PHYSICS (HONS.) 2019-20									
SEMESTER – I (revised syllabus) July 19 – December 19									
Paper	**Core Course - 1**	**No of Lectures**	**Faculty**	**Paper**	**Core Course - 2**	**No of Lectures**	**Faculty**	**Internal Assessment (by College)**	**Parent Teacher Meeting**
PHS-A-CC-1-1TH	**Mathematical Physics I**	60		**PHS-A-CC-1-2TH**	**Mechanics (Theory)**	60			
	1. Calculus	20	SDR		1. Fundamentals of Dynamics	12	BC		
	2. Vector Algebra and Vector Calculus	25	GDP		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	SD		
					4. Non-Inertial Systems	12	SN		
					5. Rotational Dynamics	12	SN		
					6. Fluid Motion	06	SD		
PHS-A-CC-1-1P	**Mathematical Physics - I (Practical)**	60	SN + SDR	**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.) 2019-20									
SEMESTER – II (revised syllabus) January 20 – June 20									
Paper	**Core Course - 3**	**No of Lectures**	**Faculty**	**Paper**	**Core Course - 4**	**No of Lectures**	**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		3^{rd} week of November	1^{st} week of December
	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		
	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	GDP		
	8. Electro-magnetic induction	07	SD		8. Diffraction	16	GDP		
	9. Electrical circuits	08	SD						
PHS-A-CC-2-3-P	**Electricity and Magnetism (Practical)**	60	SN	**PHS-A-CC-2-4-P**	**Waves and Optics (Practical)**	60	BC + GDP	3^{rd} week of November	1^{st} 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 sinθ vs graph of a certain order of grating spectra.				

PHYSICS (HONS.) 2019-20									
SEMESTER – III July 19 – December 19									
Paper	**Core Course - 5**	**No of Lectures**	**Faculty**	**Paper**	**Core Course - 6**	**No of Lectures**	**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		3rd week of November	1st week 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	SDR		
	3. Some Special Integrals	10	GDP		3. Kinetic Theory of Gases	15	BC		
	4. Variational calculus in physics	10	SN		4. Conduction of Heat	05	SDR		
	5. Partial Differential Equations	10	FK						
PHS-A-CC-3-5-P	**Mathematical Physics - II (Practical)**	60	SN + GDP	**PHS-A-CC-3-6-P**	**Thermal Physics (Practical)**	60	FK + GDP	3rd week of November	1st week of December
	1. Introduction to Numerical computation using numpy and scipy.				1. Verification of Stefan's law using a torch bulb.				
	2. Solution of Linear system of equations by Gauss elimination method and Gauss Seidel method.				2. Determination of the coefficient of thermal expansion of a metallic rod using an optical lever.				
	3. Diagonalization of matrices, Inverse of a matrix, Eigen vectors, eigen values problems				**3.** Calibration of a thermocouple by direct measurement of the thermo-emf using operational amplifier and the constants.				
	4. Generation of Special				4. Calibration of a				

	functions using User defined functions				thermocouple by direct measurement of the thermo-emf using potentiometer and the constants. [One end in ice and another end at water bath which to be heated.				
	5. Root nding: Bisection and Newton-Raphson method.				5. Calibration of thermocouple [one end at room temperature other end in the oil bath] and determination of boiling point of water.				
	6. Interpolation by Lagranges method.				6. To determine the Coefficient of Thermal Conductivity of a bad conductor by Lee and Charlton's disc method.				
	7. Numerical dierentiation - forward and backward dierence formulae.				7. To determine the Temperature Coefficient of Resistance by Platinum Resistance Thermometer (PRT).				
	8. Numerical integration - trapezoidal and simpsons rule.								
	9. Solution of ODE: First order Differential equation - Euler's method.								
	10. Basic 3D graph plotting.								

