PHYSICS (MAJOR) 2023-24									
SEMESTER – I (NEP) July'23 – December'23									
Paper	DSC - 1	No of Lectu-res	Faculty	Paper	SEC-1 / IDC	No of Lectu-res	Faculty	Mid Semester Exam.	Parent Teacher Meeting
DSC-1-TH	**BASIC PHYSICS-I (Theory)**	50		SEC-1-PR	**INTRODUCTION TO COMPUTER PROGRAMMING AND GRAPH PLOTTING (Practical)**	60		Mid of November	Mid of December
	(A) Mathematical Physics:	20							
	1. Preliminaries	5	SN		**1. Introduction to Graph Plotting (2D only, using GNUPLOT):**	15	BC		
	2. Ordinary Differential Equations	2	GDP		(a) Plotting 2D graphs				
	3. Vectors	7	DP		(b) User defined functions				
	4. Curvilinear coordinates	6	DP		(c) Fitting data files using gnuplot				
	(B) Classical Mechanics:	30			(d) Polar and parametric plots				
	1. Review of Newton's Laws	6	BC		(e) Conditional Plotting of data from file				
	2. Work Kinetic Energy Theorem	4	BC		**2. Introduction to programming in python (Version 3):**				
	3. Dynamics of a system of particles	4	BC		(a) Introduction	15	SD		
	4. Central force	8	SD		(b) The python data types	15	SN		
	5. Scattering	2	GDP		**3. Problems and Applications:**	15	SN		
	6. Mechanics of Continuum	6	GDP						

DSC-1-PR	BASIC PHYSICS-I (Practical)	30	GDP	IDC-TH	FRONTIERS IN PHYSICS:	50	
	1. Measurement of the diameter of a wire using screw gauge a number of times and to determine the mean, median, mode & standard deviation for study of random error in observation				1. Nature of Science	10	SD
	2. Measurement of a suitable vertical height using Sextant				2. Universe	10	SD
	3. Determination of the Moment of Inertia of a metallic cylinder / rectangular rod about an axis passing through its centre of gravity				3. Matter	15	SD
	4. Determination of modulus of rigidity of the material of a suspension wire by dynamical method.				4. Forces	15	SN
	5. To determine the coefficient of viscosity of water by Poiseuille's method						

PHYSICS (MAJOR) 2023-24									
SEMESTER – II (NEP) January'24 – June'24									
Paper	DSC - 2	No of Lectu-res	Faculty	Paper	SEC-2 / IDC	No of Lectu-res	Faculty	Mid Semester Exam.	Parent Teacher Meeting
DSC-2-TH	**BASIC PHYSICS-II (Theory)**	50		SEC-2-PR	**SCIENTIFIC WRITING SKILLS (LATEX) (Practical)**	60		Mid of April	First week of May
	(A) Basic Electricity and Magnetism	22			1. *Introduction to LATEX*	30	DP		
	1. Electrostatics	11	SN		2. *Document classes*				
	2. Lorentz force	3	SD		3. *Page Layout*				
	3. Magnetostatics	8	SD		4. *List structures*				
					5. *Representation of mathematical equations*				
	(B) Introduction to Thermodynamics	28			6. *Customization of fonts*	30	SD		
	1. *Kinetic theory*	3	BC		7. *Writing tables*				
	2. *Zeroth and First Law of Thermodynamics*	9	GDP		8. *Figures*				
	3. *Second Law of Thermodynamics*	10	DP						
	3. *Entropy*	6	BC						

DSC-2-PR	BASIC PHYSICS-II (Practical)	30		BC	IDC-TH	FRONTIERS IN PHYSICS:	50			
	1. Conversion of an ammeter to voltmeter and vice versa					1. Nature of Science	10	SD		
	2. Determination of an unknown low resistance using Carey-Foster's Bridge					2. Universe	10	SD		
	3. Measurement of current by potentiometer					3. Matter	15	SD		
	4. Measurement of pressure coefficient of expansion of air by Jolly's apparatus.					4. Forces	15	SN		
	5. Measurement of coefficient of thermal expansion of a metallic rod by optical lever arrangement.									

