PROGRAMME OUTCOME (PO), COURSE OUTCOME (CO) AND PROGRAMME SPECIFIC OUTCOME (PSO) FOR END SEMESTER STUDENTS :: UNDERGRADUATE COURSE (2022-2023)
Programme Name: B.Sc. (PHYSICS)

PROGRAMME OUTCOMES:

PO1: Deep understanding/basic idea/knowledge of the specialized discipline/topic: Getting extensive knowledge in the particular discipline/topic.

PO2: Critical thinking/concept towards problem solving: Making rational decisions which are logical and well-thinking and to define and make a problem, to test explicitness, to explore audacity and trend, to get off motional argument, over reduction.

PO3: Interdisciplinary knowledge/learning: Getting off tendency to keep up prejudged ideas. Evolving of analytical skill and cognitive procedures that are needed to go after through duties. Further to realize inter disciplinary ideas and conditions in terms of combined and total outlook. Giving relation across different subjects or disciplines to enrich learning.

PO4: Capability in analytical and creative thinking skills: Nourish innovative skills in order to follow things from a different view and help to make able of creating special objectives or options, indulging doubtfulness that are to be helpful in solving problems and making contact with others.

PO5: Scientific Values and ethics: Aid to fix scientific utilities, considered as approved tool, for the total growth of personality and moral ideas which lead in case of ethical difficulties and to remove those things that do not obey to the senses of right and wrong.

PO6: Acquaintance with the recent developments in the area of subject: Obtaining the recent evolution that have happened in the subject in order to stay up-to-date on the latest trends in the subject.

PO7: Environmental awareness for sustainable development: Comprehending the brittle character of the environment and its degradation due to environmental changing activities. Getting the way through the gaining cognition of the field, for the safe of the inherent world in order to arrive at acceptable growth.

PO8: Laboratory and instrumentation skills: Acquired applied/practical information and abilities that will help to study the matter in well method and to comprehend the possibility, opportunities,and limits of the subject and excite thoughts in the uses of skills collected to investigation events and to the resolution of difficulties of laboratories/industries.

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PROGRAMME SPECIFIC OUTCOMES

PSO 1	Will acquire broad information of diverse phases of Physics through theory and practical experiments and get to know the basic principles and major concepts of different branches of Physics and their solicitations.
PSO 2	Will realize the capability of systematic thinking and satisfactory unruly explaining abilities required ingaining intuition into the different branches of Physics.
PSO 3	Will become able in detail of manipulative and transport out physics experimentations and accomplished of applying suitable procedures for qualitative and reckonable study of data/results. Will also be able to analyzed data, understand the outcomes of experiments and draw a reasonable assumption, while maintaining proper scientific conduct.
PSO 4	Will become to identify how to tail the techniques/steps and principles/guidelines for suitable management of devices and how to use accurately the several instruments and apparatus's.
PSO 5	Will encourage students for doing higher studies like M.Sc./Ph.D. in Physics/related disciplines and Introduce an motivation for pleasing up theoretical work and laboratory-based research action.
PSO 6	Will improve awareness in some practical fields/branches in Physics such as Nanoscience and Nano Technology/Nano Materials and Uses, Material Science, Quantum Information and Applied Optics/Photonics, Computational Physics, Biological Physics/Bioinformatics, Medical Physics, Communication Electronics, Nuclear Technology, Atmospheric Physics/Science, Space Science, Physics of Earth, Renewable Energy & Energy Harvesting etc., which helps employability in public sector undertakings and Government administrations like Scientific/Research Institutes/Laboratories as well as in private laboratories/industries.

