Rayat Shikshan Sanstha's

DAHIWADI COLLEGE DAHIWADI

Department of Physics 2017-18

Programme Outcomes (POs)

Upon completion of the BSc Physics programme, students will be able to:

PO1	Analyze and compare alternative solutions to physical quantities.
PO2	Design and implement different energy resources that meet specified design and performance requirements
PO3	Recognize the need for and an ability to engage in continuing professional development.
PO4	Work and communicate effectively in interdisciplinary environment, either independently or in team, and demonstrate scientific leadership in academia and industry.
PO5	Communicate effectively by oral, written, computing and graphical means.

Programme Specific Outcomes (PSOs)

Students will be able to attain the following program specific outcomes:-

PSO1	Develop competence in basic technical subjects in physics like Atomic disorder, nanotechnology, solid state devices.
PSO2	Identify, analyze, formulate and develop crystal structure, elasticity, sound
PSO3	Map real life scenarios to various theoretical optimal solutions.
PSO4	Provide simplest automated solutions to various legacy systems.
PSO5	Work professionally with positive attitude as an individual or in multidisciplinary teams and communicate effectively.
PSO6	Appreciate the importance of goal setting and to recognize the need for life-long learning.

Programme Course Outcomes (COs)

B.Sc. Physics paper I Mechanics and Properties of Matter part- I

On successful completion of this course, the students will be able to

CO1	Analogy of rotational motion with translational motion, kater's pendulum
CO2	Be familiar with the elasticity, general concept of fluid flow
CO3	Understand the fundamentals of Bifilar pendulum

B.Sc. Physics paper II oscillation , waves, optics

Upon successful completion of this course, students will be able to

CO1	Understand the basic terminology used oscillation such as Damped oscillations, Over damped , critically damped , forced oscillations, amplitude resonance and Q factor .
CO2	Understand the concept of waves. Group velocity, phase velocity
CO3	Use to detect the Ultrasonic, Piezo-electric effect, and their application.
CO4	Get the knowledge of diffraction and interference in nature

B.Sc. Physics paper III Kinetic theory of gases, Heat and Thermodynamics

Upon successful completion of this course, students will be able to

CO1	To analyze and interprets temperature, Andrew's curve, thermodynamical state, isothermal changes
CO2	Acquire knowledge in fundamentals of thermodynamics.
CO3	Be able to analyze the difference between law of thermodynamics
CO4	Able to handle with Clauisus and Maxwell's equation for mean free path.

B.Sc. Physics paper IV Electricity, Magnetism and Basic Electronics

Upon successful completion of this course, students will be able to

CO1	Understand the basic concept of Complex numbers and their application in solving a. c. series LCR circuit, Ballistic galvanometer, semiconductor.
CO2	Acquire knowledge about the basic concept of construction and working of diode, transistor, their application.
CO3	Role of bridge rectifier, Pi-filter, Clippers and Clampers. Transistor as an amplifier.
CO4	Use of Thevenin's theorem, Norton's theorem, Application to simple networks with D. C. sources.
CO5	Role of Functions involving the idea of magnetism.

B.Sc. Physics paper V General Physics, sound, and Acoustics Part II

Upon successful completion of this course, students will be able to

CO1	Study a body of knowledge relating to vectors, professional motion, sound
CO2	Understand the principles of Del operator, gradient of a scalar, divergence of a vector and their physical significance, curl of a vector, line integral, surface integral, volume integral.
CO3	To identify Transducers and their characteristics, pressure microphone, moving coil loud speaker, process of recording and reproduction of sound in compact disc.
CO4	Develop Reverberation time, Factors affecting acoustics of buildings, Sabine's experimental work and formula, optimum reverberation time. Requirements of good acoustics.

B.Sc. Physics paper VI Electronics

Upon successful completion of this course, students will be able to

CO1	Study of NAND, NOR, Ex-OR and Ex-NOR gates. De Morgan's theorems, NAND and NOR as the universal gates, Half adder and Full adder. R-S flip flop, J-K flip-flop.get the experimental result.
CO2	Understand the concept of opamp and their characteristics.
CO3	Understand and implement application of opamp as adder , substrator, comparator, integrator
CO4	Develop the knowledge about CRO, the Principle, construction & working of CRT, block diagram of CRO. Uses of CRO such as measurement of A.C, D.C. voltage, Lissajous figures, Time period and frequency measurement

B.Sc. Physics paper VII optics and Laser

Upon successful completion of this course, students will be able to

CO1	Brief knowledge about Cardinal points
CO2	Michelson's interferometer & it's applications to measure wave length of' light, refractive index of thin film Construction & working of Fabry – Perot Interferometer.
CO3	Able to handle with optical rotation - laws of rotation of plane of polarization, polarimeter.
CO4	Absorption, Spontaneous & stimulated emission, , Einstein coefficients, population inversion, optical & electrical pumping, properties of lasers, Ruby laser, Helium-Neon laser, uses of laser.
CO5	Introduction to Theory of Half period zones, Principle, construction and working of zone plate, Fresnel's diffraction at a straight edge, interference phenomenon.