PHYSICS (HONS.) 2023-24									
SEMESTER – III (CBCS) July'23 – December'23									
Paper	Core Course - 5	No of Lectu-res	Faculty	Paper	Core Course - 6	No of Lectu-res	Faculty	Mid Semester Exam.	Parent Teacher Meeting
PHS-A-CC-3-5-TH	**Mathematical Physics - II (Theory)**	60		PHS-A-CC-3-6-TH	**Thermal Physics (Theory)**	60		Mid of November	Mid of December
	1. Fourier Series	10	SD		1. Introduction to Thermodynamics	25	GDP		
	2. Frobenius Method and Special Functions	20	SD		2. Thermodynamic Potentials	15	GDP		
	3. Some Special Integrals	04	SD		3. Kinetic Theory of Gases	15	DP		
	4. Integrals Transforms	10	SN		4. Conduction of Heat	05	DP		
	5. Introduction to probability	06	SN						
	6. Partial Differential Equations	10	SN						
PHS-A-CC-3-5-P	**Mathematical Physics - II (Practical)**	60	SN + SD	PHS-A-CC-3-6-P	**Thermal Physics (Practical)**	60	DP + GDP	Mid of November	Mid of December
	1. Introduction to numpy and scipy:-				1. Determination of the coefficient of thermal expansion of a metallic rod using an optical lever.				
	• the numpy array				2. Calibration of a thermocouple by direct				

					measurement of the thermo-emf using potentiometer and the constants.				
	• Using numpy for matrix operators (the 2D numpy array)				**3.** To determine the Coefficient of Thermal Conductivity of a bad conductor by Lee and Charlton's disc method.				
	• Scientific Applications				4. To determine the boiling point of a liquid using Platinum Resistance Thermometer (PRT).				
	2. Introduction to mathplotlib (Using the pyplot submodule)				5. To determine Temperature Coefficient of Resistance using Carey Foster bridge.				

Paper	Core Course - 7	No of Lectu-res	Faculty	Paper	Skill Enhancement Courses – SEC-A1	No of Lectu-res	Faculty	Mid Semester Exam.	Parent Teacher Meeting
PHS-A-CC-3-7-TH	**Modern Physics (Theory)**	60		PHS-A-3-SEC-A-1 TH	**Scientific Writing (Theory)**	15		Mid of November	Mid of December
	1. Radiation and its nature.	15	BC		1. Introduction to L ATEX	2	SD		
	2. Basics of Quantum Mechanics	15	BC		2. Document classes	1	SD		
	3. Nuclear Structure	10	BC		3. Page Layout	2	SD		
	4. Interaction with and within nucleus	12	DP		4. List structures	1	SD		
	5. Lasers	08	DP		5. Representation of mathematical equations	5	SN		
					6. Customization of fonts	1	SN		
					7. Writing tables	2	SN		
					8. Figures	1	SN		

PHS-A-CC-3-7-P	**Modern Physics (Practical)**	60	BC	PHS-A-3-SEC-A-1 PR	**Scientific Writing (Project/Practical)**		SD	Mid of November	Mid of December
	1. Measurement of Plank constant using LED.				1. Writing articles/ research papers/reports				
	2. Verification of Stefan's law of radiation by the measurement of voltage and current of a torch bulb glowing it beyond draper point.				2. Writing mathematical derivation				
	3. Determination of e/m of electrons by using bar magnet.				3. Writing Resume				
	4. To study the photoelectric effect: variation of photocurrent versus intensity and wavelength of light.				4. Writing any documentation of a practical done in laboratory with results, tables graphs.				
	5. To show the tunneling effect in tunnel diode using I-V characteristics.				5. Writing graphical analysis taking graphs plotted in gnuplot				