Course Outcomes (CO) for End Semester Students:

CO17: [Paper CC-13: Electromagnetic Theory]

CO17.1: To get knowledge on Maxwell's equations, wave equation and properties of EM waves

CO17.2: To get knowledge/concept regarding propagation of EM waves through unbounded and bounded media

CO17.3: To acquire knowledge on polarization of electromagnetic waves and its application to waves guides and optical fibres

CO18: [Paper CC-14: Statistical Mechanics]

CO18.1 To learn about classical statistical mechanics and acquire some basic

concepts CO 18.2 To learn about classical theory of radiation

CO 18.3 To learn about quantum statistical mechanics and application of BE and FD Statistics to material physics and astrophysics

CO19: [Paper DSE-3: Nano Materials and Applications]

CO19.1 To acquire knowledge on some basic aspects of nano technology

CO19.2 To gain some introductory/basic idea/concept on 1D, 2D and 3D nanostructures (nanodots, thin films, nanowires, nanorods)

CO20: [Paper DSE-4: Experimental Techniques]

CO20.1 To acquire knowledge on some basics of experimental techniques like measurements, signals and systems, shielding and groundings

CO20.2 To acquire some ideas on working principles, applications of transducers, industrial instrumentation, vacuum systems

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DETAILED SYLLABUS OF END (6th) SEMESTER UG HONOURS COURSE

DEPARTMENT OF PHYSICS

CC-13: Electromagnetic Theory CC13T:
Electromagnetic Theory
Course
Contents:

Maxwell Equations

Maxwell's equations. Displacement Current. Vector and Scalar Potentials. Gauge Transformations: Lorentz and Coulomb Gauge. Boundary Conditions at Interface between Different Media. Wave Equations. Plane Waves in Dielectric Media. Poynting Theorem and Poynting Vector. Electromagnetic (EM) Energy Density. Physical Concept of Electromagnetic Field Energy Density, Momentum Density and Angular Momentum Density.

EM Wave Propagation in Unbounded Media

Plane EM waves through vacuum and isotropic dielectric medium, transverse nature of plane EM waves, refractive index and dielectric constant, wave impedance. Propagation through conducting media, relaxation time, skin depth. Wave propagation through dilute plasma, electrical conductivity of ionized gases, plasma frequency, refractive index, skin depth, application to propagation through ionosphere.

EM Wave in Bounded Media

Boundary conditions at a plane interface between two media. Reflection & Refraction of plane waves at plane interface between two dielectric media-Laws of Reflection & Refraction. Fresnel's Formulae for perpendicular & parallel polarization cases, Brewster's law. Reflection &Transmission coefficients. Total internal reflection, evanescent waves. Metallic reflection (normal Incidence).

Polarization of Electromagnetic Waves

Description of Linear, Circular and Elliptical Polarization. Propagation of E.M. Waves in Anisotropic Media. Symmetric Nature of Dielectric Tensor. Fresnel's Formula. Uniaxial and Biaxial Crystals. Light Propagation in Uniaxial Crystal. Double Refraction. Polarization by Double Refraction. Nicol Prism. Ordinary & extraordinary refractive indices. Production & detection of Plane, Circularly and Elliptically Polarized Light. Phase Retardation Plates: Quarter-Wave and Half-Wave Plates. Babinet Compensator and its Uses. Analysis of Polarized Light.

Rotatory Polarization: Optical Rotation. Biot's Laws for Rotatory Polarization. Fresnel's Theory of optical rotation. Calculation of angle of rotation. Experimental verification of Fresnel's theory. Specific rotation. Laurent's half-shade polarimeter.

Wave guides

Planar optical wave guides. Planar dielectric wave guide. Condition of continuity at interface. Phase shift on total reflection. Eigenvalue equations. Phase and group velocity of guided waves. Field energy and Power transmission.

Optical Fibres

Numerical Aperture. Step and Graded Indices (Definitions Only). Single and Multiple Mode Fibres (Concept and Definition Only).

C13P: Electromagnetic Theory
(Lab)
List of Practical:

1. To verify the law of Malus for plane polarized light.
2. To determine the specific rotation of sugar solution using Polarimeter.
3. To analyze elliptically polarized Light by using a Babinet's compensator.
4. To study dependence of radiation on angle for a simple Dipole antenna.
5. To determine the wavelength and velocity of ultrasonic waves in a liquid (Kerosene Oil, Xylene, etc.) by studying the diffraction through ultrasonic grating.
6. To study the reflection, refraction of microwaves.
7. To study Polarization and double slit interference in microwaves.