Paper	Core Course - 7	No of Lectures	Faculty	Paper	Skill Enhancement Courses – SEC-A	No of Lectures	Faculty	Internal Assessment (by College)	Parent Teacher Meeting
PHS-A-CC-3-7-TH	**Digital Systems and Applications (Theory)**	60		**PHS-A-SEC-A-TH**	**Electrical Circuits and Network Skills - (Theory)**	30			
	1. Integrated Circuits	05	BC		1. Basic Electricity Principles	3	SD		
	2. Digital Circuits	15	BC		2. Understanding Electrical Circuits	3	SD	3rd week of November	1st week of December
	3. Boolean algebra	05	FK		3. Electrical Drawing and Symbols	5	SD		
	4. Data processing circuits	05	SDR		4. Generators and Transformers	4	GDP		
	5. Circuits	05	SDR		5. Electric Motors	3	GDP		
	6. Sequential Circuits	05	SDR		6. Solid-State Devices	3	GDP		
	7. Timers	05	GDP		7. Electrical Protection	4	GDP		
	8. Shift registers	05	GDP		8. Electrical Wiring	5	GDP		
	9. Counters (4 bits)	05	GDP						
	10. Computer Organization	05	SN						
PHS-A-CC-3-7-P	**Digital Systems and Applications (Practical)**	60	BC						
	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.								
	2. Formation of different combinational problems by construction of Truth Table and								

	implementation using basic logic gates.								
	3. Construction of half adder and full adder								
	4. Construction of half subtractor, full subtractor, adder-subtractor using full adder IC								
	5. Construction of FF circuits using NAND gates.								
	6. Construction of 4 bit shift registers (serial & parallel) using D type FF IC.								
	7. Construction of astable multivibrator using 555 Timer.								

PHYSICS (HONS.) 2019-20									
SEMESTER – IV January 20 – June 20									
Paper	**Core Course - 8**	**No of Lectures**	**Faculty**	**Paper**	**Core Course - 9**	**No of Lectures**	**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**	**Elements of Modern Physics (Theory)**	60			
	1. Complex Analysis	15	SN		1. Unit 1	15	SD		
	2. Integrals Transforms	15	SN		2. Unit 2	15	SD		
	3. Introduction to probability Coordinates	10	SN		3. Unit 3	15	GDP	3rd week of November	1st week of December
	4. Special theory of Relativity	20	SD		4. Unit 4	15	GDP		
PHS-A-CC-4-8-P	**Mathematical Physics – III (Practical)**	60	SN	**PHSA-CC-4-9-P**	**Elements of Modern Physics (Practical)**	60	GDP + SD	3rd week of November	1st week of December
	1. Solution of ODE/PDE				1. Measurement of Plank constant using LED				
	2. Dirac-delta function				2. Determination of ionization potential of Mercury				
	3. Fourier series				**3.** Determination of e/m by using bar magnet.				
	4. Frobenius method and special functions.				4. To study the photoelectric effect: variation of photocurrent versus intensity and wavelength of light.				
	5. Evaluation of trigonometric functions e.g. sinθ. Given Bessel's function at N points find its value at an intermediate point.				5. To determine the wavelength of H-alpha emission line of Hydrogen atom				

	6. Complex analysis				6. To show the tunneling effect in tunnel diode using I-V characteristics.				
	7. Integral transform				7. To determine (1) wavelength and (2) angular spread of He-Ne laser/ solid state laser using plane diffraction grating.				
	8. Introduction to OCTAVE								

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Paper	**Core Course - 10**	**No of Lectures**	**Faculty**	**Paper**	**Skill Enhancement Courses – SEC-B**	**No of Lectures**	**Faculty**	**Internal Assessment (by College)**	**Parent Teacher Meeting**
PHS-A-CC-4-10-TH	**Analog Systems and Applications (Theory)**	60		**PHS-A-SEC-B-TH**	**Renewable Energy and Energy Harvesting - (Theory)**	30			
	1. Semiconductor Diodes	5	BC		1. Fossil fuels and Alternate Sources of energy	5	BC		
	2. General discussion of bound states in an arbitrary potential	10	BC		2. Solar energy	5	BC	3rd week of November	1st week of December
	3. Bipolar Junction transistors	10	BC		3. Wind Energy harvesting	4	BC		
	4. Field Effect transistors	10	BC		4. Ocean Energy	4	GDP		
	5.(a) to (c) Amplifiers	10	BC		5. Geothermal Energy	3	GDP		
	5.(d) to (g) Amplifiers	15	GDP		6. Hydro Energy	3	GDP		
					7. Piezoelectric Energy harvesting	3	GDP		
					8. Electromagnetic Energy Harvesting	3	GDP		