<table>
<tr><td colspan="11" align="center">PHYSICS (HONS.) 2023-24</td></tr>
<tr><td colspan="11" align="center">SEMESTER – IV(CBCS)
January'24 – June'24</td></tr>
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Paper	Core Course - 8	No of Lectu-res	Faculty	Paper	Core Course - 9	No of Lectu-res	Faculty	Mid Semester Exam.	Parent Teacher Meeting
PHS-A-CC-4-8-TH	**Mathematical Physics - III (Theory)**	60		PHS-A-CC-4-9-TH	**Analog Systems and Applications (Theory)**	60			
	1. Complex Analysis	20	SN		1. Circuits and Network	04	BC		
	2 Variational calculus in Physics	20	SN		2. Semiconductor Diodes and application	08	BC	Mid of April	First week of May
	3. Special theory of Relativity	20	SD		3. Bipolar Junction transistors and biasing	10	BC		
					4. Field Effect transistors	05	BC		
					5. Regulated power supply	03	BC		
					6. Amplifiers	05	BC		
					7. Feedback amplifiers and OPAMP	15	GDP		
					8. Multivibrator	05	GDP		
					9. Oscillators	05	GDP		
PHS-A-CC-4-8-P	**Mathematical Physics – III (Practical)**	60	SN + SD	PHSA-CC-4-9-P	**Analog Systems and Applications (Practical)**	60	BC + GDP		
	1. Exploring Gaussian Integrals and the delta function				1. To study the reverse characteristics of Zener diode and study the load and line regulation.			Mid of April	First week of May
	2. Solution of Differential Equation				2. To study the static characteristics of BJT in CE Configuration.				

	3. Special functions				3. To design and study the frequency response of the BJT amplifier in CE mode.				
	4. Solution of some basic PDEs				4. Construction of a series regulated power supply from an unregulated power supply.				
	5. Fourier Series				5. To study OPAMP: inverting amplifer, non inverting amplier, adder, substractor, comparator, Schmitt trigger, Integrator, differentiator, relaxation oscillator.				
					6. To design a Wien bridge oscillator for given frequency using an op-amp.				

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Paper	Core Course - 10	No of Lectu-res	Faculty	Paper	Skill Enhancement Courses – SEC-B (Technical Skill)	No of Lectu-res	Faculty	Mid Semester Exam.	Parent Teacher Meeting
PHS-A-CC-4-10-TH	**Quantum Mechanics (Theory)**	60		PHS-A-4-SEC-B-1-TH	**ARDUINO (Theory)**	15			
	1. Wavepacket description	05	DP		1. Introduction to Arduino	02	GDP		
	2. General discussion of bound states in an arbitrary potential	08	DP		2. Basic ideas	03	GDP	Mid of April	First week of May
	3. Quantum mechanics of simple harmonic oscillator	06	DP		3. Arduino Programming:	10	GDP		
	4. Quantum theory of hydrogen-like atoms	08	DP						
	5. Generalized Angular Momenta and Spin	10	SD						

	6. Spectra of Hydrogen atom and its fine structure	05	SD						
	7. Atoms in Electric & Magnetic Fields	08	SD						
	8. Many electron atoms	10	SD						
PHS-A-CC-4-10-P	**Quantum Mechanics (Practical)**	60	SN + DP	**PHS-A-4-SEC-B-1-PR**	**ARDUINO (Practical/Project)**		GDP		
	1. Finding eigenstates solving transcendental equation				1. LED Blinking and fading.				
	2. Use of shooting algorithm				2. Measurement of voltages (Below 5 V and above).				
	3. Time Evaluation of Wave Packet				3. Interfacing 7 Segment display.				
					4. Construction of thermometer using LM35 or Others.				
					5. Construct the experimental set up for studying simple pendulum and hence determine the acceleration's due to gravity.				
					6. Construct data logger for studying charging and discharging of RC circuit.				

