PHYSICS (HONS.) 2022-23									
SEMESTER – I (CBCS) July 22 – December 22									
Paper	**Core Course - 1**	**No of Lectu-res**	**Faculty**	**Paper**	**Core Course - 2**	**No of Lectu-res**	**Faculty**	**Internal Assessment by College**	**Parent Teacher Meeting**
PHS-A-CC-1-1TH	**Mathematical Physics – I (Theory)**	60		**PHS-A-CC-1-2TH**	**Mechanics (Theory)**	60			
	1. Calculus	20	GDP		1. Fundamentals of Dynamics	12	BC		
	2. Vector Algebra and Vector Calculus	25	DP		2. Work and Energy	8	BC	3rd week of November	1st week of December
	3. Matrices	15	SN		3. Gravitation and Central Force Motion	10	DP		
					4. Non-Inertial Systems	12	SD		
					5. Rotational Dynamics	12	SD		
					6. Fluid Motion	06	SD		
PHS-A-CC-1-1P	**Mathematical Physics - I (Practical)**	60	SN + SD	**PHS-A-CC-1-2P**	**Mechanics (Practical)**	60	BC + GDP		
	1. Introduction to plotting graphs with Gnuplot	09			1.Moment of Inertia & Modulus of Rigidity				
	2. Introduction to programming in python:				2. Moment of Inertia of a Flywheel			3rd week of November	1st week of December
	(a) Introduction	08			**3.** To determine the Young modulus, modulus of				

					rigidity and Poisson ratio of the material of a wire by Searle's Dynamic method.				
	(b) The python iterables data type	15			4. To determine the value of **g** using Bar Pendulum.				
	(c) Problems and applications	28			5. To determine the height of a building (or a suitable vertical height) using sextant.				
					6. Determination of Young's modulus of the material of a beam by the method of flexure.				

PHYSICS (HONS.) 2022-23									
SEMESTER – II(CBCS) January 23 – June 23									
Paper	**Core Course - 3**	**No of Lectu-res**	**Faculty**	**Paper**	**Core Course - 4**	**No of Lectu-res**	**Faculty**	**Internal Assessment by College**	**Parent Teacher Meeting**
PHS-A-CC-2-3-TH	**Electricity and Magnetism (Theory)**	60		**PHS-A-CC-2-4-TH**	**Waves and Optics (Theory)**	60			
	1. Dirac delta function and it's properties	03	SN		1. Oscillations	08	BC		
	2. Electrostatics	12	SN		2.Superposition of Harmonic oscillations	04	BC	3rd week of November	1st week of December
	3. Dielectric properties of matter	06	SN		3. Wave Motion	04	BC		
	4. Method of Images	04	SN		4. Superposition of Harmonic waves	09	BC		
	5. Electrostatic Energy	03	SN		5. Wave Optics	04	GDP		
	6. The Magnetostatic Field	10	SD		6. Interference	10	GDP		
	7. Magnetic properties of matter	07	SD		7. Interferometers	05	DP		
	8. Electro-magnetic induction	07	SD		8. Diffraction	16	DP		
	9. Electrical circuits	08	SD						

PHS-A-CC-2-3-P	**Electricity and Magnetism (Practical)**	60	SN + GDP	**PHS-A-CC-2-4-P**	**Waves and Optics (Practical)**	60	BC + SD	3rd week of November	1st week of December
	1. Introduction and Overview				1. To determine the frequency of an electric tuning fork by Melde's experiment and verify $\lambda^2 - T$ law.				
	2. Basics of scientific computing				2. To study the variation of refractive index of the Material of a prism with wavelengths and hence the Cauchy constants using mercury/helium source.				
	3. Errors and error Analysis				3. To determine wavelength of sodium light using Fresnel Biprism.				
	4. Introduction to plotting graphs with Gnuplot / QtiPlot (or some other GUI based free software like Grace, Origin etc.)				4. To determine wavelength of sodium light/radius of plano convex lens using Newton's Rings.				
	5. Introduction to programming in python:				5. To determine the thickness of a thin paper by measuring the width of the interference fringes produced by a wedge-shaped Film.				
	6. Programs				6. Measurement of the spacing between the adjacent slits in a grating by measuring sinθvs graph of a certain order of grating spectra.				

PHYSICS (HONS.) 2022-23									
SEMESTER – III (CBCS) July 22 – December 22									
Paper	**Core Course - 5**	**No of Lectu-res**	**Faculty**	**Paper**	**Core Course - 6**	**No of Lectu -res**	**Faculty**	**Internal Assessment by College**	**Parent Teacher Meeting**
PHS-A-CC-3-5-TH	**Mathematical Physics - II (Theory)**	60		**PHS-A-CC-3-6-TH**	**Thermal Physics (Theory)**	60			
	1. Fourier Series	10	SD		1. Introduction to Thermodynamics	25	GDP		
	2. Frobenius Method and Special Functions	20	SD		2. Thermodynamic Potentials	15	GDP	3rd week of November	1st week of December
	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		
	1. Introduction to numpy and scipy:-				1. Determination of the coefficient of thermal expansion of a metallic rod using an optical lever.			3rd week of November	1st week of December
	• 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**	**Internal Assessment by College**	**Parent Teacher Meeting**
PHS-A-CC-3-7-TH	**Modern Physics (Theory)**	60		**PHS-A-3-SEC-A-1 TH**	**Scientific Writing (Theory)**	15		3rd week of November	1st week 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		
	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			3rd week of November	1st week of December
	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				