PHS-A-CC-4-10-P	**Analog Systems and Applications (Practical)**	60	BC						
	1. To study the reverse characteristics of Zener diode and study the load and line regulation.								
	2. To study the static characteristics of BJT in CE Conguration.								
	3. To designa CE transistor amplifier of a given gain (mid-gain) using voltage divider bias								
	4. To study the frequency response of the BJT amplfier in CE mode.								
	5. To study the static characteristics of FET.								
	6. To study OPAMP - inverting amplifier, non-inverting amplifier, adder, subs-tractor, comparator, integrator, differentiator.								
	7. To design a Wien bridge oscillator for given frequency using an op-amp								

.PHYSICS (HONS.) 2019-20 Second Year (1+1+1-System)									
Paper	**First Term July 19 – Oct 19**	**No of Lectures**	**Faculty**	**Second Term Nov 19 – Jan 20**	**No of Lectures**	**Faculty**	**Third Term Feb 20 - June 20**	**No of Lectures**	**Faculty**
III	**Unit-I**			**Unit-I**			**Unit-I**		
	1. Electronics II	10		**1. Electronics II**	13		**1. Electronics II**	07	
	i) Amplifier	05	BC	iii) OP-AMP	05	BC	v) Sequential logic	03	BC
	ii) Oscillators	05	BC	iv) Combinational logic	05	BC	vi) Communication principle	04	BC
				v) Sequential logic	03	BC			
	2. Electricity and Magnetism	11		**2. Electricity and Magnetism**	10		**2. Electricity and Magnetism**	09	
	i) Magnetic effect of steady current	11	SD	ii) Field and Magnetic material	10	SD	iii) Electromagnetic induction	09	SD
	Unit-II			**Unit-II**			**Unit-II**		
	1. Electrostatics	11		**1. Electrostatics**	14		**1. Electrostatics**	04	
	i) Units and dimensions	03	SDR	iii) Multipole expansion	07	SDR	v) Electrical image	04	SDR
	ii) Gauss' law	08	SDR	iv) Dielectrics	07	SDR			
	2. Wave and Optics	10		**2. Wave and Optics**	12		**2. Wave and Optics**	08	
	i) Interference of light waves	10	BC	ii) Diffraction of light waves	12	SD	iii) Polarization	08	SD
IVA	**Unit-I**			**Unit-I**			**Unit-I**		
	1. Quantum Mechanics I	10		**1. Quantum Mechanics I**	12		**1. Quantum Mechanics I**	08	
	i) Old quantum theory	06	GDP	iI) Basic quantum mechanics Compton effect	08	GDP	iii) Basic Postulates of QM (Cont.)	08	GDP
	ii) Basic quantum mechanics up to Double slit expt.	04	GDP	iIi)Basic Postulates of QM	04	GDP			
	2. Thermal Physics II	11		**2. Thermal Physics II**	13		**2. Thermal Physics II**	11	
	i) Basic concepts	03	SN	ii) 1st law of Thermodynamics part-II	03	SN	iv) Thermodynamic functions	05	SN
	ii) 1st law of Thermodynamics part-I	08	SN	iii) 2nd law of Thermodynamics	10	SN	v) Change of state	06	SN