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SEMESTER – V(CBCS)
July'23 – December'23

Paper	Core Course - 11	No of Lectures	Faculty	Paper	Core Course - 12	No of Lectures	Faculty	Mid Semester Exam.	Parent Teacher Meeting
PHS-A-CC-5-11-TH	**Electromagnetic Theory (Theory)**	60		PHS-A-CC-5-12-TH	**Statistical Mechanics (Theory)**	60		Mid of November	Mid of December
	1. Maxwell Equations	10	SN		1. Classical Statistical Mechanics	25	DP		
	2. EM Wave Propagation in Unbounded Media	20	SN		2. Classical Theory of Radiation	06	DP		
	3. EM Wave in Bounded Media	10	SN		3. Quantum Theory of Radiation	07	SD		
	4. Electromagnetic origin of Wave Optics	10	GDP		4. Bose-Einstein Statistics	12	SD		
	5. Polarization in uniaxial crystals		GDP		5. Fermi-Dirac Statistics	10	SD		
	6. Rotatory polarization.	10	GDP						
PHS-A-CC-5-11-P	**Electromagnetic Theory (Theory)**	60	BC + DP	PHSA-CC-5-12-P	**Statistical Mechanics (Theory)**	60	SD + SN	Mid of November	Mid of December
	1. To determine Brewster's angle for air-glass interface using a prism				1. Study of Random Numbers and Time series				
	2. To study Fresnels law by the reflection on the surface of a prism.				2. Applications of Random Numbers				
	3. To verify the Malus law using a pair of polaroids.				3. Scaling and plots, exponents and parameters				

	4. To study the specific rotation of opticlly active solution using polarimeter.								
	5. To determine dispersive power and resolving power of a plane diffraction grating.								
Paper	**Discipline Specific Elective Courses**	**No of Lectu-res**	**Faculty**	**Paper**	**Discipline Specific Elective Courses**	**No of Lectu-res**	**Faculty**	**Mid Semester Exam.**	**Parent Teacher Meeting**
PHS-A-5-DSE-A1(b)-TH	**Laser and Fiber Optics (Theory)**	75		**PHS-A-5-DSE-B1(a)-TH**	**Astronomy and Astrophysics - (Theory)**	75			
	1.Einstein coefficients and Rate equations	20	BC		1. Tools of Astronomy	15	SD		
	2. Basic properties of laser	04	BC		2. Stars and stellar systems	25	SD	Mid of November	Mid of December
	3. Resonantors	08	BC		3. Galaxies and the Universe	10	SD		
	4. Transient effect	05	BC		4. Cosmology	25	SN		
	5. Basic Laser Systems	07	BC						
	6. Practical properties and uses of laser	05	BC						
	7. Fiber optics	12	DP						
	8. Holography	04	DP						
	9. Introductory Nonlinear Optics	10	DP						
	Laser and Fiber Optics (Tutorial)	15	BC + DP		**Astronomy and Astrophysics - (Tutorial)**	15	SD + SN		

Paper	Discipline Specific Elective Courses	No of Lectu-res	Faculty	Paper	Discipline Specific Elective Courses	No of Lectu-res	Faculty	Mid Semester Exam.	Parent Teacher Meeting
PHS-A-5-DSE-B1(b)-TH	**Nuclear and Particle Physics - (Theory)**	75							
	1. Introduction	5	GDP						
	2. Nuclear Reactions	10	GDP						
	3. Interaction of Nuclear Radiation with matter	15	GDP						
	4. Detector for Nuclear Radiations	15	SN						
	5. Particle Accelerators	15	SN						
	6. Particle Physics	15	SN						
	Nuclear and Particle Physics - (Tutorial)	15	GDP + SN						

PHYSICS (HONS.) 2023-24									
SEMESTER – VI (CBCS) **January'24 – June'24**									
Paper	**Core Course - 13**	**No of Lectu-res**	**Faculty**	**Paper**	**Core Course - 14**	**No of Lectu-res**	**Faculty**	**Mid Semester Exam.**	**Parent Teacher Meeting**
PHS-A-CC-6-13-TH	**Digital Systems and Applications (Theory)**	60		PHS-A-CC-6-14-TH	**Solid State Physics (Theory)**	60		Mid of April	First week of May
	1. Integrated Circuits	05	BC		1. Crystal Structure	12	SD		
	2. Number systems	07	BC		2. Elementary Lattice Dynamics	10	SD		
	3. Digital Circuits	16	BC		3. Magnetic Properties of Matter	08	DP		
	4. Implementation of different circuits	06	BC		4. Dielectric Properties of Materials	08	DP		
	5. Data processing circuits	05	BC		5. Drude model	04	DP		
	6. Sequential Circuits	06	GDP		6. Elementary band theory	12	SN		
	7. Registers and Counters	06	GDP		7. Superconductivity	06	SN		
	8. Computer Organization	06	GDP						
	9. Data conversion	03	GDP						