B.Sc. Physics paper VIII Relativity and Modern Physics

Upon successful completion of this course, students will be able to

CO1	Demonstrate an understanding of the Inertial and non-inertial frame of reference, Galilean transformation, ether hypothesis. Michelson- Morley experiment, postulates of the special theory of relativity, Lorentz transformations.
CO2	Demonstrate an understanding of the advanced principles and concepts of Zeeman effect, Mosley's diagram, Mosley's law.
CO3	Design and implement Bohr's quantum condition on the basis of matter waves.
CO4	Use Neutron induced reactions, nuclear fission energy released in fission, chain reaction, Nuclear reactor, Atomic Energy in India.

B.Sc. Physics paper IX Mathematical & Statistical Physics Part III

Upon successful completion of this course, students will be able to

CO1	Define, and use of orthogonal curvilinear co-ordinates, gradient, divergence, curl, del and Laplacian in orthogonal curvilinear co-ordinate system, extension of gradient, divergence, curl, del and Laplacian in spherical polar and cylindrical co-ordinate systems.
CO2	Experimental study of black body radiation spectrum, expression for energy density, radiation pressure, relation for radiation pressure due to diffuse radiation in terms of energy density.
CO3	Differentiate the various types of basic concepts related to statistical physics
CO4	Understand the M-B distribution law, evaluation of constants α and β molecular speeds, law of equipartition of energy.

B.Sc. Physics paper X Quantum Mechanics

Upon successful completion of this course, students will be able to

CO1	Physical interpretation of wave function, Definition of an operator, commutation relation in quantum mechanics, Position operator(**x**), Linear momentum operator (**P**), Commutation relation between **x** and **P**, Kinetic energy operator (**T**), Hamiltonian operator (**H**), parity operator ($\boldsymbol{\pi}$), Hermitian operator.
CO2	Quantum mechanical treatment of particle in a rigid box .
CO3	Be familiar with hydrogen atom, Schrodinger's equation for hydrogen atom in spherical polar coordinates.

BSc Physics paper XI Classical Mechanics

Upon successful completion of this course, students will be able to

CO1	Understand the concepts of Mechanics of particle, conservation theorems for linear momentum, angular momentum and energy, Mechanics of system of particles, concept of centre of mass.
CO2	Constraints, degrees of freedom, generalized co-ordinates, principle of virtual work, D'Alembert's principle,
CO3	Develop the skill to understand Frequencies of coupled oscillatory systems, normal modes and normal coordinates, energy of coupled oscillations, energy transfer in coupled oscillatory system.

BSc Physics paper XII Atomic and Molecular Spectra, Astronomy and Astrophysics

Upon successful completion of this course, students will be able to

CO1	Students will learn a Anomalous Zeeman effect and its explanation from vector atom model of one electron system in a weak magnetic field, Lande's **g** factor, Paschen-Back effect, Paschen- Back effect in principal series doublets, selection rules for Paschen-Back effect, difference between Zeeman and Paschen-Back effect.
CO2	Students will also learn Raman Effect, characteristic properties of Raman lines, difference between Raman spectra and infrared spectra, classical theory of Raman Effect.
CO3	Clear the doubts related with The Mars - planetary properties, evidence of geological activities, prospects for life on Mars, The Sun- surface of the Sun, Sunspots, Sunspot cycle.

BSc Physics paper XIII Nuclear and Particle Physics

Upon successful completion of this course, students will be able to

CO1	Identify theories of accelerators, Cyclotron - construction, working, theory- expression for energy of cyclotron and its limitations, Principle of phase stable orbits.
CO2	Identify the basic knowledge of structure of nucleus and their properties.
CO3	Understand the beta decay ,gamma decay, alpha decay.

BSc Physics paper XIV Energy Studies and Materials Science

Upon successful completion of this course, students will be able to

CO1	Understanding of the principles and practice of Renewable energy resources and solar energy.
CO2	Ability to implement, synthesis of nano-materials.
CO3	Demonstrate the Idea of superconductivity, Critical temperature, effect of magnetic field, Meissner Effect, Type – I and Type – II superconductors.
CO4	Demonstrate the ability to use defects in solids - point, line, surface and volume
CO5	Understand the concept of Solar energy spectrum (UV, Visible and IR), thermal route, photovoltaic route, essential subsystems in solar energy plant, solar constant, clarity index, solar insolation, solar energy from satellite station through microwave to earth station.

BSc Physics paper XV Electrodynamics and Electromagnetic Waves

Upon successful completion of this course, students will be able to

CO1	Differentiate between Poisson's and Laplace's equations and their physical significance.
CO2	Prepare the environment to analyse Biot-Savart's law, Equation of continuity, Ampere's law-Integral and differential forms.
CO3	Understand Wave equation for E and B fields in vacuum, plane wave solutions, transverse nature of electromagnetic waves, orthogonality of E , B and propagation vector k , plane electromagnetic waves in vacuum
CO4	Develop a skill of Maxwell's equation ,time varying field.

BSc Physics paper XVI Solid State Physics

Upon successful completion of this course, students will be able to

CO1	Define and analyze the principles of Crystalline and non crystalline solids, space lattice, basis and crystal structure, Unit cell - primitive and non-primitive, Bravais lattices - space groups and crystal structures, symmetry elements of cubic system.
CO2	Define and analyze the concept of Elastic vibrations of linear one dimensional mono-atomic lattice, Expression for frequency and dispersion curve, Elastic vibrations of linear one dimensional diatomic lattice –optical and acoustical excitations in ionic crystals.
CO3	Define and analyze the free electron model of Somerfield theory.
CO4	Understand and implement IC 555 as monostable , astable multivibrator.