PHYSICS (HONS.) 2019-20 Third Year (1+1+1-System)									
Paper	**First Term July 19 – Oct 19**	**No of Lectures**	**Faculty**	**Second Term Nov 19 – Jan 20**	**No of Lectures**	**Faculty**	**Third Term Feb - June 20**	**No of Lectures**	**Faculty**
V	**Unit-I**			**Unit-I**					
	1. Classical Mechanics II	16		**1. Classical Mechanics II**	14				
	i) Central Force Problem	09	FK	iii) Lagrangian and Hamiltonian formulation of Classical Mechanics	14	FK			
	ii) Mechanics of Ideal Fluid	07	FK						
	2. Special Theory of Relativity	16		**2. Special Theory of Relativity**	14				
	i) Introduction	04	SN	iii) Vectors and Tensors	08	SN			
	ii) Special Theory of Relativity	12	SN	iv) Invariant Intervals	06	SN			
	Unit-II			**Unit-II**					
	1. Quantum Mechanics II	18		**1. Quantum Mechanics II**	12				
	i) Time dependent and time independent Schrodinger Eqn.	05	GDP	iii) Schrodinger Eq. in Spherical polar co-ordinate	12	GDP			
	ii) Simple Application of Quantum Mechanics	13	GDP						
	2. Atomic Physics	20		**2. Atomic Physics**	10				
	i) Atomic Spectra	12	SD	iv) Molecular Spectroscopy	04	SD			
	ii) Vector atom model	05	SD	v) Laser Physics	06	SD			
	iii) Many electron model	03	SD						
Paper	**First Term July 19 – Oct 19**	**No of Lectures**	**Faculty**	**Second Term Nov 19 – Jan 20**	**No of Lectures**	**Faculty**	**Third Term Feb - June 20**	**No of Lectures**	**Faculty**
VI	**Unit-I**			**Unit-I**					
	1. Nuclear and Particle Physics I	30		**2. Nuclear and Particle Physics II**	30				
	i) Bulk properties of Nuclei	06	GDP	i) Nuclear reactions	05	SD			
	ii) Nuclear structure	10	GDP	ii) Nuclear fission and fusion	06	SD			
	iii) Unstable Nuclei			iii) Elementary particles					

	a) Alpha decay	04	GDP	a) Four basic interactions	04	SN			
	b) Beta decay	05	GDP	b) Classifications	05	SN			
	c) Gama decay	05	GDP	iv) Particle accelerator and detector	04	SN			
				v) Nuclear Astrophysics	06	SN			
	Unit-II			**Unit-II**					
	1. Solid State Physics I	30		**2. Solid State Physics II**	30				
	i) Crystal Structure	12	BC	i) Dielectric Property of materials	05	BC			
	ii) Structure of Solids	18	BC	ii) Magnetic properties of materials	12	BC			
				iii) Lattice Vibrations	07	BC			
				iv) Super conductivity	06	BC			
VIIA	**Unit-I**			**Unit-I**					
	1. Statistical Mechanics	16		**1. Statistical Mechanics**	14				
	i) Microstates and Macrostates	07	SN	iv) Quantum Statistical Mechanics	14	SN			
	ii) Classical Stat. Mach.	03	SN						
	iii) Motivations for Quantum Statistics	06	SN						
	2. Electromagnetic Theory	16		**2. Electromagnetic Theory**	14				
	i) Generalization of Ampere's law	09	SDR	iii) EM Waves in conducting medium	06	SDR			
	ii) EM Wave in an isotropic dielectric	07	SDR	iv) Dispersion	04	SDR			
				v)Scattering	04	SDR			

PHYSICS (GEN.) 2019-20									
SEMESTER – I (CBCS) July 19 – December 19									
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	SD + FK	3rd week of November	1st week of December
	1. Mathematical Methods	15	GDP		1.Moment of inertia of cylinder/bar				
	2. Laws of Motion	05	BC		2.Y- Modulus of a metal bar				
	3. Work and Energy	05	BC		3.Rigidity modulus of wire				
	4. Gravitation	10	BC		4. Moment of Inertia of a flywheel.				
	5. Oscillations	05	BC		5.g using bar pendulum				
	6. Rotational Motion	05	SD		6.The height of a building using sextant				
	7. Elasticity	05	SDR						
	8. Surface Tension	05	SDR						
	9. Viscosity	05	SDR						