PHYSICS (HONS.) 2022-23									
SEMESTER – IV(CBCS) January 23 – June 23									
Paper	**Core Course - 8**	**No of Lectu-res**	**Faculty**	**Paper**	**Core Course - 9**	**No of Lectu -res**	**Faculty**	**Internal Assessment by College**	**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		
	2Variational calculus in Physics	20	SN		2. Semiconductor Diodes and application	08	BC	3rd week of November	1st week of December
	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.				
	2. Solution of Differential Equation				2. To study the static characteristics of BJT in CE Configuration.			3rd week of November	1st week of December

	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**	**Internal Assessment (by College)**	**Parent Teacher Meeting**
PHS-A-CC-4-10-TH	**Quantum Mechanics (Theory)**	60		**PHS-A-4-SEC-B-1-TH**	**ARDUINO (Theory)**	15		3rd week of November	1st week of December
	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		
	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.				

PHYSICS (HONS.) 2022-23									
SEMESTER – V(CBCS) July 22 – December 22									
Paper	**Core Course - 11**	**No of Lectu-res**	**Faculty**	**Paper**	**Core Course - 12**	**No of Lectu-res**	**Faculty**	**Internal Assessment by College**	**Parent Teacher Meeting**
PHS-A-CC-5-11-TH	**Electromagnetic Theory (Theory)**	60		**PHS-A-CC-5-12-TH**	**Statistical Mechanics (Theory)**	60			
	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	3rd week of November	1st week of December
	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		
	1. To determine Brewster's angle for air-glass interface using a prism				1. Study of Random Numbers and Time series			3rd week of November	1st week of December
	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.								
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Paper	**Discipline Specific Elective Courses**	**No of Lectu-res**	**Faculty**	**Paper**	**Discipline Specific Elective Courses**	**No of Lectu-res**	**Faculty**	**Internal Assessment by College**	**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	3rd week of November	1st week 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	Internal Assessment by College	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.) 2022-23									
SEMESTER – VI (CBCS) January 23 – June 23									
Paper	**Core Course - 13**	**No of Lectu-res**	**Faculty**	**Paper**	**Core Course - 14**	**No of Lectu-res**	**Faculty**	**Internal Assessment by College**	**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			
	1. Integrated Circuits	05	BC		1. Crystal Structure	12	SD		
	2. Number systems	07	BC		2. Elementary Lattice Dynamics	10	SD	3rd week of November	1st week of December
	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		
	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			3rd week of November	1st week of December
	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 Lectu-res	Faculty	Paper	Discipline Specific Elective Courses	No of Lectu-res	Faculty	Internal Assessment by College	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	3rd week of November	1st week of December
	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 (GEN.) 2022-23									
SEMESTER – I (CBCS) July 22 – December 22									
Paper	**General/Elective Course - 1**	**No of Lectures**	**Faculty**	**Paper**	**General/Elective Course - 1**	**No of Lectures**	**Faculty**	**Internal Assessment (by College)**	**Parent Teacher Meeting**
PHS-G-CC-1-1TH (GE-1)	**Mechanics (Theory)**	60		**PHS-G-CC-1-1P (GE-1)**	**Mechanics (Practical)**	60	DP + BC	3rd week of November	1st week of December
	1. Mathematical Methods	15	DP		1. Determination of Moment of inertia of cylinder/ rectangular bar				
	2. Introduction to Newtonian Mechanics	05	BC		2. Determination of Y-Modulus of a metal bar by the method of flexure.				
	3. Rotational Motion	10	BC		3. Determination of Rigidity modulus of the material of a wire.				
	4. Central force and Gravitation	10	SD		4. Determination of Moment of Inertia of a flywheel.				
	5. Oscillations	09	SD		5. Determination of g using bar pendulum				
	6. Elasticity	06	GDP						
	7. Surface Tension	05	GDP						

PHYSICS (GEN.) 2022-23									
SEMESTER – II (CBCS) January 23 – June 23									
Paper	**GeneralElective Course - 2**	**No of Lectures**	**Faculty**	**Paper**	**GeneralElective Course - 2**	**No of Lectures**	**Faculty**	**Internal Assessment by College**	**Parent Teacher Meeting**
PHS-G-CC-2-2TH (GE-2)	**Electricity and Magnetism (Theory)**	60		**PHS-G-CC-2-2P (GE-2)**	**Electricity and Magnetism (Practical)**	60	BC + DP	3rd week of November	1st week of December
	1. Essential Vector Analysis	5	DP		1. Determination of unknown resistance by Carey Foster method.				
	2. Electrostatics	25	DP		2. Measurement of a current owing through a register using potentiometer.				
	3. Magnetism	15	SD		3. Determination of the horizontal components of earth's magnetic field.				
	4. Electro-magnetic induction	05	BC		4. Conversion of an ammeter to a voltmeter.				
	5. Electrodynamics	10	BC		5. Conversion of a voltmeter to an Ammeter.				

PHYSICS (GEN.) 2022-23									
SEMESTER – III (CBCS) July 22 – December 22									
Paper	**General/Elective Course - 3**	**No of Lectures**	**Faculty**	**Paper**	**General/Elective Course - 3**	**No of Lectures**	**Faculty**	**Internal Assessment (by College)**	**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	3rd week of November	1st week 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.) 2022-23									
SEMESTER – IV(CBCS) January 23 – June 23									
Paper	**General/Elective Course - 4**	**No of Lectu-res**	**Faculty**	**Paper**	**General/Elective Course - 4**	**No of Lectu-res**	**Faculty**	**Internal Assessment by College**	**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	3rd week of November	1st week of December
	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.				