8. To determine the refractive index of liquid by total internal reflection using Wollaston's air-film.
9. To determine the refractive Index of (1) glass and (2) a liquid by total internal reflection using a Gaussian eyepiece.
10. To study the polarization of light by reflection and determine the polarizing angle for airglass interface.
11. To verify the Stefan`s law of radiation and to determine Stefan's constant.
12. To determine the Boltzmann constant using V-I characteristics of PN junction diode.

CC-14: Statistical Mechanics
CC14T: Statistical Mechanics
Course Contents:
Classical Statistical Mechanics
Macrostate & Microstate, Elementary Concept of Ensemble, Microcanonical ensemble, Phase Space, Entropy and Thermodynamic Probability, Canonical ensemble, Partition Function, Thermodynamic Functions of an Ideal Gas, Classical Entropy Expression, Gibbs Paradox, Sackur Tetrode equation, Law of Equipartition of Energy (with proof)– Applications to Specific Heat and its Limitations, Thermodynamic Functions of a Two-Energy Levels System, Negative Temperature. Grand canonical ensemble and chemical potential.

Classical Theory of Radiation
Properties of Thermal Radiation. Blackbody Radiation. Pure temperature dependence. Kirchhoff's law. Stefan-Boltzmann law: Thermodynamic proof. Radiation Pressure. Wien's Displacement law. Wien's Distribution Law. Saha's Ionization Formula. Rayleigh-Jean's Law. Ultraviolet Catastrophe. Quantum Theory of Radiation Spectral Distribution of Black Body Radiation. Planck's Quantum Postulates. Planck's Law of Blackbody Radiation: Experimental Verification. Deduction of (1) Wien's Distribution Law, (2) Rayleigh-Jeans Law, (3) Stefan-Boltzmann Law, (4) Wien's Displacement law from Planck's law.

Bose-Einstein Statistics:
B-E distribution law, Thermodynamic functions of a strongly Degenerate Bose Gas, Bose Einstein condensation, properties of liquid He (qualitative description), Radiation as a photon gas and Thermodynamic functions of photon gas. Bose derivation of Planck's law.

Fermi-Dirac Statistics:
Fermi-Dirac Distribution Law, Thermodynamic functions of a Completely and strongly Degenerate Fermi Gas, Fermi Energy, Electron gas in a Metal, Specific Heat of Metals, Relativistic Fermi gas, White Dwarf Stars, Chandrasekhar Mass Limit.

C14P: Statistical Mechanics (Lab)

List of Practical:
1. Computational analysis of the behavior of a collection of particles in a box that satisfy Newtonian mechanics and interact via the Lennard-Jones potential, varying the total number of particles N and the initial conditions: a) Study of local number density in the equilibrium state (i) average; (ii) fluctuations. b) Study of transient behavior of the system (approach to equilibrium). c) Relationship of large N and the arrow of time. d) Computation of the velocity distribution of particles for the system and comparison with the Maxwell velocity distribution. e) Computation and study of mean molecular speed and its dependence on particle mass. f) Computation of fraction of molecules in an ideal gas having speed near the most probable speed.
2. Computation of the partition function $Z(\beta)$ for examples of systems with a finite number of single particle levels (e.g., 2 level, 3 level, etc.) and a finite number of non-interacting particles N under Maxwell-Boltzmann,
Fermi-Dirac and Bose- Einstein statistics: a) Study of how $Z(\beta)$, average energy , energy fluctuation βE, specific heat at constant volume Cv, depend upon the temperature, total number of particles N and the spectrum of single particle states. b) Ratios of occupation numbers of various states for the systems considered above c) Computation of physical quantities at large and small temperature T and comparison of various statistics at large and small temperature T.