PHYSICS (GEN.) 2019-20									
SEMESTER – II (CBCS) January 20 – June 20									
Paper	**General Elective Course - 2**	**No of Lectures**	**Faculty**	**Paper**	**General Elective 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 + SD + GDP	3rd week of November	1st week of December
	1. Essential Vector Analysis	5	GDP		1. Determination of unknown resistance by Carey Foster method.				
	2. Electrostatics	25	SN		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.				
					6. Verification of Thevenin & Norton theorem and superposition theorem.				

PHYSICS (GEN.) 2019-20									
SEMESTER – III (CBCS) July 19 – December 19									
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	GDP + SDR + SN	3rd week of November	1st week of December
	1. Laws of Thermodynamics	18	GDP		1. Determination of the coefficient of thermal expansion of a metallic rod using an optical lever				
	2. Thermodynamic Potentials	09	SDR		**2.** Verication of Stefan's law using a torch bulb.				
	3. Kinetic Theory of Gases	10	BC		**3.** Calibration of a thermocouple by direct measurement of the thermo-emf using operational amplifier and the constants				
	4. Gravitation	08	SDR		**4.** To determine the Coefficient of Thermal Conductivity of a bad conductor by Lee and Charlton's disc method.				
	5. Statistical Mechanics	15	SN		5. To determine the Temperature Coefficient of Resistance by Platinum Resistance Thermometer (PRT).				
					6. Determination of the Pressure coefficient of air using Jolly's apparatus.				

PHYSICS (GEN.) 2019-20									
SEMESTER – IV (CBCS) January 20 – June 20									
Paper	**General Elective Course - 4**	**No of Lectures**	**Faculty**	**Paper**	**General Elective Course - 4**	**No of Lectures**	**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	SN + GDP	3rd week of November	1st week of December
	1. Superposition of Two Collinear Harmonic oscillations	05	BC		1. Determination of the refractive index of material of a lens and that of a liquid using a convex lens and a plane mirror.				
	2. Superposition of Two Perpendicular Harmonic Oscillation	05	BC		2. Determination of the focal length of a concave lens by auxiliary lens method.				
	3. Wave Motion - General	05	BC		3. Determination of the frequency of a tuning fork with the help of sonometer using n–l curve.				
	4. Sound	05	BC						
	5. Wave Optics - General	05	SD		4. Determination of radius of curvature / wavelength of a monochromatic / quasi monochromatic light using Newtons ring.				
	6. Interference	05	SD						
	7. Michelson's Interferometer	05	SD		5. Measurement of the spacing between the adjacent slits in a grating by measuring sinθ vs λ graph of a certain order of grating spectra.				
	8. Diffraction	10	SD		6. Measurement of specific rotation of active solution (e.g., sugar solution) using polarimeter.				
	9. Polarization	10	SD						
	10. Transverse nature of light waves	05	SD						

PHYSICS (GENERAL) 2019-20 THIRD YEAR (1+1+1- System)									
Paper	**First Term July 19 – Oct 19**	**No of Lectures**	**Faculty**	**Second Term Nov 19 – Jan 20**	**No of Lectures**	**Faculty**	**Third Term Feb 20- April 20**	**No of Lectures**	**Faculty**
IVA TH	**Unit I: Pumps, Gauges and Engine**	10		**Unit II: Energy sources**	15				
	1. Production & measurement of high vacuum	5	SDR	1. Conventional energy sources	5	SDR			
	2. Engines	5	SDR	2. Non- Conventional energy sources	5	SDR			
	Unit III: Electronics	15		**Unit IV: Communications**	10				
	1. Feedback	5	FK	1. Propagation of Electromagnetic waves	3	FK			
	2. Digital electronics	5	FK	2. Transmission of Electromagnetic waves	4	FK			
	3. Instruments	5	FK	3. Transm^{n}. through media	3	FK			