shall embark on verifying various principles and associated measurable parameters.
2 nd	PHY-HC-2016 Electricity & Magnetism	After successful completion of this course, students will be able to Understand electric and magnetic fields in matter, Dielectric properties of matter magnetic properties of matter, electromagnetic induction, applications of Kirchhoff's law in different circuits, applications of network theorem in circuits.
	PHY-HC-2026 Waves & Optics	After successful completion of this course, students will be able to Understand superposition of harmonic oscillations, different types of wave motions, superposition of harmonic waves, interference and interferometer, diffraction, holography
	PHY-HG-2016 Electricity & Magnetism	Upon completion of this course, students are expected to apply Gauss's law of electrostatics to solve a variety of problems, calculate the magnetic forces that act on moving charges and the magnetic fields due to currents, have brief idea of magnetic materials, understand the concepts of induction, and apply them to solve variety of problems. In the Lab course, students will be able to measure resistance (high and low), Voltage, Current, self and mutual inductance, capacitor, strength of magnetic field and its variation, study different circuits RC, LCR etc.
3 rd	PHY-HC-3016 Mathematical Physics II	After successful completion of the course, students will be able to solve differential equation using power series solution method, solve differential equation using separation of variables method, special integrals, different properties of matrix, Fourier series.
	PHY-HC-3026 Thermal Physics	Upon successful completion, students will have the knowledge and skills to identify and describe the statistical nature of concepts and laws in thermodynamics, in particular: entropy, temperature, Thermodynamics

		potentials, Free energies, Maxwell's relations in thermodynamics, behaviour of real gases.
	PHY-HC-3036 Digital Systems & Applications	After successful completion of the course student will be able to understand the working principle of CRO, develop a digital logic and apply it to solve real life problems, Analyze, design and implement combinational logic circuits, Classify different semiconductor memories, Analyze, design and implement sequential logic circuits, Analyze digital system design using PLD, Simulate and implement combinational and sequential circuits.
3 rd	PHY-HG-3016 Thermal Physics & Statistical Mechanics	Upon completion of this course, students are expected learn 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, Maxwell's thermodynamic relations, fundamentals of the kinetic theory of gases, Maxwell-Boltzman distribution law, equipartition of energies, mean free path of molecular collisions, viscosity, thermal conductivity, diffusion and Brownian motion, black body radiations, Stefan-Boltzmann's law, Rayleigh-Jean's law and Planck's law and their significances, quantum statistical distributions, viz., the Bose- Einstein statistics and the Fermi-Dirac statistics. In the laboratory course, the students will be able to Measure of Planck's constant using black body radiation, determine Stefan's Constant, coefficient of thermal conductivity of a bad conductor and a good conductor, determine the temperature coefficient of resistance, study variation of thermo emf across two junctions of a thermocouple with temperature etc.
3 rd	PHY-SE-3014 Physics Workshop Skills	After completing the course the students are expected to become familiar and experience with various mechanical and electrical tools through hands-on mode.
	PHY-HC-4016 Mathematical Physics III	On successful completion of the course students will able to solve complex integrals using residue theorem, apply Fourier and Laplace transforms in solving differential equations, understand properties of Tensor like Transformation of coordinates, contravariant and co-variant tensors, indices rules for combining tensors.
4 th	PHY-HC-4026 Elements of Modern Physics	On completion of the course students will be able to understand modern development in Physics, Starting from Planck's law, it development of the idea of probability interpretation and the formulation of Schrodinger equation. Students will also get preliminary idea of structure of nucleus, radioactivity Fission and Fusion and Laser.
	PHY-HC-4036 Analog Systems &	On successful completion of the course students will be able to understand about the physics of semiconductor p-