3. Plot Planck's law for Black Body radiation and compare it with Raleigh-Jeans Law at high temperature and low temperature.
4. Plot Specific Heat of Solids (a) Dulong-Petit law, (b) Einstein distribution function, (c) Debye distribution function for high temperature and low temperature and compare them for these two cases.
5. Plot the following functions with energy at different temperatures
a) Maxwell-Boltzmann distribution b) Fermi-Dirac distribution c) Bose-Einstein distributio

DSE-3: Nano Materials and Applications 06
DSE3T: Nano Materials and Applications 04
Course Contents:

Nanoscale Systems

Length scales in physics, Nanostructures: 1D, 2D and 3D nanostructures (nanodots, thin films,nanowires, nanorods), Band structure and density of states of materials at nanoscale, Size Effects in nano systems, Quantum confinement: Applications of Schrodinger equation- Infinite potential well, potential step, potential box, quantum confinement of carriers in 3D, 2D, 1D nanostructures and its consequences.

Synthesis of Nanostructure Materials

Top down and Bottom up approach, Photolithography. Ball milling. Gas phase condensation. Vacuum deposition. Physical vapor deposition (PVD): Thermal evaporation, E-beam evaporation, Pulsed Laser deposition. Chemical vapor deposition (CVD). Sol-Gel. Electro deposition. Spray pyrolysis. Hydrothermal synthesis. Preparation through colloidal methods. MBE growth of quantum dots.

Characterization

X-Ray Diffraction. Optical Microscopy. Scanning Electron Microscopy. Transmission Electron Microscopy. Atomic Force Microscopy. Scanning Tunneling Microscopy.

Optical Properties

Coulomb interaction in nanostructures. Concept of dielectric constant for nanostructures and charging of nanostructure. Quasi-particles and excitons. Excitons in direct and indirect band gap semiconductor nanocrystals. Quantitative treatment of quasi-particles and excitons, charging effects. Radiative processes: General formalization-absorption, emission and luminescence. Optical properties of heterostructures and nanostructures.

Electron Transport

Carrier transport in nanostrucutures. Coulomb blockade effect, thermionic emission, tunneling and hoping conductivity. Defects and impurities: Deep level and surface defects.

Applications

Applications of nanoparticles, quantum dots, nanowires and thin films for photonic devices (LED, solar cells). Single electron transfer devices (no derivation). CNT based transistors. Nanomaterial Devices: Quantum dots heterostructure lasers, optical switching and optical data storage. Magnetic quantum well; magnetic dots - agnetic data storage. Micro Electromechanical Systems (MEMS), Nano Electromechanical Systems (NEMS).

DSE3P: Nano Materials and Applications (Lab)
List of Practical

1. Synthesis of metal nanoparticles by chemical route.
2. Synthesis of semiconductor nanoparticles.
3. Surface Plasmon study of metal nanoparticles by UV-Visible spectrophotometer.
4. XRD pattern of nanomaterials and estimation of particle size.
5. To study the effect of size on color of nanomaterials.
6. To prepare composite of CNTs with other materials.
7. Growth of quantum dots by thermal evaporation.
8. Prepare a disc of ceramic of a compound using ball milling, pressing and sintering, and study its XRD.
9. Fabricate a thin film of nanoparticles by spin coating (or chemical route) and study transmittance spectra in UV-Visible region.
10. Prepare a thin film capacitor and measure capacitance as a function of temperature or frequency.
11. Fabricate a PN diode by diffusing Al over the surface of N-type Si and study its V-I characteristics.

DSE-4: Experimental Techniques C DSE4T: Experimental Techniques Credits 04 Course Contents:

Measurements
Accuracy and precision. Significant figures. Error and uncertainty analysis. Types of errors: Gross error, systematic error, random error. Statistical analysis of data (Arithmetic mean, deviation from mean, average deviation, standard deviation, chi-square) and curve fitting. Guassian distribution.

Signals and Systems
Periodic and aperiodic signals. Impulse response, transfer function and frequency response of first and second order systems. Fluctuations and Noise in measurement system. S/N ratio and Noise figure. Noise in frequency domain. Sources of Noise: Inherent fluctuations, Thermal noise, Shot noise, 1/f noise.

Shielding and Grounding
Methods of safety grounding. Energy coupling. Grounding. Shielding: Electrostatic shielding. Electromagnetic Interference.