PHS-A-CC-6-13-P	Digital Systems and Applications (Theory)	60	BC + GDP	PHS-A-CC-6-14-P	Solid State Physics (Practical)	60	DP + SN	Mid of April	First week of May
	1. To design OR & AND logic with diode and resistor. Basic logic gates with Transistors. To verify the logics by any type of universal gate NAND/NOR.				1. To study BH hysteresis of ferromagnetic material				
	2. Construction of half adder and full adder				2. To determine dielectric constant of different materials (solid and liquid) using fixed frequency alternating source.				
	3. Construction of SR, D, JK - FF circuits using NAND gates.				3. Measurement of variation of resistivity in a semiconductor and investigation of intrinsic band gap using linear four probe.				
	4. Construction of 4 bit shift registers (serial & parallel) using D type FF IC.				4. Measurement of hall voltage by four probe method				
	5. Construction of 4:1 multiplexure using basic gates and IC-74151				5. To study temperature coefficient of a semiconductor (NTC thermistor) and construction of temperature controller with comperator and relay switch.				
					6. Measurement of magnetic susceptibility of solids.				

Paper	Discipline Specific Elective Courses	No of Lectures	Faculty	Paper	Discipline Specific Elective Courses	No of Lectures	Faculty	Mid Semester Exam.	Parent Teacher Meeting
PHS-A-6-DSE-A2(a) - TH	**Nano Materials and Applications - (Theory)**	75		PHS-A-6-DSE-B2(a)-TH	**Communication Electronics - (Theory)**	75			
	1. Nanoscale Systems	10	GDP		1. Electronic communication	10	BC		
	2. Synthesis of Nanostructure Materials	15	GDP		2. Analog Modulation	15	BC		
	3. Characterization	10	GDP		3. Analog Pulse Modulation	10	BC	Mid of April	First week of May
	4. Optical Properties	15	SD		4. Digital Pulse Modulation	15	DP		
	5. Electron Transport	10	SD		5. Introduction to Communication and Navigation systems	25	DP		
	6. Applications	15	SD						
	Nano Materials and Applications - (Tutorial)	15	SD + GDP		**Communication Electronics - (Tutorial)**	15	BC + DP		

PHYSICS (MINOR) 2023-24									
SEMESTER – I (NEP) July'23 – December'23									
Paper	MINOR- 2	No of Lectures	Faculty	Paper	MINOR- 2	No of Lectures	Faculty	Mid Semester Exam.	Parent Teacher Meeting
MINOR -2-TH	**BASIC PHYSICS-II (Theory)**	**50**		MINOR-2-PR	**BASIC PHYSICS-II (Practical)**	**30**	DP	Mid of November	Mid of December
	(A) Mathematical Physics:	**20**							
	1. Preliminaries	5	SN		1. Measurement of the diameter of a wire using screw gauge a number of times and to determine the mean, median, mode & standard deviation for study of random error in observation				
	2. Ordinary Differential Equations	2	GDP						
	3. Vectors	7	DP		2. Measurement of a suitable vertical height using Sextant				
	4. Curvilinear coordinates	6	DP						
	(B) Classical Mechanics:	**30**			3. Determination of the Moment of Inertia of a metallic cylinder / rectangular rod about an axis passing through its centre of gravity				
	1. Review of Newton's Laws	6	BC						
	2. Work Kinetic Energy Theorem	4	BC		4. Determination of modulus of rigidity of the material of a suspension wire by dynamical method.				
	3. Dynamics of a system of particles	4	BC						
	4. Central force	8	SD		5. To determine the coefficient of viscosity of water by Poiseuille's method				
	5. Scattering	2	GDP						
	6. Mechanics of Continuum	6	GDP						