4 th	Applications	n junction and devices such as rectifier diodes, zener diode, photodiode etc. and bipolar junction transistors, transistor biasing and stabilization circuits, the concept of feedback in amplifiers and the oscillator circuits, students will also have an understanding of operational amplifiers and their applications.
	PHY-HG-4016 Waves & Optics	Upon completion of this course, students are expected to understand Simple harmonic oscillation and superposition principle, importance of classical wave equation in transverse and longitudinal waves and solving a range of physical systems on its basis, concept of normal modes in transverse and longitudinal waves: their frequencies and configurations, interference as superposition of waves from coherent sources derived from same parent source, Demonstrate understanding of Interference and diffraction experiments, Polarization. In the laboratory course, students 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, the motion of coupled oscillators, study of Lissajous figures and behaviour of transverse, longitudinal waves.
	PHY-SE-4014 BASIC INSTRUMENTATION SKILLS	This course is to get exposure with various aspects of instruments and their usage through hands-on mode. Experiments listed below are to be done in continuation of the topics.
5 th	PHY-HC-5016 Quantum Mechanics & Applications	On successful completion of the course students will be able to understand the principles in quantum mechanics, such as the Schrödinger equation, the wave function, the uncertainty principle, stationary and non-stationary states, time evolution of solutions, as well as the relation between quantum mechanics and linear algebra. Students will be able to solve the Schrödinger equation for hydrogen atom. Students will have the concepts of angular momentum and spin, as well as the rules for quantization and addition of these, spin-orbit coupling and Zeeman Effect.
	PHY-HC-5026 Solid State Physics	On successful completion of the course students should be able to explain the main features of crystal lattices and phonons, understand the elementary lattice dynamics and its influence on the properties of materials, describe the main features of the physics of electrons in solids; explain the dielectric ferroelectric and magnetic properties of solids and understand the basic concept in superconductivity.
	PHY-HE-5046 Physics of Devices and Instruments	Upon completion of this course, students will be able to gain knowledge on advanced electronics devices such as UJT, JFET, MOSFET, CMOS etc., detailed process of

5 th		IC fabrication, Digital Data serial and parallel Communication Standards along with the understanding of communication systems.
	PHY-HE-5056 Nuclear and Particle Physics	Upon completion of this course, students will have the understanding of the sub atomic particles and their properties. They will gain knowledge about the different nuclear techniques and their applications in different branches of Physics and societal application. The course will develop problem based skills and the acquire knowledge can be applied in the areas of nuclear, medical, archeology, geology and other interdisciplinary fields of Physics and Chemistry.
6 th	PHY-HC-6016 Electromagnetic Theory	On successful completion of the course students will acquire the concepts of Maxwell's equations, propagation of electromagnetic (EM) waves in different homogeneous-isotropic as well as anisotropic unbounded and bounded media, production and detection of different types of polarized EM waves, general information as waveguides and fibre optics.
	PHY-HC-6026 Statistical Mechanics	On successful completion of the course students will learn the techniques of Statistical Mechanics to apply in various fields including Astrophysics, Semiconductors, Plasma Physics, Bio-Physics, Chemistry and in many other directions.
	PHY-HE-6036 Advanced Mathematical Physics II	Upon completion of this course, students will be able to apply the concepts of Calculus of Variations, Group Theory and Probability Theory to solve numerical problems in Physics.
	PHY-HE-6056 PHYSICS-DSE: CLASSICAL DYNAMICS	Upon completion of this course, students will have the overview of Newton's Laws of Motion, Special Theory of Relativity by 4-vector approach and fluids. Students will also have the understanding of the Lagrangian and Hamiltonian of a system.. By the end of this course, students will be able to solve the seen or unseen problems/numericals in classical mechanics.

Course outcome for Physics Add-on course:

Paper	Course Outcome
PHY-ADC-01	This course offers an exposure with various aspects of renewable solar energy using solar PV cells and their applications in domestic appliances or equipments. Upon completion of this course students are expected to understand the working principle of solar cell and its various applications. They are expected to understand about semiconductor materials and their applications, learn the technique of soldering electrical components and about different types of rechargeable batteries.
PHY-ADC-02	This course offers an exposure to use of computers for representation, analysis and computation of problems in physics using Python along with basics of MS word. Upon successful completion of this course students would be able to understand the basics of scientific computing. They are expected to be able to handle figures, graphs and data with ease. They are also expected to be able to handle data files, plot graphs and write programs for computation of elementary problems in Physics.

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H. H. H.
(H.O.D.)

Department of Physics
Estd. 2017
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