Transducers &industrial instrumentation (working principle, efficiency, applications)
Static and dynamic characteristics of measurement Systems. Generalized performance of systems, Zero order first order, second order and higher order systems. Electrical, Thermal and Mechanical systems. Calibration. Transducers and sensors. Characteristics of Transducers. Transducers as electrical element and their signal conditioning. Temperature transducers: RTD, Thermistor, Thermocouples, Semiconductor type temperature sensors (AD590, LM35, LM75) and signal conditioning. Linear Position transducer: Strain gauge, Piezoelectric. Inductance change transducer: Linear variable differential transformer (LVDT), Capacitance change transducers. Radiation Sensors: Principle of Gas filled detector, ionization chamber, scintillation detector.

Digital Multimeter Comparison of analog and digital instruments. Block diagram of digital multimeter, principle of measurement of I, V, C. Accuracy and resolution of measurement.

Impedance Bridges and Q-meter
Block diagram and working principles of RLC Bridge. Q - meter and its working operation. Digital LCR bridge.

Vacuum Systems Characteristics of vacuum: Gas law, Mean free path. Application of vacuum. Vacuum system Chamber, Mechanical pumps, Diffusion pump & Turbo Modular pump, Pumping speed, Pressure gauges (Pirani, Penning, ionization).

DSE4P: Experimental Techniques (Lab)
List of Practical
1. Determine output characteristics of a LVDT & measure displacement using LVDT
2. Measurement of Strain using Strain Gauge.
3. Measurement of level using capacitive transducer.
4. To study the characteristics of a Thermostat and determine its parameters.
5. Study of distance measurement using ultrasonic transducer.
6. Calibrate Semiconductor type temperature sensor (AD590, LM35, or LM75)
7. To measure the change in temperature of ambient using Resistance Temperature Device (RTD).
8. Create vacuum in a small chamber using a mechanical (rotary) pump and measure the chamber pressure using a pressure gauge.
9. Comparison of pickup of noise in cables of different types (co-axial, single shielded, double shielded, without shielding) of 2m length, understanding of importance of grounding using function generator of mV level & an oscilloscope.
10. To design and study the Sample and Hold Circuit.
11. Design and analyze the Clippers and Clampers circuits using junction diode
12. To plot the frequency response of a microphone.
13. To measure Q of a coil and influence of frequency, using a Q-meter.

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO17.1	✔	✔		✔				✔	✔	✔	✔	✔	✔
CO17.2	✔	✔		✔				✔	✔	✔	✔	✔	✔
CO17.3	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔	✔	✔
CO18.1	✔	✔		✔				✔	✔	✔	✔		✔
CO18.2	✔	✔		✔				✔	✔	✔	✔		✔
CO18.3	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔		✔
CO19.1	✔	✔	✔					✔	✔	✔	✔	✔	✔
CO19.2	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔	✔	✔
CO20.1	✔	✔	✔					✔	✔	✔	✔	✔	✔
CO20.2	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔

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MAPPING OF CO AND PO (HONOURS COURSE)