PHYSICS (MINOR) 2023-24									
SEMESTER – II (NEP) January'24 – June'24									
Paper	MINOR- 1	No of Lectu-res	Faculty	Paper	MINOR- 1	No of Lectu-res	Faculty	Mid Semester Exam.	Parent Teacher Meeting
MINOR-1-TH	BASIC PHYSICS-I (Theory)	50		MINOR-1-PR	BASIC PHYSICS-I I (Practical)	30	DP	Mid of November	Mid of December
	(A) Basic Electricity and Magnetism	22							
	1. Electrostatics	11	SN		1. Conversion of an ammeter to voltmeter and vice versa				
	2. Lorentz force	3	SD						
	3. Magnetostatics	8	SD		2. Determination of an unknown low resistance using Carey-Foster's Bridge				
	(B) Introduction to Thermodynamics	28			3. Measurement of current by potentiometer				
	1. Kinetic theory	3	BC						
	2. Zeroth and First Law of Thermodynamics	9	GDP		4. Measurement of pressure coefficient of expansion of air by Jolly's apparatus.				
	3. Second Law of Thermodynamics	10	DP						
	3. Entropy	6	BC		5. Measurement of coefficient of thermal expansion of a metallic rod by optical lever arrangement.				

	PHYSICS (GEN.) 2023-24							
	SEMESTER – III (CBCS) July'23 – December'23								
Paper	General/Elective Course - 3	No of Lectures	Faculty	Paper	General/Elective Course - 3	No of Lectures	Faculty	Mid Semester Exam.	Parent Teacher Meeting
PHS-G-CC-3-3TH (GE-3)	**Thermal Physics and Statistical Mechanics (Theory)**	60		PHS-G-CC-3-3P (GE-3)	**Thermal Physics and Statistical Mechanics (Practical)**	60	DP + SN	Mid of November	Mid of December
	1. Laws of Thermodynamics	18	SN		1. Determination of the coefficient of thermal expansion of a metallic rod using an optical lever				
	2. Thermodynamic Potentials	09	SD		**2.** Verication of Stefan's law using a torch bulb glowing beyond draper point.				
	3. Kinetic Theory of Gases	10	DP		**3.** To determine the Thermal Coefficient of a resistance using Carey- Foster bridge.				
	4. Theory of Radiation	08	DP		**4.** To determine the Coefficient of Thermal Conductivity of a bad conductor by Lee and Charlton's disc method.				
	5. Statistical Mechanics	15	DP		5. Determination of the Pressure coefficient of air using Jolly's apparatus.				

PHYSICS (GEN.) 2023-24									
SEMESTER – IV(CBCS) January'24 – June'24									
Paper	General/Elective Course - 4	No of Lectu-res	Faculty	Paper	General/Elective Course - 4	No of Lectu-res	Faculty	Mid Semester Exam.	Parent Teacher Meeting
PHS-G-CC-4-4TH (GE-4)	**Waves and Optics (Theory)**	60		**PHS-G-CC-4-4P (GE-4)**	**Waves and Optics (Practical)**	60	DP + SN	Mid of April	First week of May
	1. Acoustics	10	SD		1. Determination of the focal length of a concave lens by auxiliary lens method.				
	2. Superposition of vibrations	05	SD		2. Determination of the frequency of a tuning fork with the help of sonometer using n–l curve.				
	3. vibrations in string	08	SN		3. Determination of radius of curvature / wavelength of a monochromatic / quasi monochromatic light using Newton's ring.				
	4. Introduction to wave optics	02	SN						
	5. Interference	15	SN		4. Measurement of the thickness of a paper from a wedge shaped film.				
	6. Diffraction	10	DP						
	7. Polarization	10	DP		5. Measurement of specific rotation of active solution (e.g., sugar solution) using polarimeter.				