JUSTIFICATION MATRIX OF CO WITH PO & PSO (High:3, Medium:2,

	Mapping	Correlation	Justification
CO17.1	PO1	HIGH	Students learned elementary and enough information on Maxwell's equations, wave equation and properties of EM waves
	PO2	HIGH	Helps to describe critical thinking and intellectualize a problem, study confirmation
	PO4	LOW	Helps to encourage imaginative thoughtful abilities
	PO6	LOW	Students will be capable to invent the latest growths that have happened in the subject area in order to stay up-to-date on the newest developments in the subject.
	PO8	MEDIUM	Students will be able to gain some laboratory skills
	PSO1	MEDIUM	Get elementary information and concepts that will be useful in different branches of Physics
	PSO2	MEDIUM	Realize the capability and skills needed in gaining perception in various branches of Physics
	PSO3	LOW	Will be effective to transmit out experimentations
	PSO4	LOW	Will be able to identify the techniques/stages in carrying out experiments
	PSO5	HIGH	Will be cooperative for MSc entrance Test of different Universities and also for NET/JEST/GATE/SET/PhD entrance test and other competitive examinations
	PSO6	HIGH	Will develop basic knowledge required in different branches of Physics
CO17.2	PO1	HIGH	Students learned complete and adequate information about the propagation of electromagnetic waves through unbounded and bounded media.
	PO2	HIGH	Helps to describe critical thinking and intellectualize a problem, study confirmation
	PO4	LOW	Helps to encourage imaginative thoughtful abilities
	PO6	LOW	Students will be capable to invent the latest growths that have happened in the subject area in order to stay up-to-date on the newest developments in the subject.
	PO8	MEDIUM	Students will be able to gain some laboratory skills
	PSO1	MEDIUM	Get elementary information and concepts that will be useful in different branches of Physics
	PSO2	MEDIUM	Realize the capability and skills needed in gaining perception in various branches of Physics
	PSO3	LOW	Will be effective to transmit out experimentations
	PSO4	LOW	Will be able to identify the techniques/stages in carrying out experiments
	PSO5	HIGH	Will be cooperative for MSc entrance Test of different Universities and also for NET/JEST/GATE/SET/PhD entrance test and other competitive examinations
	PSO6	HIGH	Will develop basic knowledge required in different branches of Physics
CO17.3	PO1	HIGH	Students acquired complete knowledge about polarization of electromagnetic waves and its application to waves guides and fibre optics
	PO2	HIGH	Helps to describe critical thinking and intellectualize a problem, study confirmation
	PO3	HIGH	Help to gain fundamental knowledge
	PO4	LOW	Helps to encourage imaginative thoughtful abilities
	PO5	LOW	Help to infix scientific values
	PO6	HIGH	Students will be capable to invent the latest growths that have happened in the subject area in order to stay up-to-date on the newest developments in the subject.
	PO8	HIGH	Students will be able to gain some laboratory skills
	PSO1	HIGH	Get elementary information and concepts that will be useful in different branches of Physics
	PSO2	HIGH	Realize the capability and skills needed in gaining perception in various branches of Physics
	PSO3	MEDIUM	Will be effective to transmit out experimentations
	PSO4	LOW	Will be able to identify the techniques/stages in carrying out experiments
	PSO5	HIGH	Will be cooperative for MSc entrance Test of different Universities and also for NET/JEST/GATE/SET/PhD entrance test and other competitive examinations
	PSO6	HIGH	Will develop knowledge in some of the application of electromagnetic waves such as optical fibre
CO18.1	PO1	HIGH	Students learn about idea of some fundamental concepts of classical statistical mechanics.
	PO2	HIGH	Enables to improve critical intellectual to clarify the problem of classical

	PSO1	HIGH	Acquire comprehensive knowledge of different aspects of classical statistical mechanics
	PSO2	HIGH	Will get ability of logical thinking and problem solving skills on classical statistical mechanics
	PSO3	HIGH	Will be capable to cart out Python Programming of some physical problems
	PSO5	HIGH	Will be helpful for MSc entrance Test of different Universities and also for NET/JEST/GATE/SET/PhD entrance test and other competitive examinations
	PSO6	HIGH	Will improve elementary knowledge necessary in different branches of Physics
CO18.2	PO1	HIGH	Students acquire comprehensive knowledge about classical theory of radiation
	PO2	HIGH	Students progress satisfactory skills/concepts of critical thinking in classical theory of radiation
	PO4	MEDIUM	Helps to encourage imaginative thoughtful abilities
	PO8	HIGH	Enables to develop skills in Python Programming of some physical problems
	PSO1	HIGH	Get elementary information and concepts that will be useful in different branches of Physics
	PSO2	HIGH	Realize the capability and skills needed in gaining perception in various branches of Physics
	PSO3	HIGH	Will be effective to transmit out experimentations
	PSO5	HIGH	Will be cooperative for MSc entrance Test of different Universities and also for NET/JEST/GATE/SET/PhD entrance test and other competitive examinations
	PSO6	HIGH	Will develop basic knowledge required in different branches of Physics
CO18.3	PO1	HIGH	Obtain elementary knowledge/idea on quantum statistical mechanics
	PO2	HIGH	Procure knowledge about critical perceptive/thoughts on BE and FD Statistics and their application
	PO3	HIGH	Help to gain fundamental knowledge
	PO4	HIGH	Helps to encourage imaginative thoughtful abilities
	PO5	HIGH	Help to infix scientific values
	PO6	HIGH	Students will be capable to invent the latest growths that have happened in the subject area in order to stay up-to-date on the newest developments in the subject
	PO8	HIGH	Enables to develop skills in Python Programming of some physical problems
	PSO1	HIGH	Get elementary information and concepts that will be useful in different branches of Physics
	PSO2	HIGH	Realize the capability and skills needed in gaining perception in various branches of Physics
	PSO3	HIGH	Will be capable/efficient to carry out Python Programming of some physical problems
	PSO5	HIGH	Will be helpful for MSc entrance Test of different Universities and also for NET/JEST/GATE/SET/PhD entrance test and other competitive examinations
	PSO6	HIGH	Will develop basic knowledge in some of the application of quantum statistics
CO19.1	PO1	HIGH	Obtain basic concept on nanotechnology
	PO2	HIGH	Students improve adequate skills/concepts of 1D,2D,3D nanostructure
	PO3	MEDIUM	Helps to secure elementary information in interdisciplinary topics
	PO8	HIGH	Enables to develop basic skills in the laboratory based practical
	PSO1	HIGH	Acquire comprehensive knowledge of different aspects of nanotechnology and its application
	PSO2	MEDIUM	Will get facility of disciplined intellectual and problem solving skills on nanotechnology
	PSO3	MEDIUM	Will be well-organized to carry out some basic experiments
	PSO4	LOW	Will be able to know the techniques/phases in carrying out experiments
	PSO5	LOW	Will be helpful for MSc entrance Test of different Universities and also for NET/JEST/GATE/SET/PhD entrance test and other competitive examinations
	PSO6	HIGH	Will develop sufficient knowledge on nanotechnology and its synthesis, characterization and properties
CO19.2	PO1	HIGH	Acquire knowledge on optical properties of nanostructure
	PO2	HIGH	Students will be make to understand on basic ideas of quantum dots
	PO3	HIGH	Helps to secure elementary information in interdisciplinary topics
	PO4	LOW	Helps to encourage imaginative thoughtful abilities

	PO5	MEDIUM	Help to infix scientific values
	PO6	HIGH	Students will be capable to invent the latest growths that have happened in the subject area in order to stay up-to-date on the newest developments in the subject
	PO8	MEDIUM	Students get acquainted with some laboratory experiments
	PSO1	HIGH	Acquire comprehensive knowledge of different aspects of nanotechnology through its synthesis and characterization
	PSO2	MEDIUM	Will get ability of methodical thinking and problem solving skills on nanotechnology
	PSO3	MEDIUM	Will be well-organized to carry out some basic experiments
	PSO4	LOW	Will be able to know the techniques/phases in carrying out experiments
	PSO5	LOW	Will be helpful for MSc entrance Test of different Universities and also for NET/JEST/GATE/SET/PhD entrance test and other competitive examinations
	PSO6	HIGH	Will develop sufficient basic knowledge of the application of nanotechnology such as nanowires, thin films, photonic devices
CO20.1	PO1	HIGH	Students will get elementary idea on the tentative methods like measurement etc
	PO2	HIGH	Students create enquiring and thinking to enhance the matter of this course.
	PO3	HIGH	Helps to get simple information basic topics
	PO8	MEDIUM	Students get familiar with certain laboratory tests
	PSO1	MEDIUM	Obtain complete information of diverse features of experimental skills
	PSO2	MEDIUM	Will obtain capability of systematic philosophy and problem resolving abilities about the experimental skills
	PSO3	MEDIUM	Will be capable to perform various simple tests
	PSO4	LOW	Will be capable to identify the techniques/phases in performing tests
	PSO5	LOW	Will be supportive for MSc entrance Test of different Universities and also for NET/JEST/GATE/SET/PhD entrance test and other competitive examinations
	PSO6	HIGH	Will grow enough information of the uses of experimental techniques
CO20.2	PO1	HIGH	Students will get various elementary idea for this identified subject
	PO2	MEDIUM	Students make inquiring and cognitive to improve this zone of topic for this course
	PO3	HIGH	Helps to get elementary information in interdisciplinary subjects
	PO4	LOW	Helps to nurture logical and artistic thinking of skills
	PO5	MEDIUM	Help to impress logical morals
	PO6	LOW	Pupils will be capable to get the latest growths in the topic to be latest on the recent trends in the topic
	PO7	LOW	Will acquire some information on ecological consciousness
	PO8	MEDIUM	Students will be conscious with some elementary tests
	PSO1	MEDIUM	Obtain inclusive awareness of various features of testing skills over waged principle, use of transducers, manufacturing equipment, and void methods.
	PSO2	LOW	Will get capability of careful thinking and problem solving abilities around these specified courses.
	PSO3	MEDIUM	Will be capable to perform some basic tests
	PSO4	LOW	Will be capable to know the processes/stages in performing various tests
	PSO5	MEDIUM	Will be helpful for MSc entrance Test of different Universities and also for NET/JEST/GATE/SET/PhD entrance test and other competitive examinations
	PSO6	HIGH	Will grow enough information of the use of experimental methodsin in different branches of Physics

ARTICULATION MATRIX OF CO WITH PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO17.1	3	3		1		1		2	2	2	1	1	3	3
CO17.2	3	3		1		1		2	2	2	1	1	3	3
CO17.3	3	3	3	1	1	3		3	3	3	2	1	3	3
CO18.1	3	3		2				3	3	3	3		3	3
CO18.2	3	3		2				3	3	3	3		3	3
CO18.3	3	3	3	3	3	3		3	3	3	3		3	3
CO19.1	3	3	2					3	3	2	3	2	2	3
CO19.2	3	3	3	1	2	3		2	3	2	2	1	1	3
CO20.1	3	3	3					2	2	2	2	1	1	3
CO20.2	3	2	3	1	2	1	1	2	2	1	2	1	2	3
TARGET	3	2.9	2.8	1.5	2.0	2.0	1	2.6	2.6	2.3	2.2	1.1	2.4	3

The following list of students from 2022-2023 Batch have taken admission into higher studies:

Sl. No.	Name of student enrolling into higher education	Program graduated from	Name of institution joined	Name of programme admitted to
1	BISHWAROOP PAHARI	B.Sc. Hons in PHYSICS	PRABHAT KUMAR COLLEGE, CONTAI	M.Sc. in Physics
2	KALLOL PAHARI	B.Sc. Hons in PHYSICS	----	M.Sc. in Physics
3	RAHUL GIRI	B.Sc. Hons in PHYSICS	----	---
4	RIJU DAS	B.Sc. Hons in PHYSICS	BELDA COLLEGE	M.Sc. in Physics
5	SAYAN PATRA	B.Sc. Hons in PHYSICS	BIRENDRANATH SASMAL P.T.T.I.	B.ED.

DIPAK KUMAR TAMILI

Digitally signed by DIPAK KUMAR TAMILI
DN: c=IN, postalCode=721429, st=WEST BENGAL, street=EGRA, EAST MIDNAPORE, l=EGRA, o=EGRA SARADA SHASHI BHUSAN COLLEGE, ou=PRINCIPAL & DDO, serialNumber=146520c32d95593132b0022ca159eb9ed30aee4042abcf6913d6b4eed49e8b77, pseudonym=e3a91c86e5b7424fa9bc82279346d753, 2.5.4.20=2b6151021361 3f91f9c5b8d5ebe03f602445220196d064b1cb8d117e880413c1, email=TAMILIDK@GMAIL.COM, cn=DIPAK KUMAR TAMILI
Date: 2024.02.06 15:52:21 +05'30'